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Supplier value creation configurations in high-cost countries

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Abstract

Purpose

This paper explores value creation configurations pursued by suppliers in high-cost countries. The proposed value creation configuration approaches are seen as means for supplier firms to strengthen their competitiveness when faced with increasing global sourcing.

Design/methodology/approach

Survey data on supplier firms in Denmark are used in a hierarchical cluster analysis. The identified clusters are interpreted as expressions of different value creation configurations pursued by suppliers with regards to relations with their most important customers.

Findings

Three types of suppliers are identified: (1) detached suppliers, which seek to create customer net benefits through low costs; (2) technology-focused suppliers, which design value creation around benefits linked to being at the technological forefront; and (3) integrated suppliers, which share characteristics with technology-focused suppliers, but also align closely with a relatively broader range of customer activities.

Research limitations/implications

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4 Limitations include the specificity of findings from one small, open economy with an extensive
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6 supplier base.
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10 Originality/value

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13 Studies of industrial competitiveness of high-cost countries tend to overlook suppliers'
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15 developments of value-creating activities to maintain customer relationships. The present paper
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17 takes a supplier perspective to deepen the empirically based understanding of value creation
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19 configurations followed by high-cost country suppliers in the context of increasing global
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21 competition and production relocation. Theoretical implications as well as lessons for managers in
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23 supplier firms from the identification of the different approaches to value creation configurations
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25 are presented.
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34 Keywords: Supplier taxonomy; buyer–supplier relationships; collaboration; value configuration
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39 Type: Research Paper
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INTRODUCTION

Manufacturing supply firms in high-cost countries face challenges as manufacturing activities in these countries decline. Looking back twenty years, suppliers frequently enjoyed being in the vicinity of their key customers' production activities (Andersen, 1999). Today, technological, political and economic factors have lowered costs and improved possibilities for global coordination of value chains. This has expanded the possibilities for sourcing in a wide range of low-cost countries (Holmström & Partanen, 2014), and, accordingly, contributed to a global shift in the centre of manufacturing (Quah, 2011). This trend was reinforced in the severe economic downturn of 2008–9, when focus increased on cost-cutting through outsourcing and offshoring.

Concerns about the impact of globalization upon the prospects of suppliers in high-cost countries has spurred research that either argues for suppliers' need to relocate to remain competitive or focuses on how to improve the framework conditions for suppliers through the means of industrial policy (e.g., Molnar et al., 2007; Rodwin & Sanzanami, 2017).

For most suppliers in high-cost countries, maintaining a competitive ability remains a serious challenge. Studies into the demise of the industrial competitiveness of high-cost countries tend to overlook suppliers' development of value-creating activities to maintain customer relationships (OECD, 2018). One way of investigating suppliers' activities is to study their configuration of value propositions. A value proposition describes the configuration of cost-reducing or benefit-enhancing activities that a supplier proposes to customers (Anderson et al., 2006). From the supplier perspective these activities constitute a value creation configuration.

With a few exceptions, empirically based knowledge is still sparse concerning how suppliers deal with the impact of production offshoring in high-cost countries. The existing studies indicate that

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4 interesting patterns of supplier value creation configurations may emerge from data (Ellram &
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6 Krause, 2014; Clark & Fujimoto, 1991). Accordingly, the present paper takes the supplier
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8 perspective, with the main purpose of deepening the empirically based understanding of the value
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10 creation configurations followed by high-cost country suppliers in the context of increasing global
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12 competition and production relocation. The analysis explores the following research question: *What*
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14 *are the strategies that suppliers in a high-cost country follow to build value creation configurations*
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16 *in the relationships with their most important customers?* Based on a survey of 980 supplier firms in
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18 Denmark and their activities toward their most important customers, a taxonomy of value creation
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20 configurations is presented.
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29 LITERATURE REVIEW

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32 Over the past decades, suppliers in low-cost countries have become increasingly involved in global
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34 value chains as a means to strengthen their competitiveness (Mudambi & Venzin, 2010). A
35
36 substantial proportion of mature industries in high-cost countries, such as the automotive and
37
38 machinery industries, have offshored substantial parts of their production activities and have
39
40 established supply chains in low-cost countries (Levine, 2012; Coucke & Sleuwagen, 2008). Also,
41
42 manufacturers in small European countries have increased their international sourcing activities,
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44 effectively downgrading or replacing relationships with their domestic suppliers (Slepinov &
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46 Wæhrens, 2008; Statistics Denmark, 2008).
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52 The strategic options and choices of high-cost country suppliers and their customers are mainly
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54 studied in the aggregate, for example from the value chain perspective (Frolich and Westbrook,
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56 2001). Consequently, there has been less emphasis on understanding how the increasing
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4 globalization of value chains impacts the positioning of suppliers from high-cost countries. Some
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6 might expect that such suppliers' only remaining option is to participate in a race to the bottom with
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8 suppliers in low-cost countries, effectively weeding out many firms from the high-cost countries.
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10 Entire industries face the danger of being hollowed out as manufacturers lose their local hinterland
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12 of capable suppliers, thus further losing competitive advantage to low-cost countries (Stehrer et al.,
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14 2012).
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19 High-cost country suppliers may pursue a variety of activities to maintain their value creating
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21 abilities for customers in the face of increasing globalization and production relocation, and may
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23 take on new activities in the increasingly complex global value chains (Ellram et al., 2007; Defever
24
25 et al., 2016). One approach to better understand the strategic endeavours of suppliers toward their
26
27 customers is to move from the aggregate perspective and focus on the configuration of value
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29 propositions in customer relationships (Ulaga & Eggert, 2006; Anderson et al., 2006; Ballantyne et
30
31 al., 2011). A value proposition can be defined as the difference between a statement of benefits
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33 offered to a customer and the price a customer will pay (Ballantyne et al., 2011). Basically, the
34
35 difference between any two value propositions reflects the perceived net difference in the sum of
36
37 benefits and costs incurred (Anderson & Narus, 2004). However, the creation of superior value
38
39 propositions for business customers is complex (Ford et al., 2006). A value proposition can be
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41 broken down to the activities carried out in the exchange relationship, and differences in value
42
43 propositions derive directly from differences in the configurations of activities to meet customers'
44
45 demands. Thus, the concept of a value proposition focuses on the net value seen by the customer,
46
47 whereas the value creation configuration represents the supplier perspective. For suppliers in high-
48
49 cost countries, the ability to configure, maintain and reconfigure value propositions to differentiate
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51 them from their rivals' is central to their survival. Building supplier resilience, capability and
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4 engagement can not only keep customers from relocating their activities, but can also trigger more
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6 reshoring and backshoring activities through enhancing the roles and responsibilities of domestic
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8 suppliers (Slepinov et al., 2014).
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11 Additional research is called for to reveal how value creation configurations relate to suppliers'
12
13 ability to maintain customer loyalty and relevance (Dietl et al., 2009). Although relationships may
14
15 be seen as either cost-efficient or benefit-oriented, buyers perceive benefits and costs differently,
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17 and changes in both benefits and costs may be influenced by or even occur as a consequence of
18
19 sustained exchange activities between partners (Thorelli, 1986; Jarillo, 1988). Cost reduction and
20
21 benefit enhancements may include mutual adaptations of resources and/or activities, knowledge
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23 or trust and other means that provide relational competitive advantages (Dyer & Singh, 1998; Kim
24
25 & Choi, 2015). For a supplier firm, creating valuable offerings calls for interaction, mutual adaptation
26
27 and commitment to adjust for the various forms of benefits and costs related to exchanges with
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29 buyer firms.
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36 Configuring a value proposition, however, also comes with choice. No supplier is equally good at
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38 providing all forms of value propositions. Each supplier must configure a viable set of activities that
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40 works across a set of customer relationships, where 'viable' means considered valuable by
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42 customers and also resource-coherent and profitable for the supplier. Too much individualization
43
44 of customer value propositions may lead to failing economies of scale and scope and ultimately to
45
46 business failure. Hence, as seen in other studies of market strategy, identifiable activity
47
48 configurations for combining activities and value propositions are expected to surface (Miles &
49
50 Snow, 1978; Day & Wensley, 1988). Several studies have addressed the strategic value of the supply
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52 network from the manufacturer's point of view (Dyer, 1996; Choi & Kim, 2008; see also Hesping &
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54 Schiele, 2015 for a recent overview). Other research has provided customer-centric typologies,
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4 grouping suppliers into various categories based on their strategic value, risk or power issues (Olsen
5 & Ellram, 1997; Petroni & Panciroli, 2002; Cox, 2015; Torres-Ruiz & Ravindran, 2018).
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9 Some contributions have focused on categorizing suppliers from the buyer's perspective or in
10 relation to the role carried out in a value-producing network, or have taken departure from pre-
11 selected theoretical perspectives (Clark & Fujimoto, 1991; Andersen & Christensen, 2005). For
12 instance, Kaufmann et al. (2000) offer a framework for supplier categorization comprising four types
13 of supplier strategic positions theoretically grounded along two dimensions: collaboration and
14 technology. The first type, commodity suppliers, have little technological skill and little interest in
15 collaborations. They propose standard products with little or no differentiation and compete in
16 areas such as cost-cutting and low price. The second type, collaboration specialists, develop close
17 collaborations with their customers and use standardized technologies (general assets and skills) to
18 make parts in ways that accord with customers' specifications and delivery schedules. These firms
19 develop enhanced collaborative techniques to fulfill their current customers' requirements and
20 anticipate their future needs, but as their products remain under their customers' detailed (design)
21 control, they employ few resources to innovate in product or process technology. The third type,
22 technology specialists, provide technology-based components but without engaging in collaborative
23 relations. The fourth type, problem-solving suppliers, provide high-tech solutions through intense
24 collaborations with their customers, and their work flows via small production batches, leveraging
25 their advantages of labor and process flexibility.
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50 An explorative approach towards developing a taxonomy of supplier roles in customer product
51 innovation activities in the food machinery industry is provided by Petroni & Panciroli (2002). They
52 pinpoint technological complexity as a major influencer of supplier roles and identify three types:
53 A-type suppliers, which manufacture and supply products of high complexity and interact with
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4 customers in the early stage of product development; B-type suppliers, which manufacture products
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6 of medium complexity, and typically adapt these to customer needs; and C-type suppliers, which
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8 provide standardized parts, requiring less specialized dialogue with customers. In a related research
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10 stream, although moving from suppliers to buyer-supplier relationships, Kim & Choi (2015) present
11
12 a relationship typology, which builds on but also extends the business relationship literature.
13
14 According to this, business relationships differ with respect to relational posture (collaborative or
15
16 adversarial) and relational intensity. Combining these dimensions reveal four types of buyer-
17
18 supplier relationships: transient relationships where there is little commitment or joint action; deep
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20 relationships, which are characterized by a mutual and highly integrated form of collaboration;
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22 sticky relationships, which suggest a power asymmetry in the relationship where the buyer is
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24 exploiting a supplier's dependence; and gracious relationships, where the buyer lacks control over
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26 the supplier but seeks access to a resourceful supplier.
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34 From the perspective of understanding the challenges faced by suppliers, the foregoing
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36 research contributions suffer from a number of issues. First, their perspective is on the supplier's
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38 output and how this contributes to various forms of value creation in the buying firm. Less focus is
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40 on the suppliers' choice of value configurations that makes this positioning possible, typically
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42 rendering suppliers a passive role in the relationship. The present work applies an empirical value
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44 creation configuration approach to explore which activities suppliers configure and which strategies
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46 suppliers in a high-cost country follow in order to create value propositions in the relationships with
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48 their most important customers.
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DATA AND RESEARCH DESIGN

The analysis of value creation configurations presented in the present work draws on evidence from a survey carried out on behalf of the authors by Statistics Denmark regarding suppliers' relations to their most important customers. The survey was carried out in 2014 among 980 firms from a total population of 4196 firms in Denmark, corresponding to a response rate of 23.4 percent. The survey data are supplemented with register data from Statistics Denmark on firm size, industry affiliation and economic performance. The register data are based on several official sources, such as firms' financial reports and VAT payments.

The survey covered firms with at least 10 employees in manufacturing industries, as well as a few selected business services industries that serve as suppliers to manufacturing. Table 1 provides an overview of the included industries. Non-response analysis revealed some response rate variation among individual industries, but the response rates for manufacturing and business services were almost identical at 23.3 and 23.5 percent respectively. Furthermore, there were no systematic differences in response rates between firms in high- and low-tech industries. The response rate decreased with increasing firm size, varying between 21 percent for firms with fewer than 250 employees, and 24 percent for firms with fewer than 50 employees. The response rate for firms with at least 250 employees was 16 percent, considerably lower than those of the other firm sizes. However, there are relatively few firms in this category in Denmark. In the descriptive statistics, all firms with 100 employees or more were joined in one category. In conclusion, with the exception of an underrepresentation of what is considered very large firms in Denmark, there are no signs of a considerable systematic non-response bias in the data.

Table 1: Industry and size distribution of firms included in the cluster analysis

Industry affiliation*	Number of firms
Low-tech manufacturing (NACE codes 10–14, 16–18, 31–33)	148
Medium–low-tech manufacturing (NACE codes 22–25)	180
Medium–high-tech manufacturing (NACE codes 20, 27–30)	129
High-tech manufacturing (NACE codes 21, 26)	32
Service industries (NACE codes 61, 71–72, 74.1)	168
Industry code missing	6
Size	
<20 full-time equivalent (FTE) employees	234
20–50 FTE employees	264
50–100 FTE employees	93
>100 FTE employees	72
Total	663

* NACE codes 15 and 19 were not represented because the corresponding firms accounted for only five firms in the population; each of these either did not answer the questionnaire or were excluded from the analysis because of item non-responses.

In the survey, CEOs or CTOs from the respondent supplier firms were asked to identify and rank their up till four most important customers. The questionnaire should only be answered for more than one customer if each additional customer firm represented a minimum 10 percent of the respondent firm's turnover.

To identify different types of customer value creation configurations followed by suppliers, a clustering of firms according to their value creation activities was carried out. Inspired by the supplier relationship categorization dimensions suggested by Kim & Choi (2015) and Petroni & Panciroli (2002), we have derived a set of activities and related these to integration, trust and commitment as three dimensions of buyer-supplier closeness (See Kim and Choi, 2015 for a similar approach). The three dimensions were operationalised into 24 statements regarding supplier firms' relations with their most important customers. These statements were derived from supplier relationship management literature including metrics for portfolio models, supplier collaboration

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4 metrics and supplier integration metrics. Statements were based on previous similar surveys
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6
7 conducted in Denmark (see Andersen and Christensen, 1998; Freytag et al., 2000). This was
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9 supplemented by international sources such as Krause (1999); Lamming (1993), Frohlich and
10
11 Westbrook (2001), Cao and Zhang (2010; 2011), Caridi et al. (2012), Kotabe et al. (2003), Lau et al.
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13 (2010), Ramanathan and Gunasekaran (2012), Von Corswant et al. (2003) and Wong et al. (2011)
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16 (See Table 2)
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Table 2: value configuration activities and relationship to previous operationalizations of integration, trust and commitment in buyer-supplier relationships

Dimension	Definition	Measured by/construct operationalization
Integration	Extensive supplier networks (Clark & Fujimoto, 1991)	Collaborates on the development of new products/services Provides advise on customer's technologies or materials Integrates technology from other suppliers to the customer.
	Linking pins in integrated problem solving (Clark & Fujimoto, 1991) commitment to joint training and development (Krause 1999; Petroni & Panciroli, 2002)	Exchanges/posts employees Establishes cross-organizational teams Carries out joint training/education
	Task based interdependencies leading to indirect/direct and aligned/unaligned relationships (Lamming 1993); proprietary supply, black box, controlled part (Clark & Fujimoto 1991), grey box supply (Lamming, 1993)	Supplies products /services according to the customer's specifications Supplies products/services produced according to technical specifications Specifies products/services for the customer Adapts standard products/services to the requirements of the customer Supplies standard products/services to the customer
	Synchronized capacity (Petroni & Panciroli, 2002)	Cooperates on the optimization of processes Functions as an extra production capacity Supplies products/services that are sold under the trademark of the customer
Trust	Perceived shared understanding of the relationship (Kim & Choi, 2015).	Makes adaptations to materials/intermediate goods supplied by the customer. Uses open calculations. Agrees on prices and conditions of delivery per order Engages in joint purchasing. Guarantees certification or other types of documentation or approval. Shares achieved cost reductions
Commitment	Relational stability over time and the extend of relationship specific investments and commitments (Petroni & Panciroli, 2002)	Enters into long-term contracts. Invests in customer specific technology, machinery or equipment.
	Joint activities beyond the regular exchange (Kim & Choi, 2015). Intention to maintain the relation even at the cost of short-term sacrifices (Kim & Choi, 2015)	Takes on product responsibility for components or systems that are integrated in the products/services of the customer. Engages in joint cooperation with approved technical service institutions or universities

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4 A workshop was held with peers representing three different research environments in Denmark
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7 to qualify the survey instrument. Before the survey was sent out, it was tested for appropriateness
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9 with targeted respondents. This test also ensured that respondents correctly understood the
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11 questions.
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14 In the survey, suppliers were asked to indicate the degree to which they engaged with their most
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16 important customers in each of the 24 activities expressed in the statements. The engagement was
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18 measured on a 4-point scale, ranging from “to a large extent” to “not at all” (see Table 3).
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20 Respondents could also reply “do not know,” but such answers were treated as non-responses in
21
22 the cluster analysis. Although Likert (1932) proposes a 5-point scale, a 4-point scale was chosen in
23
24 the current survey to avoid a possible “clustering” of answers around a neutral middle category.
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26 This is in accordance with Lozano et al. (2008), who find that the optimum number of response
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28 categories from a reliability validity point of view is between four and seven. The supplier firms’
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30 responses to the 24 statements were used as input into the cluster analysis which grouped firms
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32 according to their value creation activities.
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Table 3: Distribution of firms' answers to the question "To which degree do the following options apply to your most important customers?"

Please give an overall assessment of each statement for the customer(s) you have identified as the most important in the previous questions

	To a large degree	To some degree	To a small degree	Not at all	Don't know	N
1. Collaborates on the development of new products/services	49.0%	32.5%	12.3%	5.1%	1.2%	950
2. Exchanges/posts employees	4.2%	9.7%	15.6%	68.4%	2.2%	910
3. Establishes cross-organizational teams	7.7%	19.0%	26.2%	44.9%	2.2%	905
4. Carries out joint training/education	2.3%	7.2%	20.7%	68.0%	1.7%	898
5. Cooperates on the optimization of processes	13.7%	30.7%	26.1%	27.0%	2.4%	918
6. Supplies products/services produced according to technical specifications	54.1%	23.8%	10.7%	10.0%	1.5%	930
7. Guarantees certification or other types of documentation or approval	39.0%	26.2%	16.8%	15.6%	2.4%	921
8. Functions as an extra production capacity	9.9%	15.9%	18.4%	51.3%	4.4%	906
9. Makes adaptations to materials/intermediate goods supplied by the customer	7.6%	11.7%	17.4%	59.9%	3.3%	906
10. Supplies products/services that are sold under the trademark of the customer	25.0%	15.7%	9.1%	45.8%	4.5%	913
11. Uses open calculations	6.7%	17.8%	26.0%	42.6%	7.0%	911
12. Engages in joint cooperation with approved technical service institutions or universities	1.9%	3.9%	13.0%	74.1%	7.1%	905
13. Agrees on prices and conditions of delivery per order	32.5%	23.8%	19.3%	22.0%	2.4%	917
14. Shares achieved cost reductions	2.8%	18.2%	23.5%	50.1%	5.4%	906
15. Enters into long-term contracts	28.9%	35.6%	21.0%	12.9%	1.6%	924
16. Integrates technology from other suppliers to the customer	11.6%	25.0%	26.3%	33.3%	3.8%	915
17. Provides advice on customers' technologies or materials	26.5%	32.8%	23.9%	14.6%	2.1%	936
18. Engages in joint purchasing	2.0%	5.5%	17.2%	72.5%	2.9%	908
19. Invests in customer-specific technology, machinery or equipment	7.5%	20.8%	30.1%	38.9%	2.7%	918
20. Supplies products/services according to the customers' specifications	59.3%	25.2%	9.9%	4.6%	1.0%	937
21. Specifies products/services for the customer	35.6%	30.6%	20.7%	10.5%	2.6%	924
22. Adapts standard products/services to the requirements of the customer	34.9%	31.5%	17.8%	14.7%	1.2%	924
23. Supplies standard products/services to the customer	28.7%	30.2%	21.7%	18.1%	1.4%	924
24. Takes on product responsibility for components or systems that are integrated in the products/services of the customer	31.7%	24.2%	15.9%	23.7%	4.6%	921

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4 Due to item non-responses, the analysis was carried out on responses from 663 supplier firms.
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6 Relative to the total population, the item non-responses led to a slight underrepresentation of firms
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8 in services and a considerable underrepresentation of firms with fewer than 20 employees. Firms
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10 with 20–49 employees or 50–99 employees were overrepresented. Large firms were slightly
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12 underrepresented.
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20 Because several of the 24 variables generated from the statements listed in Table 3 were highly
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22 correlated, the analysis was carried out in two steps. First, a principal component analysis was
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24 carried out based on the polychoric correlation between the 24 variables. Polychoric correlation is
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26 preferred over e.g. Pearson correlation when working with ordinal data (Holgado-Tello et al., 2010).
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28 Based on a proportion criterion, five factors were retained. The factor loadings of the variables are
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30 available upon request. Second, factor scores from the principal component analysis were used as
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32 inputs in a hierarchical clustering analysis, which was carried out using Ward's method applying
33
34 Euclidian distance as the similarity measure. This method aims at minimizing within-cluster variation
35
36 (Govaert, 2009). Hierarchical clustering is an agglomerative approach in which each firm forms a
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38 cluster in the initial step and in subsequent steps the closest clusters are merged. The process ends
39
40 when all firms are grouped together in one cluster. Determination of the appropriate number of
41
42 clusters relies to a large extent upon the judgment of the researcher, since there are no exact tests
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44 that determine *the* best solution (Ketchen and Shook, 1996). In the present analysis, the incremental
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46 changes in agglomeration coefficients (which express the heterogeneity within clusters) between
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48 the numbers of clusters were applied in the process of determining the appropriate number of
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50 clusters. The larger the increase in agglomeration coefficient, the more dissimilar clusters have been
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52 merged (Ketchen and Shook, 1996).
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Table 4: Agglomeration coefficients used for determining the appropriate number of clusters

Number of clusters	Agglomeration coefficient	Difference in coefficients	Percentage change in coefficients between levels
10	1021.836	42.573	4.00%
9	1064.409	53.858	4.82%
8	1118.267	70.293	5.91%
7	1188.56	71.677	5.69%
6	1260.237	98.083	7.22%
5	1358.32	127.772	8.60%
4	1486.092	181.506	10.88%
3	1667.598	236.195	12.41%
2	1903.793	243.479	11.34%
1	2147.272		

Since there is no fixed rule regarding the how large a change in agglomeration coefficient should be in order to be considered too large, solutions around the threshold of a 10 percent change, i.e. 2-, 3- and 4-cluster solutions, were tested. The 2-cluster solution produced a very uneven distribution in which 82 percent of the firms ended up in one cluster. In the 3-cluster solution, this cluster was split into two clusters accounting for 46 and 36 percent of all firms, and in the 4-cluster solution the latter of these was further split into two clusters accounting for 22 and 14 percent of all firms (see Table 5). Based on these analyses, and considering pragmatic factors to ensure that (1) the number of clusters is manageable; (2) the individual clusters do not become too small; and (3) the results are interpretable and meaningful (Mooi and Sarstedt, 2011), the 3-cluster solution was chosen. Details on the 4-cluster solution are available upon request.

Table 5: Comparison of the chosen 3-cluster solution with the alternative 4- and 2-cluster solutions (cells show the number of firms in each cluster)

	3-cluster solution	4-cluster solution	2-cluster solution
Cluster 1	303	303	540
Cluster 2	237	146	

		91	
Cluster 3	123	123	123

A cluster analysis applying a non-hierarchical clustering method (*k*-means clustering) with three clusters was also performed in order to test the stability of the chosen solution; 65.2 percent of the firms were assigned to the same clusters by the *k*-means and Ward methods. That is to say, one third of the firms changed cluster affiliation when the *k*-means method was applied. It is not unexpected that changes would occur when different clustering methods are applied to the same data, even when the solution is adequate (Mooi and Sarstedt, 2011). However, the relatively large proportion of firms that changed cluster affiliation depending on the method used indicates that the boundaries between the clusters are blurred.

To provide contextual detail on how strategic logic unfolds in the different clusters, a company representing each cluster was interviewed as an illustrative case. Because the anonymity of respondent firms was guaranteed by Statistics Denmark, a pool of potential case firms was identified with the aid of business consultants and other specialists. The CEOs were presented with the survey's 24 statements and were asked to indicate the degree to which they engaged with their key customers. The three case firms were selected based on the fit of their answers with the profiles of each of the identified clusters. The CEOs of the case firms were interviewed using an interview protocol. The interviews were supplemented with other types of company-specific material. Each interview was transcribed into a short case and presented to the case firm's CEO to enhance inter-rater reliability and validity. The three case studies are presented below pseudonymously.

A TAXONOMY OF SUPPLIERS BASED ON VALUE CREATION CONFIGURATIONS

The identified clusters were interpreted as groups of suppliers following different types of value creation configurations. Based on the characteristics of the clusters illustrated in Table 6, they were labelled as cluster 1, 'technology-focused suppliers'; cluster 2, 'integrated suppliers'; and cluster 3, 'detached suppliers'.

It is apparent from Table 6 that there were similarities between the integrated and technology-focused suppliers. This is in accordance with the results from the cluster analysis; these two clusters were merged in the 2-cluster solution shown in Table 5. Both these supplier types engaged closely with customers. However, there was a decisive difference in the scope of activities provided. Most integrated suppliers pursued a value creation configuration by seeking to align as many types of activities as possible. Technology-focused suppliers, on the other hand, adapted fewer types of activities to their customers. The activities that the technology-focused suppliers adopted were mainly linked to the provision of technology inputs to their customers.¹

The third and smallest cluster, the detached suppliers, mainly provided standard offerings and were in general involved in few different types of activities with their customers.

The differences in value creation configurations followed were not reflected in any statistically significant differences in performance across clusters in terms of added value or growth in turnover. Thus, there is no basis for concluding that one configuration is preferable to another. However, as discussed below, the firms following different value creation configurations may face different types of strategic challenges.

Table 6. Overview of the three types of suppliers according to value creation configuration

	Technology-focused		Integrated		Detached	
	N = 303		N = 237		N = 123	
	To some/a large degree	Not at all	To a some/a large degree	Not at all	To some/a large degree	Not at all
1. Collaborates on the development of new products/services	83.2%	4.6%	89.9%	3.0%	61.8%	14.6%
2. Exchanges/posts employees	11.3%	76.6%	20.6%	56.5%	5.7%	83.7%
3. Establishes cross-organizational teams	20.1%	52.5%	38.4%	26.2%	19.4%	66.7%
4. Carries out joint training/education	4.7%	78.2%	12.2%	59.1%	11.4%	73.2%
5. Cooperates on the optimization of processes	41.2%	29.0%	57.4%	12.7%	18.7%	53.7%
6. Supplies products/services produced according to technical specifications	82.5%	7.3%	92.8%	2.1%	36.4%	41.5%
7. Guarantees certification or other types of documentation or approval	66.3%	14.9%	75.5%	8.0%	37.4%	41.5%
8. Functions as an extra production capacity	15.2%	66.3%	46.8%	30.0%	13.8%	74.8%
9. Makes adaptations to materials/intermediate goods supplied by the customer	9.5%	76.9%	32.5%	39.7%	7.3%	78.0%
10. Supplies products/services that are sold under the trademark of the customer	30.7%	63.0%	62.9%	28.3%	27.6%	59.3%
11. Uses open calculations	15.8%	58.4%	46.0%	22.8%	15.5%	56.9%
12. Engages in joint cooperation with approved technical service institutions or universities	3.3%	86.5%	7.5%	65.8%	5.7%	85.4%
13. Agrees on prices and conditions of delivery per order	66.7%	17.2%	57.8%	20.7%	36.5%	43.9%
14. Shares achieved cost reductions	11.6%	65.3%	43.9%	26.6%	8.1%	68.3%
15. Enters into long-term contracts	61.1%	17.8%	78.0%	3.8%	52.9%	20.3%
16. Integrates technology from other suppliers to the customer	36.7%	33.3%	48.1%	23.6%	8.9%	68.3%
17. Provides advice on customers' technologies or materials	67.3%	10.6%	69.6%	7.6%	26.0%	40.7%
18. Engages in joint purchasing	3.3%	87.1%	16.0%	47.7%	1.6%	88.6%
19. Invests in customer-specific technology, machinery or equipment	19.8%	49.5%	46.4%	20.7%	10.6%	66.7%
20. Supplies products/services according to the customers' specifications	93.8%	1.0%	96.7%	0.4%	41.5%	23.6%
21. Specifies products/services for the customer	85.1%	3.0%	61.6%	8.9%	26.9%	39.0%
22. Adapts standard products/services to the requirements of the customer	86.1%	3.0%	55.3%	25.7%	32.6%	30.9%
23. Supplies standard products/services to the customer	74.2%	7.9%	39.6%	30.4%	50.5%	26.0%
24. Takes on product responsibility for components or systems that are integrated in the products/services of the customer	61.1%	23.1%	63.7%	17.3%	33.3%	49.6%

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6 In the following section, each of the three types of supplier value configurations is described in
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8 more detail.
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10 11 12 13 Technology-focused suppliers

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15 Technology-focused suppliers were mainly found in services and medium–high-technology
16 manufacturing industries. Very small firms with fewer than 20 employees were overrepresented,
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18 whereas firms with more than 100 employees were underrepresented. The technology-focused
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20 suppliers were characterized by their collaboration with their main customers in the development
21
22 of new products or services. Typically, they also provided their customers with advice on materials,
23
24 and three out of four guaranteed certification or provided other types of documentation of products
25
26 or services. They tended to both produce according to technical specifications and to specify
27
28 products or services for customers, just as they customized standard products or services to the
29
30 needs of their main customers. The majority of technology-focused suppliers took on product
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32 responsibility for components or systems that were integrated into the customers' products or
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34 services. A majority of these suppliers entered into long-term contracts with their main customers,
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36 but at the same time, there was a widespread tendency to agree on prices and conditions of delivery
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38 per order. This apparent contradiction may reflect the practice of entering long-term framework
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40 contracts that do not specify prices or terms of delivery.
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50 Summing up, the specificity of the products and services supplied by a technology-focused
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52 supplier to its main customers is largely related to technology or technical specifications. A likely
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54 strategic priority for a technology-focused supplier is to maintain its position as a leading-edge
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56 technology partner to its customers. An important challenge for technology-focused suppliers is to
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4 continuously document their relevance as problem-solvers as their customers' technology-related
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6 problems change in scope and definition.
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13 *Technology Company: an example of a small technology-focused supplier*
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16 Technology Company (pseudonym) is a supplier of technology solutions for indoor and vehicular
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18 environmental solutions as well as refrigeration technology. Technology Company has changed
19
20 considerably over the years — from a traditional supplier of electronics and automation technology
21
22 to a highly specialized provider of technological solutions. Technology Company has managed to
23
24 quadruple its turnover and number of employees over a decade and has hired more engineers to
25
26 sharpen its technology focus. This growth trajectory has been achieved by refocusing on
27
28 technological development within a specialized field and by having outsourced a number of
29
30 manufacturing activities. This refocusing also meant that Technology Company stopped producing
31
32 standardized solutions and reduced its customer base to increase potential synergies across the
33
34 customer relationship portfolio. The main customers today are selected large manufacturers and
35
36 users of industrial equipment for transportation and storage, such as cargo firms, logistical
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38 companies and producers of containers, with the specific need for continuous technological
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40 development.
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48 Today, Technology Company contracts and develops tailored state-of-the-art technological
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50 solutions for customers. Most often, Technology Company is responsible for specifying
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52 technological solutions in dialogue with its customers. Furthermore, it provides advice to customers
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54 with respect to their choice of materials, etc. This is governed by development contracts whereby
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56 Technology Company grants customers exclusive rights to the products developed over a specified
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4 period and takes on the development risk and responsibility. Technology Company retains
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6 intellectual property rights over technologies and designs, and also reserves the right to modify and
7
8 develop the technological solutions for other customers.
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11 Close customer dialogue is critical for a technology-focused supplier like Technology Company.
12
13 As will be seen below, this is also the case for integrated suppliers. However, the organizational
14
15 modes of collaboration are different between integrated and technology-focused suppliers.
16
17 Technology Company is responsible for technological development, but knowledge about the use
18
19 context is a vital key to develop and deliver state-of-the art applications. Thus, in Technology
20
21 Company, customers are seen not only from a profit perspective, but also represent a valuable
22
23 context for learning and further technological advancement. Technology Company collaborates
24
25 closely with customers to get detailed access to context-specific information, to understand
26
27 customer specifications and how they are linked to the problems that users experience. In contrast
28
29 to the integrated supplier, who takes a broader perspective, Technology Company's dialogue with
30
31 customers revolves around technology applications, and there is a clear task specification and strict
32
33 division of work between buyers and suppliers, which is also enforced by the contractual
34
35 governance.
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43 For Technology Company, the main strategic challenge is balancing between being close to
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45 customer needs while at the same time being at the forefront of technology. Technology Company
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47 is thus looking for ways to engage with more customers to reap positive externalities from learning
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49 and applying solutions to a broader customer base.
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56 Integrated suppliers
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4 Integrated suppliers were mainly found in high-technology manufacturing industries, and large
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6 firms with more than 100 employees were overrepresented in this cluster. The integrated suppliers
7
8 collaborated with their main customers on a broad scope of activities, and thus their value creation
9
10 configurations can be perceived as extensions of the value creation configurations pursued by the
11
12 technology-focused suppliers. Nine out of ten integrated suppliers collaborated with their main
13
14 customers on the development of new products or services, and more than half collaborated with
15
16 their main customers on process optimization. Although open book accounting was not applied by
17
18 the majority of firms, the integrated suppliers were the most frequent users of open calculations
19
20 with their main customers, and they were also more likely than suppliers of the other types to share
21
22 cost reductions with their main customers; to integrate technology from other suppliers; and to
23
24 invest in customer-specific technology, machinery or equipment. However, more than half of the
25
26 integrated suppliers also adapted standard products or services to the requirements of customers,
27
28 and almost all integrated suppliers provided products or services according to customer
29
30 specifications. Furthermore, they often took on product responsibility for components or systems
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32 that were integrated into the products or services of the customer, and they often supplied products
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34 and services that were sold under the trademark or brand of the customer.
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44 Summing up, an integrated supplier is characterized by a high degree of customer specificity in
45
46 value creation configurations, where offerings are to a high degree specified by and customized for
47
48 the customers. An important challenge for suppliers of this type is to develop and further strengthen
49
50 relations with the main customers. This requires a continuous development of customer-specific
51
52 competences and resources, balanced with maintaining flexibility toward other customers to
53
54 prevent becoming locked into potentially captive relationships.
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59 *Solution Company: an example of an integrated supplier*
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4 Solution Company (pseudonym) specializes in construction and processing involving metal sheets
5
6 and tubes. This focus on relatively simple processes would typecast Solution Company for the role
7
8 of an endangered supplier. However, Solution Company has taken important measures to upgrade
9
10 their value proposition. Beyond providing simple manufacturing services, Solution Company also
11
12 provides customers with a one-stop service including R&D, manufacturing and parts of logistics
13
14 services, for example in the form of kitting tasks. Solution Company works as a provider of solutions
15
16 by helping its customers integrate technology from other suppliers, providing advice and helping
17
18 with product design choices such as those related to lowering the production costs of new products.
19
20 Solution Company actively seeks to be involved early on in customers' new product development
21
22 projects, but R&D involvement with customers usually increases gradually, along with the
23
24 development of trust resulting from repeat business. The focus on new customer products allows
25
26 Solution Company to take advantage of their manufacturing capabilities and to optimize design for
27
28 manufacturing, and new products are less likely to have the supplier drawbacks related to situations
29
30 where existing customer operations equipment is already in place. Although Solution Company
31
32 accepts less advanced manufacturing work as a stepping stone toward getting more advanced
33
34 orders like engineering work, they try to avoid situations where they serve merely as a production
35
36 buffer capacity for their customers.
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46 The scope of activities handled for customers entails close collaboration, and Solution Company
47
48 uses various tools to coordinate with customers. Open book accounting has mostly brought positive
49
50 experiences. If customers can source components more cheaply from other suppliers, they are
51
52 invited to do so. Although quality certifications are actively used to develop and improve the
53
54 processes in Solution Company, a bad experience with a customer has made Solution Company
55
56 reluctant to take on full product life responsibility. However, it readily takes responsibility for the
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4 production quality of its deliveries. Solution Company makes customer-specific investments in
5
6 increased inventory facilities and special equipment, but such investments are usually safeguarded
7
8
9 by having customers commit to long-term contracts.
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11 For Solution Company, the recipe for success as an integrated supplier entails early involvement
12
13 in customers' new product development activities. Solution Company finds it worthwhile to
14
15 collaborate closely and continuously with customers, but is selective and thorough in terms of which
16
17 tools it uses to improve the collaborations.
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20

21 Detached suppliers

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23 Detached suppliers were mainly found in services and low-tech manufacturing industries. Firms with
24
25 fewer than 50 employees were overrepresented in this cluster. The detached suppliers were mainly
26
27 characterized by what they do *not* do in relation to their main customers. Typically, they did not
28
29 collaborate with their main customers on organizational or employee-related areas such as by
30
31 exchanging employees or using cross-organizational teams. Furthermore, relatively low proportions
32
33 of detached suppliers made customer-specific investments, shared cost reductions with customers,
34
35 or engaged in joint purchasing with their main customers.
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41 Fifty percent of the detached suppliers provided standard products or services to their main
42
43 customers. A small majority of the detached suppliers entered into long-term contracts with their
44
45 customers. However, close to two-thirds of the detached suppliers also collaborated with their main
46
47 customers on the development of new products and services, making this a cross-cutting
48
49 characteristic for all three types of firms.
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53 In conclusion, a detached supplier is characterized by a relatively low degree of customer
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55 specificity in its behavior, both in terms of the character of the supplied products or services and in
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57 the actual mode of collaboration. Accordingly, an important priority for detached suppliers is to
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4 minimize costs and exploit economies of scale. For customers, they provide options for engaging
5
6 with suppliers without strong commitments or where the organizational interface is definable,
7
8 suggesting a clearly specified supplier task and division of work.
9
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11 12 13 14 *Steel Company: an example of a small detached supplier*

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16
17 Steel Company specializes in producing components and stainless steel profiles based on
18
19 customers' requests. It is part of a group of two companies and supplies about 20% of its production
20
21 to the other company. Steel Company has a customer base comprised of 50 significant customers,
22
23 with a modest rate of replacing existing customers with new ones. Steel Company has long-standing
24
25 relationships with 5 to 6 of its most important customers, but is not strongly connected to any in
26
27 terms of joint investments or other mutual commitments. Steel Company's ability to provide
28
29 flexibility and agility to any customer in its customer base, rather than being seen as specifically
30
31 dedicated to one customer, is a key strength that allows the firm to maintain its market flexibility
32
33 and ability to attract new customers.
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39 After a period with unpredictable turnover due to the economic crisis and changing sourcing
40
41 behaviors of customers, the turnover and number of employees in Steel Company has stabilized.
42
43 This stabilization is ascribed to two main events.
44
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46
47 First, as a consequence of the increased competitive pressure from suppliers in low-cost
48
49 countries starting 10–15 years ago, Steel Company invested in automating production. This allowed
50
51 the company to rely on a less specialized work force, which brought down costs and simultaneously
52
53 reduced dependency on the local availability of skilled workers. In addition, to serve the customer
54
55 base effectively, Steel Company nurtured an international network of specialized component
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4 seems to pivot around three identifiable value creation configurations, which reflect both
5
6 differences in customers' perceptions of valuable supplier inputs and corresponding differences in
7
8 suppliers' value-creation logic.
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11 This paper has developed a new taxonomy of supplier value creation configurations, based on
12
13 activities carried out with customers. The starting point of the value creation configuration approach
14
15 is the micro-level activities carried out by the suppliers to address their main customers. As this
16
17 approach shows, most if not all suppliers engage in some form of adaptation to their customers as
18
19 part of their value creation configuration. Compared to the typologies discussed in the literature
20
21 review, for instance, this shows that the distinct supplier ideal type proposed in typology
22
23 approaches — for instance the commodity supplier type proposed by Kaufmann et al. (2000),
24
25 theorized as seeking to minimize customer interactions and adaptations and focus on providing
26
27 standard commodity supplies — may be difficult to find in the current reality. The present
28
29 investigation suggests that categorial definitions are not necessarily adequately representing a real
30
31 difference between suppliers. The present results suggest that the differences between suppliers
32
33 are more muddled. There appear to be two main strategies that suppliers follow: a detaching and
34
35 an involving strategy. The latter is in fact a family of strategies that differ in degree and scope rather
36
37 than in kind. In these, adaptation to customer needs is a central part of the value creation
38
39 configurations followed. However, integrated and technology-focused suppliers differ with respect
40
41 to the activity scope of these adaptations.
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50 This study contributes to literature that addresses the nature and dynamics of production
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52 systems on the national and international levels. Offshoring and backshoring of production activities
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54 may also reflect that suppliers in general have been better at developing new value activity
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56 configurations, which may countervail the benefits of outsourcing. Research relating to both
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4 innovation systems and business systems seeks to improve the understanding of the underlying
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6 dynamics and logic that translate crude differences in production factor endowments into new
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8 competitive realities. Theoretical concepts such as the smile of value creation (Mudambi, 2007) seek
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10 to conceptualize the dynamics leading to new forms and ways to divide work in vertical production
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12 systems. The present work contributes to this research by emphasizing the role of suppliers in high-
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14 cost countries as active strategizers who try to offset the challenges of being cost leaders, rather
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16 than passive recipients of change.
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23 CONCLUSIONS

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27 Managers in supplier firms can draw several lessons from the taxonomy suggested herein. Much in
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29 line with the logic of value proposals, suppliers should think of value creation configurations as
30
31 viable positions based on different guiding principles, which links to different emphasis in terms of
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33 organizational skills. *Detached suppliers* have an overall focus on achieving economic efficiency —
34
35 both for their customers and for themselves. This may result in a strong focus on standardization
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37 with respect to market offerings, but particularly in reducing their customer involvement —
38
39 probably also as a way to avoid anything that may threaten their focus on efficiency. Organizations
40
41 following a cost-oriented logic typically develop skills with respect to operations management and
42
43 focus their development efforts on process re-design that support cost-out. *Technology-focused*
44
45 *suppliers, on the other hand* are concerned with their value-creating ability to both scout broadly
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47 for new technological solutions and to develop these for customers. They have a project-oriented
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49 approach to customer collaboration, seeking to embed value in their customers' products and
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51 processes through leading technologies. They must constantly look for ways to match customer
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53 needs with new technologies within a strictly defined scope, which calls for skills with respect to
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4 scouting for and utilizing new technologies. Finally, *integrated suppliers* seek to create a detailed
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6 understanding of specific customers' needs and adopt not only technologies but a wide range of
7
8 activities to improve their customers' value creation opportunities, in a strategic configuration that
9
10 builds on commitment and adaptation but is also challenged by overdependence on specific
11
12 customers. Besides also being at the technological forefront, organizational skills with respect to
13
14 managing and developing customer relationships is at the core for integrated suppliers.
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19 There are some limitations to the present study. First, the empirical context is Denmark — a small,
20
21 open economy with an extensive supplier base, which may have an impact on the transferability of
22
23 the present findings to other national contexts. Second, the research assesses value creation
24
25 configurations, but did not involve directly asking respondents about the strategic choices made.
26
27 The configurations are derived from the analysis, rather than from the interviews; although the
28
29 representative case studies have been applied as an illustration, they can never provide full insight
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31 into the variations possible. These issues call for further research.
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27 ⁱ In the 4-cluster solution, the integrated suppliers were split into two clusters, the main difference being whether
28 firms adapt and supply standard products to customers.
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