The Structures of Cooperation: Downscaling, Outsourcing and the Networked Alliance

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ABSTRACT. This article explores interfirm cooperation and its relationship with downscaling, cooperative outsourcing, and the network structures of multiple firm alliances. Downscaling is defined and related to cooperative outsourcing, as major influences shaping interfirm relations. The advantages of embedding cooperative outsourcing in strategic alliances are then addressed, with special relevance to small and medium-size firms. Five types of network structures that may develop within alliances are considered, relating their main characteristics and internal division of labor to various aspects of interfirm cooperation, such as embeddedness, disparities, commitment and trust.

1. Introduction

Interfirm cooperation has become an increasingly common feature of corporate strategy in recent years. Many small and medium-size firms in creative, high technology sectors have joined strategic alliances that encompass virtually any aspect of enterprise. Research, coproduction, and the sharing of marketing, distribution arrangements or personnel training, are only some of the cooperative activities being undertaken by many firms engaged in alliances.

Despite the rising importance of interfirm cooperation, the structuring of alliances and their networks has received relatively little attention in the literature. The network structures that develop within alliances can determine the levels of trust, reciprocity and commitment among engaged firms. Increasing disparities between firms, as an alliance diversifies and some firms specialize, can affect how firms contribute to their shared projects or activities, and the types of cooperative relationships that develop. In recent years, such relationships have, for example, become vital in supporting R&D activities for many small firms with limited access to capital, technical knowledge and other basic resources.

This article will explore, first, the relationship between downscaling and the role of cooperative outsourcing in structuring interfirm relations. The embedding of cooperation in interfirm alliances and networks will then be addressed, as a more effective means to develop cooperative relationships, and the relations of trust and commitment that underpin them. Finally, the various structures that may develop in networked alliances will be explored, considering how their internal division of labor may influence embeddedness, disparities among firms, and various aspects of firm performance.

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2. The embedding of cooperation: downscaling and strategic partnering

2.1. *Downscaling and cooperative outsourcing*

Downsizing has been one of the most prevalent business trends of the past two decades. Achieving greater specialization, targeting market niches more competitively, increasing productivity, and developing continuous streams of innovations are considered to have been some of the more important benefits of reduced size (see, for example, Acs and Audretsch, 1990, 1993; Carlsson, 1992; Hoskisson and Hitt, 1994; Kleinknecht et al., 1991; Pratten, 1991; Hansen, 1990; Sengenberger et al., 1990; Cole, 1989; Dougherty, 1989; Pedersen, 1989; Fischer and Nijkamp, 1988;

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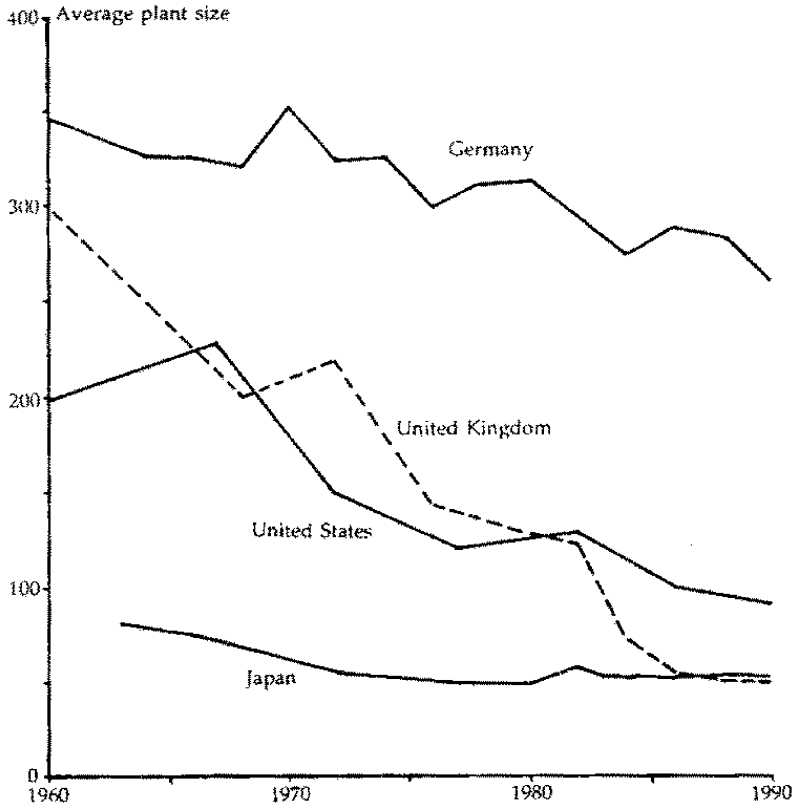
Karlsson, 1988; Storey et al., 1987). Although some sectors have been affected more than others, downsizing has been especially significant in most high technology industries. The electronics industry has, for example, seen one of the most drastic reductions in average establishment size since the late 1960s, as some firms specialized or reduced scope, others shifted production abroad, and others still either outsourced capacity or fragmented their operations into smaller units (Suarez-Villa and Karlsson, 1996; Suarez-Villa and Fischer, 1995; Henderson, 1991; Suarez-Villa and Han, 1990a, 1990b, 1991; Todd, 1989; Soete and Dosi, 1983; Braun and MacDonald, 1982).

Reductions in plant and firm size have gone beyond mere downsizing, however, to encompass much broader processes. The term *downscaling* may perhaps be more representative of the kinds of transformations that have accompanied reduced size, such as the redefinition of scope, the targeting of R&D for continuous innovation, the development of new transactive relationships with suppliers, or the participatory engagement of labor in production. These mainly qualitative transformations have been at the root of changes in the competitiveness of entire industrial sectors, and of the economic fortunes of the nations and regions with which they are associated.

Downscaling, and the qualitative transformations that it introduces, can occur in several ways. Firms can outsource production to reduce scope, costs, or to specialize in the most advantageous facets of their operations. Scope reductions through outsourcing may allow a more effective use of resources, if savings can be redeployed to enhance a firm's internal advantages, leading, for example, to improvements in its R&D capabilities or to better product quality. Segmenting operations into smaller units or subsidiaries can also result in downscaling, inducing greater specialization,



Sources: Suarez-Villa and Han (1990a) and United Nations (various years).

Fig. 1. Average establishment sizes in electronics production.

more autonomy and operational flexibility. New and more vibrant organizational cultures can blossom in such autonomous units, if changes in the intracorporate division of labor allow the segmented operations to deepen their innovative capabilities (Hounshell and Smith, 1988; von Hippel, 1988; Susman, 1992; Pornschlegel, 1992; Hitt et al., 1988; Pavitt, 1986; Hill and Snell, 1988).

Although the segmentation of large firms has provided many benefits, it can be argued that outsourcing among independent or partner firms has been the more important source of downscaling. Production outsourcing has generally been of two types. The competitive mode, relying on hierarchical arrangements, minimal cost objectives, and on rigid or preordained performance expectations, still prevails among many firms in some of the more traditional industries. A cooperative mode, relying on tacit performance agreements, trust, and reciprocal adjustment has been more common in high technology sectors, where short product cycles and continuous innovation are imperatives. Firms engaged in cooperative outsourcing have tended to adjust more to each other as contingencies, specification changes or demand fluctuations arise. Reciprocity and mutual familiarity have also tended to be important for cooperative outsourcing, helping to add value beyond narrow performance expectations (see Hansen, 1992; Powell, 1990; Bramanti, 1992; Young, 1994; Osborn et al., 1988; Mizruchi and Schwartz, 1992; Clark, 1989; von Hippel, 1976).

Cooperative outsourcing has drawn increasing attention in recent years because of the successes of many firms across various sectors and nations. Among Japanese automobile and electronics manufacturers, for example, cooperative outsourcing has allowed substantial improvements in quality and the reduction of lead times for introducing new products (see, for example, Forester, 1993; Fruin, 1992; Mishima, 1989; Nishiguchi, 1993; Shiomi and Wada, 1995; Thoburn and Takashima, 1992). In the textile, apparel and ceramics sectors, cooperative outsourcing has allowed Northern Italian producers to increase the value of their products, introducing innovations rapidly and raising labor skills through networks of small producers (Bramanti, 1992; Goodman et al., 1989; Russo, 1986). In America's Silicon Valley, cooperative outsourcing has played a significant role in the development of new microelectronic components, computers and software, helping add value and improve overall quality (see, for example, Frieberger and Swaine, 1984; Saxenian, 1994). The fact that some of the most successful cooperative outsourcing arrangements have occurred in localized clusters of firms, such as Silicon Valley or in the Northern Italian industrial districts, such as Prato, should not withdraw significance from the increasing globalization of cooperative outsourcing arrangements, especially in such high technology sectors as advanced electronics, commercial aerospace manufacturing, or biotechnology.

In many cases, cooperative outsourcing has helped keep small firms small, by allowing high quality, specialized operations to remain independent and external. Although this aspect cannot be considered to be part of the downscaling process, it can nevertheless support and add to its effects, by preventing the sort of scale increments that occur as firms mature. Keeping coproducers small, or of similar size, can also prevent the kind of interfirm disparities that undermine trust and reciprocity. Growing disparities among coproducers, on access to capital, new technologies, facilities, or labor and marketing skills, can lead to a dissolution of cooperative outsourcing arrangements, as transactions end up being dominated by a larger or wealthier partner (see, for example, Cook, 1977; Cook and Emerson, 1978; Ghemawat, 1991; Harrigan, 1988; Harrigan and Newman, 1990).

For firms engaged in cooperative outsourcing, saving resources that can be redirected to bolster R&D or other vital areas of the firm can be a significant benefit (see Suarez-Villa and Fischer, 1995; Suarez-Villa and Karlsson, 1996; Suarez-Villa and Rama, 1996). Similarly, avoiding costly investments in just-in-time production systems can help save resources in firms with significant output volumes and standardized products, if some production needs can be entrusted to coproducers. Keeping such functions external can be vital for firms with highly competitive market niches, requiring frequent product improvements, where rationalizations of scope and scale are a routine component of strategy-making (see, for example, Axelrod, 1984; Carlsson, 1989; Cole, 1989;

Dougherty, 1989; Håkansson, 1989; Imrie, 1986; Leus and Pellenbarg, 1991; Lorenz, 1988; Mønsted, 1987; Pratten, 1991; Sengenberger et al., 1990; Suarez-Villa and Fischer, 1995; Thoburn and Takashima, 1992). Increasing specialization by outsourcing less essential functions can also provide greater internal flexibility, allowing management and production to become more focused in areas of greater priority (see Hagedoorn, 1993; Hounshell and Smith, 1988; Suarez-Villa and Karlsson, 1996; Suarez-Villa and Rama, 1996).

TABLE I
Technical alliances of major electronics firms, 1980–89

Firm name	1980–84	1985–89
Siemens	51	134
Philips	40	127
Olivetti	42	110
IBM	48	108
Fujitsu	46	78
Motorola	53	68
Total	280	625

Source: Organization for Economic Cooperation and Development (1992).

2.2. *Embedding cooperation in alliances*

Cooperative outsourcing can be more effectively furthered when it is embedded in alliances involving association across various areas of the firm, such as R&D, marketing or skills development. The growth of such alliances has been one of the more remarkable trends of the past 15 years. Major electronics producers more than doubled their number of technical alliances over the 1980s, with European multinationals such as Siemens, Philips and Olivetti leading their American and Japanese peers by a substantial margin (see Table I). All indications are that such alliances have continued to increase substantially over the early 1990s (Gates, 1995; Culpan, 1993; Lei and Slocum, 1992; Organization for Economic Cooperation and Development, 1992).

Despite the rising number of strategic alliances for large firms, small and medium-size (SME) producers have been more extensively engaged in alliances, especially in the advanced high technology sectors. SMEs also typically engage more in alliances with independent firms, creating the conditions for cooperation and networking that help sustain producers with limited access to capital, markets and production technology. A 1990 survey of semiconductor firms, for example, found that a substantially larger proportion of SMEs engaged in technical or R&D alliances with other, mostly independent, producers (see Table II). Since R&D activities are typically the most private component of any firm, holding many clues for future market performance, it is plausible to conclude that most of the technical alliances involved substantial cooperation and trust (see, for example, Egelhoff and Haklisch, 1991; Hagedoorn, 1993; Håkansson, 1989; de Meyer, 1993; Segers, 1993). In some cases, such alliances may provide SMEs with opportunities and resources that only the larger producers can afford, while allowing them to remain small and competitive. Technical alliances among various independent firms can also provide a collective sort of invention or innovation, where each of the allied producers nevertheless retains the initiative to apply the results in ways that benefit its own strategic aims (see Allen, 1983; Alter and Hage,

TABLE II
Technical alliances and firm size in semiconductor firms

Alliance type	Percentage of firms[a]		
	SMEs[b]	Large firms[c]	Very large firms[d]
Technical R&D alliances with independent firms	37	10	5
Technical R&D alliances with consortia	4	6	4
All technical R&D alliances	41	16	9

Notes: [a] Based on a 1990 survey of 31 firms; [b] Revenues of under $100 million; [c] Revenue of $100 million to $1 billion; [d] Revenues of over $1 billion.
Source: Egelhoff and Haklisch (1991)

1992; Andersson and Batten, 1988; Antonelli, 1992; Bosworth et al., 1990; Howells, 1990; Kelley and Brooks, 1991).

Embedding cooperation within a strategic alliance involves arrangements that are significantly different from those of simple cooperative outsourcing. Firms engaged in an alliance typically share or risk more, and usually give up some assets, such as knowledge, facilities or capital, in order to gain strategic advantages that they would not be able to obtain on their own. Gains can be in the form of direct access to knowledge, inventive resources such as laboratories, more advanced production equipment, an expansion of production capacity, or access to an already established marketing and service network. SMEs may find it difficult or impossible to obtain such gains independently or on their own, because of the higher risks involved, their inability to obtain venture capital, a lack of market power, or insufficient production capacity.

In a sense, the question of how much a firm may be willing to give up by entering an alliance could be framed in terms analogous to those posited by Coase (1937) in his analysis of industrial organization. To some extent, it might be assumed that firms will enter an alliance up to the point where the perceived costs, such as giving up knowledge, facilities or capital, equal or surpass the expected gains. Entering into an alliance, however, involves many qualitative dimensions and expectations, which may be difficult, if not impossible, to assess with any quantitative precision. Even when an alliance does not produce the desired benefits, it may nevertheless be kept in expectation of future gains or out of relational value. Trust that builds up over time may in itself lead to unforeseen benefits, even when the expected gains are not fully realized over a given time period. The social and cultural conventions of the communities where the allied firms are located may also work to maintain an alliance, even when actual benefits do not match expectations (see, for example, Grabher, 1993; Granovetter, 1985). Trust and the temporal, qualitative and community dimensions of an alliance are therefore important factors in determining commitment, over and above any strict cost-benefit accounting, particularly among small and medium-size producers.

Alliances also place greater emphasis on firm strategy than simple cooperative outsourcing. Goal and objective-setting will affect more, or may possibly set, the entire course of cooperation. In the alliances, cooperation can be more firmly subordinated to a firm's strategic goals, rather than being aimed at resolving immediate or circumstantial needs, such as avoiding the expense of plant expansion or meeting an unexpected surge in product demand. Subordinating cooperation to strategic goals can also provide longer-term horizons for the alliances, compared with circumstantial cooperative outsourcing, even when an alliance is structured to deal with specific projects of a pre-determined duration (see Gates, 1993; Hagedoorn and Schakenraad, 1990; Lewis, 1990; Ring and van de Ven, 1992).

Alliances can also tailor cooperation to better support continuous innovation, when R&D collaboration is involved. This can lead to more rapid testing and product development through the use of additional or more skilled personnel, or more sophisticated equipment and facilities, all of which might be too costly for a firm to maintain on its own. Alliances that are structured among several firms can also provide networking capabilities, beyond the expected gains from resource-sharing. Networking that is tailored to support a firm's strategies is possibly the greatest advantage of alliances over simple cooperative outsourcing. Joining a networked alliance may expand the resource horizons of participating firms considerably, offering access to supportive aspects that surpass those offered by simpler, bilateral alliances or outsourcing (see Badaracco, 1991; Håkansson, 1989; Håkansson et al., 1993; Hamel, 1991; Howells, 1990; Porter and Fuller, 1986).

3. Alliances in networks: possibilities and structures

3.1. *The networked alliance*

Strategic alliances can serve as the basic building blocks of knowledge networks for design, product innovation, or new production techniques. For SMEs with limited knowledge, capital or production capacity, joining a network can provide a basis for greater stability, if not survival. In the introduction or development of inventions, for

example, a networked alliance that links up with a research institution, such as a university or a major laboratory, can increase its utility to participating firms. Accelerating innovation diffusion would likely be more effectively done through the network of firms involved in an alliance, rather than through bilateral or individual agreements between an institution and any given firm.

Linking up a networked alliance with research institutions may also provide for the sort of cross-fertilization of ideas and discoveries that only the practical and cumulative knowledge of the various firms involved in the alliance can provide. Much scientific knowledge today tends to be cumulative, providing a substantial advantage to networks of firms that can cooperatively apply their research memories toward a production or marketing objective (see, for example, Allison et al., 1982; Brett et al., 1991; Feldman, 1994; Gander, 1986; Suarez-Villa, 1990; Suarez-Villa and Hasnath, 1993). The institutional linkages involved can therefore serve as diffusion channels of new discoveries, enhancing the mission, if not eventually the resources, of the research institutions that become partners to a networked alliance. Such linkages, difficult as they may be to structure, can become the foundation of significant productive communities (Suarez-Villa, 1993).

At the national or international scales, a networked alliance can also make it easier for any participating firm to enter new markets or deal effectively with institutional regulation. Although most international strategic alliances have occurred between or with multinational firms, SMEs attempting to expand to international markets may find a networked alliance of similar firms to be the only viable vehicle to establish market niches independently (see Ahern, 1993; Dunning, 1993; Harrigan, 1987; Ohmea, 1989; Segers, 1993). Networked alliances with international links can, for example, help secure patenting in various nations or within a trading bloc, by sharing the institutional memories of the member firms. Networked alliances can also help secure international licensing agreements, or marketing arrangements for distribution, by linking up with a foreign partner, in ways that any individual SME might find very difficult to do on its own (see, for example, Gates, 1995; Håkansson, 1989; de Meyer, 1993).

Better access to capital markets may also benefit SMEs that participate in networked alliances, whenever such links are thought to provide for more dynamic firm performance. If many or all of the firms in a networked alliance are geographically concentrated, the very existence of the alliance may provide a "critical mass" that can help attract external capital investment to a locality. Indications are, for example, that the producer networks found in the Northern Italian industrial districts in various sectors, such as garments manufacturing, textiles or ceramics, have helped local economic development considerably, by attracting substantial external sources of financing for the various producers involved, above and beyond the specific merits of individual firms (see, for example, Bramanti, 1992; Goodman et al., 1989). To a great extent, however, the attractiveness of a networked alliance to capital markets may depend on the structure of the network itself, and its implications for the market performance, innovation and commitment of the various firms involved.

3.2. *Structure in the networked alliance*

Network structures condition and reflect the internal division of labor existing between firms in an alliance. Such functional divisions help determine the role each firm may play, including, for example, the "nodal" responsibilities involving coordination, resource allocation for shared projects, gatekeeping, or even arbitration. The internal division of labor of a networked alliance also helps determine the disparities that may occur among firms, involving, for example, access to internal resources within the network, and the external links that may be developed through the alliance itself.

Network structures can also determine the level of commitment of the firms involved in an alliance. Commitment may be provided broadly or narrowly, based on the production, research or marketing needs of the various firms involved, or it may be tailored more toward cooperation in specific projects of limited scope and duration. Commitment may also be an important determinant of the "embeddedness" of firms in a networked alliance. The embedded quality of an alliance can, in turn, help "anchor" the engaged firms to a locality, providing advantages that may

be difficult to match by other competing areas or nations. The commitment and embeddedness of firms in a networked alliance can also go a long way toward developing a local manufacturing or research culture that can provide resilience in times of stress, or enlist institutional support to develop commonly needed resources.

The structure of a networked alliance can also help determine the support for innovation that is elicited from the member firms. Support for research and production projects involving continuous innovation may depend greatly on the nodal or coordinating role that one or more participating firms play, regarding the sharing of R&D secrets and strategies. Trust and reciprocity are bound to be the vital lubricant of any cooperation involving research activities, especially among SMEs (Alter and Hage, 1992; Axelrod, 1984; Håkansson, 1989; Hansen, 1992). The level of trust involved in such cooperation may also depend on the degree of commitment that any of the engaged firms have to the alliance, and their embeddedness in it.

Among the various typologies, the *circuit* (non-nodal) network structure is more likely to occur among independent SMEs (see Figure 2). The lack of hierarchy may provide for fluid transactional patterns, where cooperative relations are established as needs arise, and where reciprocity may be a tacitly expected feature of interfirm relations. In this network structure, reciprocity may lead to *two-way* subcontracting, whereby firms outsource some of their production or research needs within the alliance, while they are also subcontracted by partner firms for specific production or research tasks (see Suarez-Villa and Fischer, 1995; Suarez-Villa and Rama, 1996). Such a strategy, which may lead some firms to over-externalize some of their functions in order to accommodate requests from alliance partners, may be engaged in to build up cooperative relationships. The reciprocity obtained in this way may be especially helpful during stressful periods, such as in times of unexpectedly high or low market demand. Although they have received virtually no attention in the literature, the study of such strategies could lead to useful constructs about how firms adjust to each other through cooperation and reciprocity within alliances (see Borys and Jemison, 1993; Lorange and Roos, 1991; Parkhe, 1993).

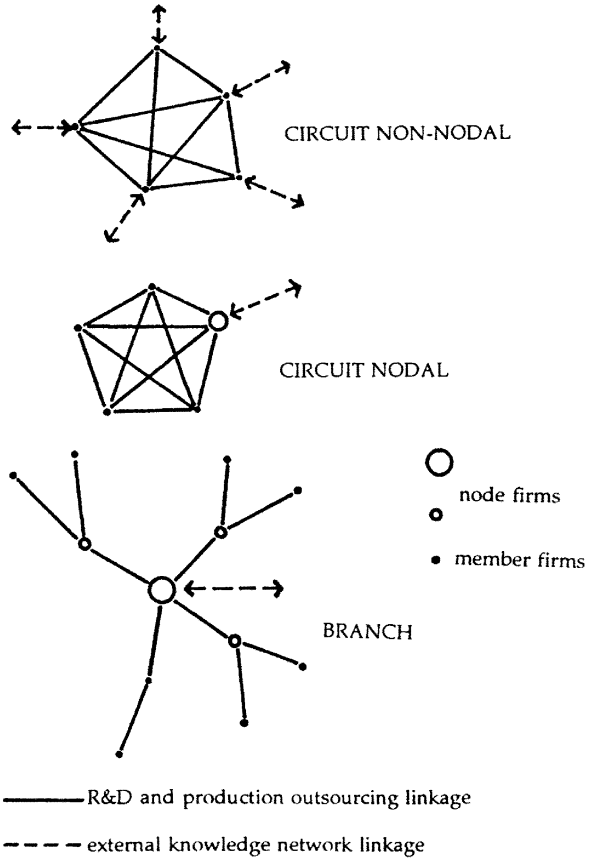


Fig. 2. Basic network structures.

The division of labor within a networked alliance may help determine the extent to which two-way outsourcing occurs. Greater specialization may preempt such reciprocal strategies, if some firms' capabilities become narrower through substantial downscaling. Thus, for example, firms that specialize greatly in production or marketing may be unable to accommodate requests for research work, even when plant capacity is available.

The development of a hierarchy, as some firms take up a coordinating or gatekeeping function within the alliance, can produce the *nodal circuit* variant (see Figure 2). The empowerment of a firm to develop a unique decision-making function within the alliance may occur for specific projects, or for definite or unspecified periods of time, and may be the result of a need to specialize, to manage a complex project, or because of a growing number of member firms. An expanded

division of labor can raise questions about interfirm disparities in decision-making powers within the alliance, leading to more limited trust, however. An increasing division of labor may therefore result in greater gains and efficiency for the alliance, or it may lead to a reduction in the commitment of some member firms, or even exit (see Harrigan, 1988; Lorange and Roos, 1991; Young and Olk, 1994).

The development of nodal functions in a networked alliance may be inevitable, as firms become more embedded or the possibility of greater gains becomes enticing. A nodal firm can, for example, serve a clearinghouse function, to sort or select the R&D knowledge and resources needed for a specific project, or to manage external transactions for the alliance. The need for an outreach function may similarly become necessary, if a need to seek additional partners with new capabilities arises. Seeking new distribution or service arrangements may also require a nodal function to be delegated, especially when all or many of the member firms' products, differentiated as they may be, can nevertheless share distribution and servicing opportunities.

A hierarchical network populated by SMEs dependent on a large firm, or by its subsidiaries and spun-off units, is more likely to be of the *branch* form (see Figure 2). Nodal firms are necessarily an integral part of the branch network, unlike in the previously discussed circuit structure. The very structure of the branch network may lead to significant interfirm disparities in terms of access to resources, information, or in the decision-making prerogatives that accompany any nodal function. Disparities may also tend to become stronger as the division of labor deepens and the hierarchy develops levels. In this context, therefore, cooperation is more likely to be "programmed", or organized, by the main firm (or firms) in the network; as such, the interests of the smaller participants may well be subordinated to those of the firms that take up major coordinating roles.

Exit from the branch network structure may become more difficult for any participating unit, and especially so for the smaller firms, because of this network's organization and the highly specialized roles that may be developed over time. More difficult exit prospects may well translate into greater commitment to the alliance, especially when opportunities to join other networks in a similar role, or to diversify and grow unilaterally, are very limited. Thus, commitment to a networked alliance can become a function of its structure and division of labor, as well as of the alternative opportunities available. The influence of location on the latter should not be dismissed lightly, especially for the smaller producers, since a lack of alternatives within a firm's geographical range of possibilities may well constrain its exit from the alliance.

Hybrid network structures should also be considered in multilateral alliance formation (see Figure 3). The types of firms involved (independent or subsidiaries), their sizes (SMEs, large, very large) and their geographical range (local, regional, national, multinational) can produce diverse combinations. Two hybrid structures possibly deserve more attention: the *circuit-barrier* and the *circuit-branch* networks. The circuit-barrier structure essentially shields or segments a portion of the network, for strategic or functional reasons (see Suarez-Villa et al., 1992). Hierarchy is a characteristic of this structure, where a controlling function is exercised by one or more major nodal firms; in the case of a

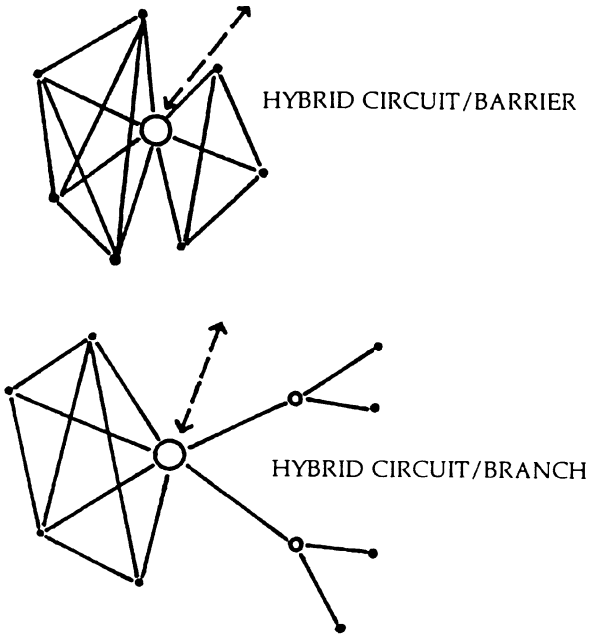


Fig. 3. Hybrid network structures.

network of subsidiaries, a major nodal firm would likely be the parent organization. The circuit-barrier network may, for example, be more typical of defense project alliances, where secrecy may require restricted access to some members of a network. This structure could therefore prevent any of the non-nodal firms from gaining a broad or strategic understanding of the ultimate product, before testing or production are completed.

The control function of the nodal firms in the circuit-barrier and circuit-branch structures therefore acquires greater relevance for the alliance than in any of the previous network types. Such control need not be associated with lesser interfirm cooperation, although the inevitably hierarchical structure of these networks can induce greater specialization, thereby limiting or segmenting interfirm relations. Also, greater control over an alliance's members need not have an adverse effect on commitment, to the extent that continuing in the alliance is perceived to be more advantageous than exiting it. For SMEs operating in a highly specialized production niche within these hybrid networks, however, the possibilities for survival and growth may be more closely linked to the fortunes of an alliance, since exit and readjustment to a new role outside the alliance may carry great risks and uncertainty.

4. Concluding remarks

Three aspects related to interfirm cooperation have been explored in this article. Downscaling was defined and conceptualized as a major factor encompassing the transformations that accompany reduced size, such as the redefinition of scope or the development of new transactive relationships for R&D and production. Cooperative outsourcing, a major means of downscaling that is of special relevance to SMEs, was thought to be more effective when it is embedded in strategic alliances involving cooperation across various areas of the firm. Network structures involving multiple firm alliances were then explored, to consider how they influence the division of labor within an alliance, and their effects on various aspects of cooperation, such as commitment, knowledge-sharing, and reciprocity.

The evolution of hierarchy within a networked alliance can provide many valuable insights on the dynamics of strategic partnering. The development of nodal functions in a networked alliance can be seen as the result of a deepening division of labor and increased specialization, with substantial effects on any given firm's commitment to the alliance. The delegation of nodal functions, the accumulation of authority that they entail, or the more advantageous access to resources that they provide, can become major factors affecting the longevity of an alliance and the level of embeddedness that occurs within it. Such nodal functions can, despite the disparities that may be generated, be vital in "anchoring" SMEs to an alliance, and to a locality's productive structure.

Perhaps the most important benefit of the development of hierarchy within an alliance may be the expanded support for continuous innovation that it can provide. The resources to support state-of-the-art R&D activities are usually least accessible to SMEs. Resource sharing and strategic partnering may thus be of greatest benefit when a network structure can provide the functional diversity needed to support continuous innovation within the alliance, without undermining the relations of trust, reciprocity and commitment that are so vital in maintaining cooperation.

Although there are many questions and few answers on this matter, the development of networked alliances may become the single most important means for SMEs to sustain highly competitive market niches involving short product cycles and continuous innovation. For communities and nations that encompass a critical mass of internationally competitive SMEs, the development of networked alliances may become one of the most important sources of comparative advantage, as technical knowledge and capital become increasingly global. Hopefully, this contribution will stimulate other scholars to probe the many unexplored aspects of cooperative production and alliance formation.

Note

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