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Business suppliers' value creation potential A capability-based analysis☆

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Abstract

Joint value creation through partnering and networking is a topic of current interest. This paper proposes that the dimensions of the supplier's value creation in a supplier–customer relationship could be classified according to efficiency, effectiveness and network functions. These functions are interrelated, but they are conceptually distinct. The value creation process could be described as a spectrum ranging from core value, to added value, to future value. The value-producing potential of a supplier can be assessed reasonably well only in the case of the core value, where there is sufficient benchmarking information in the form of existing alternative offerings and solutions. A priori evaluation of the costs and benefits of added value and, especially, future value projects is problematic, because the realisation of the value is dependent on the development of multiple partners, technologies and industries. In these cases, we suggest that a customer could use a supplier's capability profile as an indicator of how suitable that particular supplier is for specific value creation projects. A framework connecting specific capabilities to different types of value production is suggested, and its managerial implications are discussed.

Keywords: Business networks; Joint value-creation; Relational capabilities; Supplier partnerships

1. Introduction

Traditional supplier–buyer relationships have changed dramatically during the past decade. Business firms are increasingly concentrating on their core competencies and are externalising traditionally important activities such as manufacturing, design and logistics. This externalisation of value activities is dependent on the creation of strong supplier partnerships in areas that have high strategic relevance for the customer firm and has primarily led to hierarchical supply chain networks comprising several tiers of suppliers. The management of these hierarchical supply systems covering industrial components and parts has been studied within both logistics, or supply chain management, and business marketing [12,13,20,39]. What is much less understood is the more complex partnering targeted at generating innovative products, services or system solutions through a joint value creation process. These projects are often future oriented, and there is no market for a priori assessment of the economic value of the inputs of any supplier. Moreover, the emerging network character of industries enhances the risks involved in this kind of strategic partnering, because the potential network effects of specific partners are difficult to anticipate (see Refs. [1,22]). In this article, we address the question of how to evaluate the value creation potential of a strategic supplier in a network context.

Both the buyer and the supplier often have to make substantial adaptations and commitment of resources in the development of partnering supplier relationships [9,22, 37,40]. These efforts reflect the investment character of partnership establishment. The strategic nature of key supplier relationships makes it essential for the buyer to be able to evaluate the value creation potential of available suppliers. This is a demanding task for a number of reasons. First, a particular supplier's value potential is often based on several organisational capabilities that are at least partly tacit and not easy to benchmark. Second, a significant part of a supplier's value is generally realised in the future and is thus dependent on the development of multiple partners, technologies and even industries. Third, as already mentioned, the value creation potential may be dependent on the network of other relationships that this supplier and the customer firm have. These network effects may be either functional, such as when a supplier provides the customer with access to other important actors, or dysfunctional, such

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as when the selection of a particular supplier leads to the loss of an important customer.

We address the problem of evaluating the value creation potential of a strategic supplier as follows: (1) by discussing the types of value that may be achieved through or with a supplier, (2) by identifying the factors that enable or impede value creation and (3) by proposing a conceptual framework for the assessment of a supplier's value creation potential. In essence, we argue that a customer could use a supplier's current capability profile as a proxy indicator of how suitable that particular supplier is for specific value creation projects. Our conceptual discussion is illustrated with business examples; managerial recommendations conclude the article.

2. Types of supplier value

2.1. The issue of value

The issue of supplier value could be seen as a "mirror problem" to that of analysing customer value, which has attracted considerable interest. At the operational level, it is a question of estimating the revenue received from a customer and the cost of serving that customer [38,41,43]. Beyond this simplistic view lies the problem of defining value. Value and perceived value have received considerable attention in literatures on such wide-ranging issues as pricing, consumer behaviour, business marketing and strategy (for good reviews, see Refs. [18,47]).

Some researchers in the field of business marketing define value primarily in monetary terms [3,6]. Others use broader definitions that include nonmonetary benefits and sacrifices, such as competitive gains, competencies, social relationships, knowledge, managerial time spent, etc. [8,19,36,47]. In their recent review of value, de Chernatory et al. [18] show that the prevalent view is to regard it as the perceived trade-off between the total benefits obtained and the total sacrifices incurred. The actual assessment of value is seen as a complex task due to the problems in identifying and measuring both the monetary and nonmonetary benefits and sacrifices. Moreover, perceived value and sacrifices are bound to vary between cultures, between customers, among customers and within the supplier–customer relationship.

2.2. Relational value: dimensions and realisation levels

A supplier provides value for its customers in several ways. In its simplest form, this value is reflected by the market price of the resources that can be transacted through competitive markets. When the value creation requires sustained joint efforts, the focus of this analysis, the value, is dependent on the characteristics of the particular supplier–customer relationship. Functions of business relationships have been basically classified into direct and indirect functions [2,10,14,20,23,44]. Direct functions describe the immediate cost-and-revenue effects of a supplier relationship for the customer. Indirect functions are more difficult to ascertain, because their impact is realised through linking of the supplier–customer dyad to other actors.

Two recent contributions may help us to understand the dimensions of value and value generation in a more refined fashion. Walter et al. [44,45] used the following direct- and indirect-value dichotomy for identifying the following value functions in a business relationship from the supplier's perspective:

Direct-value functions
- Profit function—refers to the relative direct revenue from a customer.
- Volume function—refers to the volume of business generated by a customer.
- Safeguard function—refers to the possibility of 'guaranteeing' a level of business and revenue through contractual arrangements with specific customers.

Indirect-value functions
- Innovation function—refers to the possibility of product and process innovation with a particular customer.
- Market function—refers to the possibility of accruing new customers/distributors through the reference impact of a particular customer.
- Scout function—refers to the market and other information that can be acquired from the working environment through a particular customer.
- Access function—refers to gaining access to relevant other actors in the working environment though a particular customer.

These functions are interrelated, and they are dynamic, meaning that the functional profile of a supplier–customer relationship evolves over time. The direct functions may be realised within a specific dyad, whereas the indirect functions rely on the linkages provided by the customer to a larger network environment. This dyad-versus-network aspect of value creation has been investigated by Ford et al. [21,22]. They propose that the influence of actions carried out in a relationship should be analysed on the following four levels.

The first level, the direct effects "in a relationship" refers to activities that can be realised without any—or with only minor—adaptations among the exchanging actors. For example, a customer's decision to concentrate the procurement of certain components on a specific producer generally reduces purchasing costs and may also involve a reduction in the need for incoming quality inspections. The producer may also achieve cost reductions in selling and negotiation costs and more predictable production runs. The key point is that "in-the-relationship" effects are relatively transparent and, as such, identifiable and often calculable in monetary terms. We

have called the value creation at Level 1 the "transaction value" to reflect its qualities of direct benefits and costs.

The second level comprises the generative effects on a relationship. These represent the impact of activities in which adaptation by the actors is a prerequisite. To continue the previous sole-sourcing example, actors may, after getting to know each other, make relationship-specific investments in order to exploit better their value creation potential. The supplier may suggest modifications to the components, and the companies may establish joint logistic and electronic data interchange systems. This development, as Ford and McDowell [22] point out, may be based on deliberate decisions and plans, or it could be the result of more organic and unconscious development. For example, ABB Power Technology Products aims to be the most efficient supplier in terms of cost and in saving the customer's time. They do this by fitting in to the customer's processes in the execution of the project. We have called the value creation at Level 2 the "generative value" to denote its basis in mutual learning and adaptation. The success of Walmart could be partly ascribed to this kind of systematic use of intensive supplier relationships. By leveraging its negotiation potential, Walmart compels suppliers to adapt to its efficient demand-pull system.

The third level concerns the effects on the relationship portfolio and refers to the impact of value activities on the portfolio of relationships of the supplier and/or customer. Just like the Level 2 effects, the portfolio effects may be direct or indirect, planned or unconscious. For example, by becoming engaged in a major cooperative venture with a specific supplier, a buyer may destroy its potential for developing customer relationships that compete with the said supplier. On the other hand, the cooperative venture may also have a positive reference effect on the new customers that are not competing with the cooperative partner. A pronounced commitment to one partner also signals potentially less commitment to other suppliers—an inevitable result in the world of scarce resources. If there is only a handful of suppliers capable of developing next-generation technological solutions, the decision with whom to partner is crucial. In the mobile phone business, for example, Motorola first produced and marketed many key components in-house, and the independent suppliers of these components regarded Motorola as both a competitor and a customer. This led to an ambivalent situation. Nokia, which did not have any in-house production, started to develop deep supplier partnerships and was able to outpace Motorola in several key components.

The fourth level, the effects on a network, refers to the influence of value activities on the wider network of the supplier/customer. An example provided by Ford and McDowell illustrates the point. If a buyer develops new technology with a particular supplier (Level 2 activity), this may become a new industry standard and be adopted throughout the network, thus providing positive revenues for the initiator. Similarly, a move by two major players to establish the kind of strategic alliance that is typical in the telecommunications and electronics industries may be emulated by other actors, thus leading to a major restructuring of the industry, as witnessed in the airline business.

A number of key points arise from the reflection of the above discussion from the perspective of assessing a supplier's value potential. First, the value dimensions proposed by Gemünden, Walter and Ritter could also be applied to a supplier. To make them more operational in supplier evaluation, we suggest that, whenever possible, the targeted value functions should be defined in terms of the costs and benefits involved. Second, the complexity of the impact of any major value development, as indicated by Ford et al., suggests that managers should define very carefully the type of value that they want from or with a specific supplier. Only direct-efficiency gains can be evaluated at the relationship level (Level 1). All developmental activities targeted on more effective product or production solutions are bound to have network-level effects (Levels 3 and 4) that influence their final profitability for the principal company. Finally, the complexity involved in assessing any major changes in supplier strategy is very high due to the number of contingencies and the relatively long time horizon influencing the realisation of the benefits and costs of the activity. From the point of managerial feasibility, this implies the use of approximation in supplier evaluation.

2.3. Supplier-value dimensions

We propose that the value that a supplier is able to provide for a business customer could be classified in efficiency and effectiveness dimensions [33] and a network dimension (see Fig. 1).

Efficiency refers to the efficacious use of current resources, in other words, getting more out the resources used. A gain in efficiency results in lower production or transaction costs. Increased efficiency can be achieved by fine-tuning the business processes of the supplier and customer, and the exchange processes linking them. Efficiency is the major underlying factor in Walter and Ritter's [44] direct-value functions: the Profit function, the Volume function and the Safeguard function.

A supplier that consistently offers a better price for a standard quality component operates more efficiently than its competitors, and it may also have a better supplier portfolio itself. This assumes that competing suppliers have equivalent capacity usage. A supplier with a large capacity and the capability of forecasting demand fluctuation scores highly on both the Volume and the Safeguard functions. Stora Enso Timber, the largest timber producer in Europe, is highly esteemed by its major construction-industry customers, because it has been able to provide materials during timber shortages. Similarly, Intel provides volume guarantees for specific processor

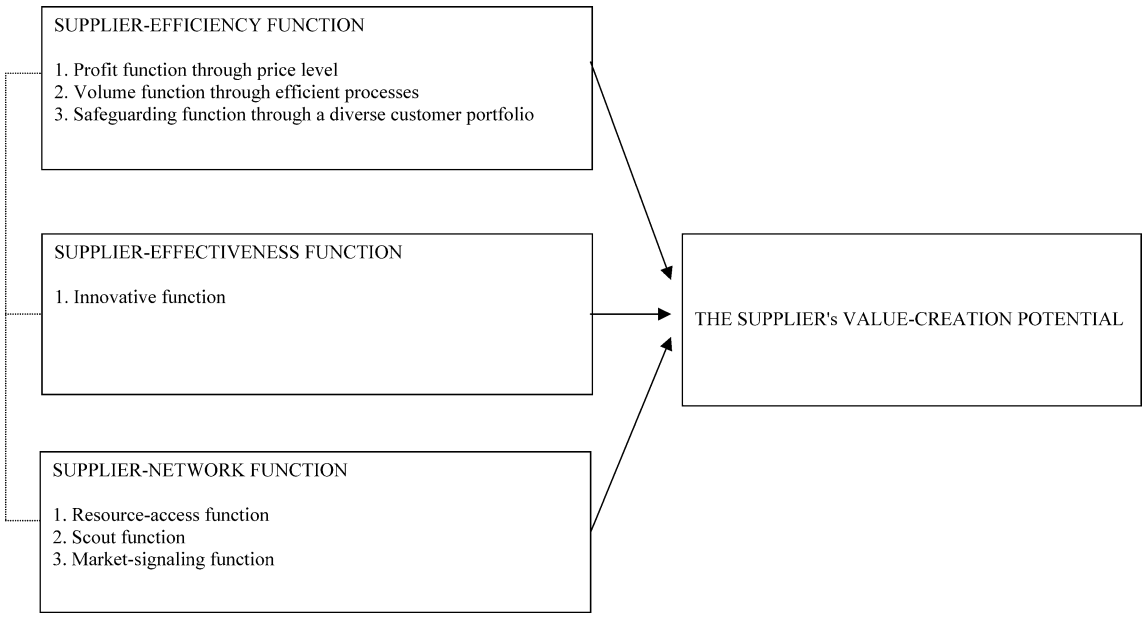

Fig. 1. Dimensions of supplier's value creation potential.

types to its major customers, a source of considerable value during high peak demand.

Efficiency value may be present in a supplier–customer relationship at the first level, that is, without any actor adaptations. By adjusting their operations (Level 2) in order to achieve a better match between their processes, the actors may often make considerable efficiency gains, as proven by numerous Just-in-Time production and logistic supplier nets in a variety of industries such as the automotive industry, electronics, clothing, sporting goods and furniture.

Effectiveness refers to an actor's ability to invent and produce solutions that provide more value to markets (customers) than existing offers. This creation of new resources is increasingly taking place through coproduction between firms and research institutions [11,42].

Through the Innovation function, a specific supplier or supplier–customer team can produce new product and process solutions that, if very successful, may form new industry standards. The Wireless Application Protocol in the mobile telecommunications industry is one example. More incremental gains in effectiveness are also very important in the current global climate of competition. If a supplier cannot keep up with the pace of developing next-generation solutions within a technological field—such as PC processors, Internet interface software and process automation—its major customers will lose their competitiveness, at least temporarily.

A single supplier may produce new effective solutions, although this is becoming rare due to the difficulties and costs involved in mastering the multiple technologies generally involved. The development of products and processes commonly takes place through joint action between the supplier and the customer in multifunctional teams. The implementation requires mutual adaptations (Level 2) that can affect the current supplier/customer portfolio (Level 3), and even the larger network (Level 4).

We have adopted the term Supplier Network Function to cover the rest of the indirect-value functions proposed by Walter et al. (see Fig. 1). The Resource Access function describes the network connections of a specific supplier, including its linkages to next-level suppliers, research and government agencies, and other customers. These linkages may provide customer access to actors who possess relevant resources for enhancing the customer's business processes. These could range from potential R&D partners, to channel actors, to actors with a gatekeeper position for specific markets. A supplier's network also provides some indications of its own general development potential.

The Scout function refers to market and other information that can be obtained from the working environment through a particular supplier. In an abstract sense, this dimension could be combined with the Resource Access function discussed above, because information falls into the more abstract category of resources. This comment is also valid for the Market-signalling function. When a supplier is highly esteemed, a relationship with it may have a positive reference or signalling effect that is realised through the wider network actors.

In our discussion, we have treated the three basic supplier-value functions independently. In reality, they are generally highly intertwined, as indicated by the left-hand dotted line in Fig. 1. For instance, the Network Access and Scout functions also support the supplier's capability to develop innovative solutions (Innovation function). It is clear that the potential value of a supplier is highly related to its various capabilities. This notion

forms the backbone of our discussion of the evaluation of the supplier's value potential.

3. Evaluation of the supplier's value creation potential

Following on from the previous discussion, we propose that a supplier's value creation potential can, in theory, be evaluated by identifying the level of various functional values and the costs of achieving them. This is basically the same as regarding perceived value as the difference between the total benefits received and the total sacrifice incurred. The question that remains is how to do it.

3.1. About production costs, transaction costs and supplier risk

Jarillo [26], drawing on transaction cost economics and strategic literature, suggested that any major supplier–customer decisions could be treated as a make-or-buy dilemma. It is a question of evaluating the production costs and transaction costs involved in using an outside supplier against the internal costs of the potential customer. Although this simplifies the situation considerably, it provides a solid starting point.

It may be assumed that a company specialising in specific components or services could become a more efficient producer than a potential buyer who is focusing on his or her own intermediate or end products. This makes the transaction costs of the components crucial, especially if the current production costs are reasonably transparent. The transaction costs may be divided into two components, operational transaction costs and strategic transaction costs. Operational transaction costs comprise the costs of all the activities that are necessary (1) for establishing the supplier–buyer relationship (such as information collection about the supplier candidate, negotiating and drawing up the contract, and establishing delivery procedures) and (2) for running the relationship (such as logistics and quality inspections). Although these costs may be difficult to evaluate, it should not be impossible to make a reasonable approximation.

Strategic transaction costs involve two major elements: (1) the risk that the supplier will loose its competitiveness as a producer of the product or service in question and (2) the risk that the supplier will behave opportunistically if the buyer becomes dependent on it. Let us call the first element functional risk. It is enhanced if the technological development is highly turbulent (increasing the probability of the supplier's R&D insufficiency), if there are no alternative suppliers (potential others may be engaged with our competitors) and if the component is very important for the buyer's business (an approximation of the financial stake involved). The risk of opportunistic behaviour is accentuated if the buyer is not an important customer of the supplier in terms of volume, reference value, or technological learning (a "lead customer"). In sum, the risks related to strategic suppliers complicate the evaluation of a supplier's value creation potential even further.

3.2. Understanding supplier value creation—a value spectrum

We would like to suggest that it is useful to describe value production through a continuum expressing simultaneously the level of complexity involved and the time horizon of value realisation (see Fig. 2). Our relational value spectrum is based on the work of Ford et al. discussed above and on the emerging notions about the relative interactional intensity of business relationships (see Refs. [7,17,29,30,46]).

On the left end of the spectrum, value production does not need any major adaptation by the actors, or the creation of new resources. The production of this kind of value—labelled here "core value"—aims at maximum efficiency in terms of current resources and process technology. Consequently, the focal products and services offered by a particular supplier have reasonably close substitutes offered by competing suppliers, in other words, there is at least some kind of market for the core value production.

In the terminology of social exchange theory, this means that the customer has a relatively accurate market-based comparison level (CL) for the offering, as well as an experience-based idea (comparison level of alternatives, CLalt) of the potential gains and their relative costs [4,5]. In other words, the relative benefits and costs of alternative supply arrangements may be adequately assessed within an acceptable risk range. This does not mean that these supplier relationships are not relevant. In fact, most of the important

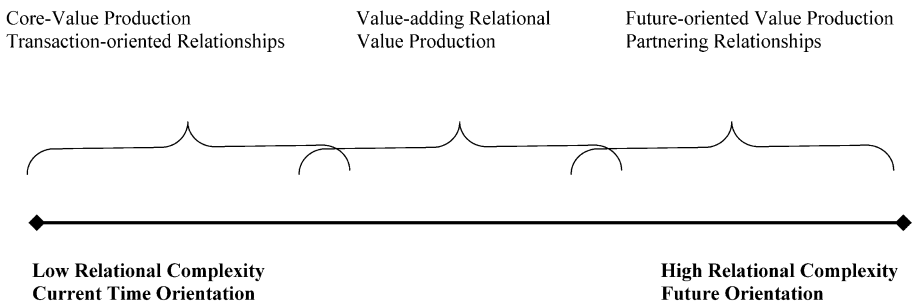

Fig. 2. The relational value spectrum.

efficiency gains such as the Profit, Volume and Safeguard functions are realisable within this range of the value-production spectrum.

The middle range of the spectrum describes value-adding relational value production. Why do we use such "consultant-speak" as value adding? We think that it describes well the differences between this mode of value production and the core value part of the spectrum discussed above (see Ref. [18] for a summary of the "value-added" discussion). The key idea is that through mutual investments and adaptations, a supplier and a customer can create new product and process solutions that are more effective than the ones that exist in the field, or that improve the efficiency of the supplier–buyer relationship. As such, this relation-specific development creates new "added" value in terms of the available solutions.

For example, if a supplier is able to adapt to the processes of a customer and even to improve them, the operation costs of the relationship will be reduced. Customer effectiveness may be improved through product customisation, by offering total solutions or by introducing new product features. Many raw material producers such as Stora Enso Pulp have even started to provide added value to key customers through product customisation. Pulp that specifically matches a customer's production process can increase the production efficiency of a paper mill.

When the added value offered by a supplier is more novel, there are no established comparison levels or clear alternatives to facilitate the initial evaluation of the supplier's potential, as in the core value case. This uncertainty concerns the assessment of both the cost and benefit sides of the Innovation function in a supplier relationship. The difficulty of assessment depends on several things, including the level of radicalness of the solution, which, in turn, influences how close the available comparisons are, whether important resource inputs are needed from third parties and how open and trusting the relationship is. Most value-adding value production nevertheless takes place in an incremental fashion in relatively established relationships, which enables the actors to form reasonable estimates of their functional and economic value. The more transparent these incremental innovations are the sooner they will be imitated and transformed into expected core values.

The far right side of the spectrum deals with radical innovations that are realised in the future, the value of which depends on many networked actors. The value of this kind of solution is very difficult to assess in advance with any accuracy, since it depends on the evolution of the field in question, or several fields, and on society. Any major radical innovation, such as the combustion engine, the transistor, the microprocessor and the Internet, validates this notion. The uncertainty related to the market value of emerging wireless Internet services provided by third-generation mobile phones is a current example. The high risk associated with the future value production is partly compensated by the potentially huge revenues to be accrued. This challenge makes any proxies that enable managers to make better "guestimates" of future value production projects invaluable.

To summarise, only the production of core value can be sufficiently estimated in terms of costs and benefits. The more we move from the left to the right, the more problematic the evaluation of the suppliers' value-production potential becomes. This kind of evaluation depends on several factors. These include the radicalness of the targeted or potential innovations, whether the innovation fits the existing systems or needs auxiliary system innovations, whether it can be mastered and distributed by a few actors or if it requires wider networks, and how trusting the relationships between the key actors are.

3.3. Evaluation of the supplier's value creation potential—a capability-based approach

The a priori assessment of the value of this type of supplier-driven innovation, the success of which is conditioned by multiple factors that change in character over time, has proven very problematic. We argue that a feasible alternative is to examine the supplier's existing organisational capabilities. These capabilities, as recognised in the resource-based theory of the firm [15,32,35,48], form the basis on which all the current and future value activities of a firm must rely. Fig. 3 suggests how capabilities are linked to relational value production.

The capabilities needed in value production are presented in an approximate order of ascending complexity. By this, we do not mean to imply that the capabilities at the left-hand end of the spectrum are less important. On the contrary, being able to produce core value is generally a necessary condition for achieving incremental innovations, and these provide the platform for more radical innovations. In the same vein, being able to manage one business relationship well is a necessary learning step towards being able to work in a net of complex relationships. Another point is that, although the capabilities are presented in a row, generally, a set of them is required to produce any type of value. Broadly speaking, the more capabilities that are needed, the more ambitious and innovative the value production in question is. A small supplier, for example, may make a major technological innovation but is able to generate only one application to fit the process of its core client. A supplier with a more broad knowledge of different types of processes could come up with more applications matching the requirements of different technologies. Similarly, a supplier may have a highly competitive production capability but may lack the relational capability needed for building systems that serve many customers in a flexible manner.

Our value-production framework and discussion emphasises the role of the supplier. Obviously, the production of value in a relationship is dependent on the capabilities and

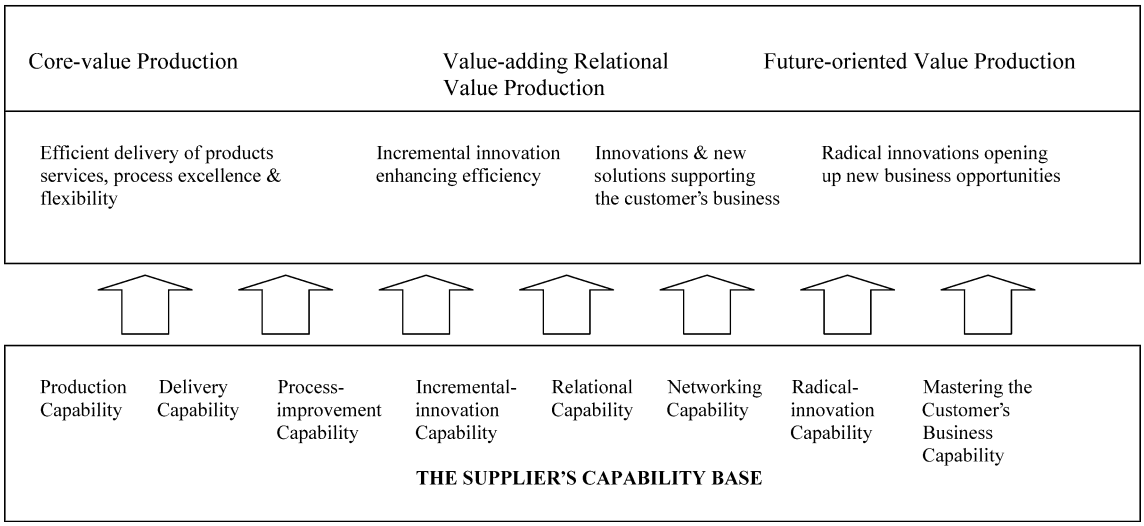

Fig. 3. Capability base and value production.

orientation of both parties. There is space here for only a few relevant comments on this much-studied topic (for a more general discussion on the dynamics of buyer–seller relationships, see Refs. [24,25,28,31]). It has been shown that managerial orientation is a decisive factor in developing the supplier–customer relationship from the basic transactional production of core value towards the higher-value levels demanding a relational, and at the far right a partnering, orientation to value coproduction [9]. The more complex and novel the technologies are, the greater the need for

Table 1
Indicators of the supplier's value-production capabilities

Capability type	Example indicators
Production capability	Documented process records (capacity, speed, flexibility, quality)
	Production facilities—technical specifications, certifications
	Qualifications of workforce; history of labour relations
Delivery capability	Documented process records (accurate deliveries and documentation in terms schedules, volumes and quality)
	Flexibility in emergency cases
Process improvement capacity	Record of stepwise improvements in production and delivery capability
	Record of continuous cost reductions in the core processes
Incremental innovation capability	Record of product improvements (better functionality, lower costs or both)
	Record of production process and delivery process innovations (the influence of functionality and costs on these innovations)
Relational capability	Working key-account management
	Qualified technological support personnel
	Committed personnel with team-working skills
	Ability to view things from the customer's perspective
	Organisation-wide relational orientation
	Sharing of proprietary information
	Making propositions enhancing the customer's business processes
	Information systems integration
Networking capability	Organisation-wide network player orientation—key personnel share and support the achievement of joint goals
	Mobilisation and maintenance of multilevel and multifunctional contacts between several actors
	Working communications system supporting the maintenance of network relationships
Radical innovation capability	Record of R&D achievements (patents, other IPRs, major product or process innovations)
	Number of technologies mastered, number of familiar application fields
	Qualifications and track record of key scientific/technical personnel
	Relations with core research institutions and other relevant actors (organisations, expert individuals)
Capability of mastering the customer's business	Track record of understanding the business logic of the customer (production process, logistic process, customer types and their needs, competitive situation)
	Track record of proposing major suggestions leading to business improvements or new business concepts
	Capability of offering "externalisation" of some key business processes or complete business (e.g., manufacturing, design and distribution)

partnering orientation and the matching of working cultures in terms of producing future value [11].

Actors must also have complementary technological capabilities. If their capability profiles are too similar, they have fewer opportunities for new knowledge creation than if their profiles are more specialised. On the other hand, they must have sufficient ''common ground'', or joint knowledge, that facilitates mutual learning processes. Companies with widely different technologies and business systems have great difficulties in trying to coproduce value. When the value production requires a combination of knowledge and capabilities that have been appropriated by several actors, it has been found to result in nets of collaborating firms, as Powell et al. [34] noticed in the field of commercial biotechnology.

We have discussed the capabilities required for producing value in fairly general terms. In order to be managerially useful, the proposed capability approach needs to be operationalised. In other words, clear indicators for each supplier capability that is considered essential in producing the targeted value should be derived. These indicators are probably often contextual, or dependent on the types of industry and technology in question. However, the work of Day [15–17] suggests that even general capability indicators are useful in directing our attention towards less recognised skills in value production. In the future, managers would benefit from having more concrete indicators that should be identified by persons with experience in the field. In order to give the reader an idea of some potential indicators, a set of examples is given in Table 1 (see also Ref. [17]).

Indicators measuring the process and innovation capabilities of a supplier could be used to evaluate the value-added and the future value-production potential, as well as the functional risk incorporated in these kinds of major R&D projects. Relational capability and networking capability indicators also provide proxies for estimating the potential for opportunistic behaviour in the supplier. These are fairly general notions, obviously. More research is needed to establish a validated set of capability indicators.

4. Managerial implications

The managerial applications of this paper could be expressed through the following notions and propositions. We suggest that the value creation of a supplier within a supplier–customer relationship can be examined through efficiency, effectiveness and network functions. These functions are interrelated, but they are conceptually distinct. This value creation should be analysed further through the proposed spectrum that ranges from core value, to added value, to future value. The value-producing potential of a supplier can be assessed reasonably well only in the case of its core value where there is sufficient benchmarking information in the form of existing alternative offerings and solutions.

A priori evaluation of the costs and benefits of added value, especially in terms of future value projects, poses a severe problem, since the realisation of value may be dependent on the development of multiple partners, technologies and other network relationships. In these cases, we suggest that a customer could use the supplier's capability profile as an indicator of how suitable a particular supplier is for specific value creation projects. A framework connecting specific capabilities to different types of value production is offered.

We contend that our proposed value creation dimensions and framework combining the value spectrum and supplier capabilities take into account the complexity of value production in a network environment in a more valid way than extant evaluations of customer or supplier value [6,19,36,38,41,43,47].

The proposed assessment of supplier's value potential could further be applied in portfolio management regarding suppliers. The basic idea of portfolio management is to classify a firm's suppliers into more homogeneous categories according to the kinds of functions that they serve, and then to develop appropriate programmes for managing the different groups [27]. The idea has been adopted from customer portfolio management [10,38,43]. A key problem with the existing supplier and customer portfolio models is the assessment of the potential value of the suppliers or customers. Another limitation is that these models do not offer any tools for taking into account the network effects that are becoming widely relevant in the current business landscape.

Our conceptual analysis suggests that suppliers providing core value as opposed to added value, as opposed to future value, form groups that require different relational management. Core value providing supplier relationships could be handled either by adopting a traditional competitive supplier strategy in which a firm has two to three key suppliers, or by constructing a tightly controlled multitier supplier system. The latter is becoming the dominant mode in industries that are able to use demand-pull production.

In the case of strategic future value creation, each case should be carefully examined from the network perspective. The more complex the value creation in question, for example, if it involves several actors whose knowledge and capabilities are required, the more the case should be approached from the perspective of a web of equal partners. Here, the emerging tools of network management are appropriate (see Ref. [11]). The value-adding supplier relationships represent an in-between case, the governance of which depends on the inherent complexity, in other words, on how many value dimensions are involved, and whether the possibility of strong network effects exists. A combination of relational governance relying on the establishment of trust and commitment and a shared information system for ensuring efficient control of the value creation

processes is required. The balance in this hybrid mode depends on whether the relationships bear a greater resemblance to core value production with many alternative suppliers, or to complex, joint value creation with future potential.

Our discussion of the managerial implications of the proposed capability-based supplier value creation framework is fairly general and limited. We need programmatic research on the management of relational value creation. Several themes could be identified. For example, the evaluation of suppliers' value creation potential through the proposed range of capabilities needs better empirical validation. Special attention should be given to the derivation of operational capability indicators that offer immediate managerial use. The modes of supplier value creation also require more detailed attention. If we are to develop more valid managerial tools, we need a better set of characteristics for classifying the specific supplier relationships. An analysis of the tools that firms are currently using in the management of strategic supplier relationships would be very useful. This kind of research effort could result in more efficient portfolio management of value-creating supplier relationships in network environments.

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