

AN EVALUATION OF NETWORKS AND GROUP SERVICES FOR SMALL FIRMS

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Networks can be defined as linkages among firms. The term *network* encompasses contacts useful to the business, to technological capabilities, and to other complementary assets of production (Teece 1986). Gelsing (1992) makes the distinction between *trade networks*, which link users and producers of traded goods and services, and *knowledge networks*, which focus on the flow of information and exchange of knowledge irrespective of its connection to the flow of goods. For the individual firm, networks provide external sources for inputs that complement — or substitute for — the firm's internal capabilities.

The importance of human interaction and social behavior is central to recent research on formal organizations in both economics and sociology (Granovetter 1985; Lundvall 1988). Empirical research consistently finds that learning about technologies occurs primarily via informal channels of communication — through interpersonal contacts (Allen et al. 1983; Håkansson 1987, 1989; MacPherson 1991; Meyers and Wilemon 1989). These studies have identified the central role of geographical proximity, which facilitates face-to-face contact, and the critical nature of networks to firms' activities and competitiveness (Sabel 1989).

Networks: Personal and Entrepreneurial

Interpersonal contacts provide not simply raw information, but the sorted and evaluated information which firms can apply to the context of the business (Rosenfeld 1992a). Information and social networks clearly are critical to business success — to firm formation as well as to survival and growth (Aldrich and Zimmer 1986; Birley 1985; Christensen et al. 1990; Sweeney 1987). At one level, information and contact with other firms are simply examples of the use of *external resources* critical to the success of flexible firms (Jarillo 1989). Initial contacts from social networks evolve into business-focused networks, and then into strategic networks, which allow firms to innovate and to thrive by their links to other

organizations (Butler and Hansen 1991; Courlet and Pecqueur 1991; Dubini and Aldrich 1991; Falemo 1989). For small firms but especially for new firms, most contacts are likely to be local, and this is particularly true for venture finance. Distances beyond the local area hinder the frequent face-to-face interaction desirable to entrepreneurs and investors (Wetzel 1986). Formal venture capital also tends largely to be invested within local areas (Florida and Kenney 1988).

Personal contacts can be critical, as acquaintances become suppliers, customers, or key agents of new technology. This occurs as contacts accumulated over long periods of time provide the "lists" needed for an entrepreneur or organization to succeed. The lack of a network or networking can severely impair the competitiveness of firms. A prominent example is the need to have a global market — to export — which affects small firms most directly, because they typically lack the resources and management capacity to do this. The networks developed for other purposes are the principal means of entering export markets (Christensen 1991). Producer-user interactions are especially fruitful, because they provide the necessary feedback to producers, and they allow users to successfully implement new technologies (von Hippel 1988). Gertler (1993) demonstrates that this is a particular challenge with advanced industrial machinery, which must be tailored to the needs of the user.

The increased intensity of technological change means that, in contrast to the linear innovation model (which underlies product cycle theory), there is no longer a clear-cut differentiation and no clear sequence from research to development and to production and distribution. Instead, the innovation process is highly interdependent, and includes a variety of ways of learning and of generating new knowledge (Kline and Rosenberg 1986; Malecki 1991). Firms are able to enhance their technological capabilities by learning from customers and from suppliers, by interacting with other firms, by searching for new technologies, and by taking advantage of spillovers from other industries (Lundvall 1988; Malerba 1992). Taken together, these sources provide the *know-why*,

know-how, *know-who*, *know-when*, and *know-what* necessary for entrepreneurial success (Johannisson 1991; Lipparini and Sobrero 1994).

Networks also allow large, as well as small, firms to expand the scope of their information-gathering activities with somewhat less effort and expense than either (1) if all activities were internal to the firm's hierarchy, or (2) if all interaction had to take place via market transactions (Thorelli 1986). Another model for viewing networks is through core-ring relationships, where the core firm (usually large) dominates a set of supplier firms which comprise the ring (Storper and Harrison 1991). Identifiable *all ring, no core* systems are typically found in agglomerated networks, whereas *core-led* systems are found in all sorts of geographic settings. A firm uses a network as an alternative to vertical integration and diversification, mainly by marketing. However, a network involves more: technology transfer, information exchange, accounting and finance, as well as public and private interpersonal relations (Thorelli 1986: 46). Networks thus provide a very different model from the hierarchy for thinking about the interactions, formal and informal alike, within and among firms (OECD 1992).

The place of networks in understanding economic relations also brings one into one of the most "noneconomic" variables: trust. It is much more difficult for large firms to incorporate trust into their calculus. Indeed, arms-length contractual relations (ACR), described by Granovetter (1985) as functional substitutes for trust, are typically legalistic and may thwart the development of cooperative relationships. Trust, by contrast, creates and reinforces mutual obligations and cooperation (Casson 1990: 105-124; Sako 1992). Trust requires personal relationships that transcend the contact at hand, and it is reinforced by face-to-face relationships. Laage-Hellman (1987: 63) suggests that fruitful collaboration requires four conditions: (1) a common language, (2) mutual knowledge of each other, (3) mutual trust, and (4) they should make great demands upon each other. These conditions and the social bonds formed "are often person-specific rather than firm-specific" (Thorelli 1986: 47). Put another way, "personal

contacts are the medium in which communication takes place" between organizations (Hamfelt and Lindberg 1987: 177).

Trust relationships are typically informal and often result, for instance, in a supplier exceeding the contractual requirements, whether by early delivery, higher quality, or some other means of assuring goodwill (Sako 1992). The legalistic nature of relations common among American firms contrasts with the obligational contractual relations (OCR) found among Japanese firms at the opposite end of the spectrum of possible trading relationships (Casson 1990). However, firms typically maintain both types of relationships: formal, arm's-length relationships and a small number of stable exchange relationships with favored outside companies (Larsson 1993). The deciding factor is the competence, information and knowledge of other firms or organizations with whom a firm can be joined (Hedlund et al. 1990). Most indicative of trust is the exchange of unstandardized or nonroutine information between firms (Gelsing 1992). In a regional setting, especially in innovative milieux, trust operates as the short-cut mechanism for communication and cooperation between firms (Hansen 1992).

Relationships between firms, like those between people (which is what they actually are), take time to develop. The first stage is a "trial period" during which the prospective partners evaluate each other and learn about their respective businesses, their performance capabilities and, ultimately, their credibility. The second stage, partnership, involves more extensive and frequent communications, often in the context of changes, and reciprocated investments of time, people and equipment. The progression from arm's-length, market exchanges to trust-based cooperation takes about two years, with increasing benefits over time in information and technical innovation (Larsson 1993).

Gatekeepers

People whose role is to identify potential contacts and to increase information flow from sources outside to people within the organization whose contacts are less developed are called *gatekeepers*. Every employee brings in information acquired in formal and informal education, from simply being aware of what is going on in the world, from non-work activities and non-organizational relationships, and from previous experience, especially that gained in other organizations. In using this information, the individual does not distinguish between that gained within the organization and that gained externally (Macdonald and Williams 1993).

Gatekeepers are proactive in acquiring external information and, although they might use it personally, they also are keenly interested in passing it on to others in the organization for their use (Falemo 1989; Macdonald and Williams 1993). Their role in selecting and filtering information is critical, but the role is rarely institutionalized or formalized. Most importantly, gatekeepers see their acquisition of information as part of a *quid pro quo*, whereby they are obligated to supply information in return, as a means of building or maintaining trust in counterparts in other organizations. Therefore, despite the fact that informal information is the most common and often the most important means of interfirm information flow, it is channeled through gatekeepers who may retain it for their own use rather than to pass it on to others in the organization (Macdonald and Williams 1994).

Small-firm Based Networks

Although much of the research literature on networks has focused on those of large firms, small firms also have extensive contact networks, comprised mainly of business contacts. These are most likely to be associated with commercial organizations, such as customers, consultants, and

other managers (Falemo 1989). However, because of the lack of resources associated with small size, and the inexperience of many new entrepreneurs, small firms are often disadvantaged in their ability to access and direct the flow of information into their organizations. Small firms can benefit from those gatekeepers known as "community entrepreneurs" or "social entrepreneurs" who have the development of the local community as a goal (Cromie et al. 1993; Johannisson 1990; Johannisson and Nilsson 1989). These "key individuals" use their extensive personal contacts to communicate across sectors (Stöhr 1990). They can provide the necessary sorting and evaluating that others — and especially small-firm owners and managers — are less able to do (Rosenfeld 1992a: 315). Such a "key individual" usually operates at the center of a manufacturing or business network.

The success of industrial districts in many parts of Europe lends credence to the belief that intensive interactions and collaborative arrangements negotiated by gatekeepers contribute to the strength of successful economies (Hansen 1991, 1992; Pyke 1992). Among the most important characteristics of these local economies is the transmission of crucial knowledge and skills among individuals and firms, which gives rise to localized specializations. The most well-developed of these local areas are usually characterized by tightly-linked networks of innovative firms and other actors which together comprise dynamic *milieux* of economic activity (e.g. Camagni 1992; Pyke and Sengenberger 1992). A competitive networked region has [in addition to a high level of inter-firm networking], several other characteristics: (1) a thick layering of public and private industrial support institutions, (2) high-grade labor-market intelligence and associated vocational training, (3) rapid diffusion of technology transfer, and (4) receptive firms well-disposed towards innovation (Cooke and Morgan 1993: 562). Dubini (1989) describes such a region as "munificent," where networking is the norm, in contrast to sparse regions, where little takes place. Policies are rarely able to compensate for the absence of a "technical culture" and the networks of firms found in such places (Sweeney 1991). In places where such a

culture and milieu has not formed, firms must be outward-looking, seeking knowledge from outside the local region, and widely spread markets. This conclusion derives from a wide variety of settings, including Buffalo, New York (MacPherson 1991, 1992), Gainesville, Florida (Malecki and Veldhoen 1993), Norway (Vatne 1994), and the UK (White et al. (1988). It is in such environments — without a functioning network of firms — that networks and services to stimulate competitiveness have centered.

Regions without Networks: Networks and Group Services as Policy Strategies

Small firms face several problems in attempting to gather information. Competitive small firms have developed networks, of course, but not always with other small firms. In many cases, their networks are dominated by their relationship with a single, large customer, usually located within the local region. These large firm customers are technologically demanding, and custom work produced on a flexible schedule is frequently the norm (Young et al. 1994 a, b).

What SMEs need most is information (often called knowledge in Europe). The many potential sources of information may not be utilized for several reasons: primarily cost and lack of awareness. For example, the range of expertise and services of consultants are relatively well-known, but remain unutilized in many cases because of their cost, which is often seen as prohibitive to small firms. In addition, the National Research Council (1993:52) notes that many consultants are oriented toward the circumstances found in large firms, including long-term relationships, which may be inappropriate for small firms.¹ The same can be

¹ Consultants themselves often refute the accusation that their services are costly, claiming that they are able to provide a wide range of assistance to businesses from simple (and relatively inexpensive) to complex (and more costly). It remains true that many

said in many cases of institutional sources of technology, including Federal laboratories and universities: tailoring the information to the specific needs of a small firm. The result is frequently that noted by Smallbone et al. (1993) in the UK: a significant fraction of firms (45% in their case) use no external assistance of any kind, suggesting a need for policy interventions to help competitiveness.²

Networks of firms facilitate their sharing of information horizontally with each other, rather than to rely on a top-down model of technology transfer. Any strategy to increase inter-firm networking, however, must take into account the real constraints that which mitigate against network participation. An obvious negative influence is time, which clearly restricts owner-managers' opportunities for networking activities at the voluntary end of the continuum. Perhaps a more important negative influence are the self-definitions typical of many of those who run their own business concerning autonomy and independence (Blackburn et al. 1993: 117).

Networks and Group Services as Policy: European Roots

The use of interfirm networks as an economic development strategy has roots in Europe, where policies to create innovation networks and to provide business services are in place in several countries, most prominently in Italy and Denmark, but also in others, such as Austria (Grabher 1989). In Emilia-Romagna, Italy, a number of specific institutions have emerged over the past decade or so, in response to local needs of individual industries, such as ceramics, textiles, and metals (Bianchi and Giordani 1993). Italian localities tend to be very specialized in particular industries, so even national

services are geared toward large customers, because the transaction costs of dealing with the diversity found among small firms is often too great for service providers (Nooteboom et al. 1992).

² I leave out technology transfer and industrial extension services, topics which are covered by other papers at this workshop.

agencies operate to provide services tailored to specific industries in cooperation with small-firm networks. The provision of real services, rather than of subsidies, is a key part of Italian policy for small firms (Brusco 1992; Mazzonis 1989; Rosenfeld 1989-90).

In Denmark, particularly rural Jutland, small and medium-sized firms and their networks serve global markets in several industries (Hansen 1991; Illeris 1992; Kristensen 1992). Jutland, along with Emilia-Romagna in Italy and Grenoble in France, are prominent examples of "innovative regional milieux" where trust and cooperation are especially prominent (Hansen 1992). In settings where trade or labor unions are significant, their participation may be central to the formation and success of local networks, as they are in Jutland (Lund and Rasmussen 1988).

The Danish experience in training people to be network brokers has also made its way across the Atlantic. It is based on the premise that local brokers are not likely to be skilled or knowledgeable enough, especially in product development and other specialized areas. On the other hand, a range of facilitative skills can be taught that will be applicable in networked anywhere. Modeled in part on the Danish experience, Oregon has trained a pool of 43 brokers in an effort to promote the concepts of flexible networks and interfirm cooperation (Regional Technology Strategies 1993). These and other European experiences have stimulated efforts in the United States to build networks of small and medium-size firms (Bosworth and Rosenfeld 1993).

Experience with flexible manufacturing networks in the USA

Firm networks, structured to retain the best elements of both formal technology transfer programs and informal interaction networks, are a recent, but growing, phenomenon throughout the country. Initially championed by Piore and Sabel (1984) in *The Second Industrial Divide*, and based explicitly on the industrial districts of Italy and Denmark (Rosenfeld 1992a), a variety of such networks have arisen in the USA since the late 1980s. Close to 30 well-established networks are identified in a mid-1992 compilation, along with a

number of other "network projects" being developed by state agencies, labor unions, and colleges and universities (Lichtenstein 1992). The bulk of what follows is taken from in-depth interviews with the brokers and owners of several member firms of four networks: ACEnet in Athens, Ohio; TeCMEN in Fort Walton Beach, Florida; and WoodNet, in Port Angeles, Washington, and the FlexCell Group, in Columbus, Indiana.

The (almost standard) term *flexible manufacturing networks* is perhaps the most common name for these cooperative efforts (Bosworth and Rosenfeld 1993). The emerging U.S. model, described by Bosworth and Rosenfeld (1993: 29), is activity supported by local economic development agencies, building a multi-firm network organization with a defined membership and internal structure. Operating on a small geographic scale, and frequently involving smaller universities and community colleges (rather than only a major state university), firms in similar circumstances are encouraged to combine their capabilities in design, training, product development, and other activities. Although every activity does not involve every member, it is generally agreed that only members will participate, thus making this a "static" model. This contrasts with the "dynamic" model in Italy, where multiple network relationships evolve and dissolve almost organically. In general, networks created by explicit policies and initiatives tend to be formal in some respects, but also to rely on certain aspects of informal interaction (Malecki and Tödtling 1994).

Outside the US, there is some evidence that formal networks are fertile sources of innovation. For example, in the British medical equipment industry, a highly innovative sector, 26 of 34 innovations were developed with other network actors (Shaw 1991). However, there is precious little hard evidence of such beneficial impacts from networks in the USA, in part because nearly all research has focused on the networks themselves rather than on the firms in them. Bosworth and Rosenfeld (1993: 4-6) also caution that networks are no panacea, especially when simply joining weak firms together.

A more widely acknowledged benefit of networks is that they serve as a catalyst for informal "networking" by firm owners, many of whom literally might not know their counterparts in the same town. It is here that the role of the network broker is significant. In many ways, the ideal broker is the Swedish *community entrepreneur*. This key individual (the community entrepreneur) enforces members' pride in their own community, operates locally to develop further networks among established and would-be entrepreneurs and, most importantly, links with external parties both to gain legitimacy and to obtain operative and financial resources (Johannisson 1990). While many community entrepreneurs also are autonomous entrepreneurs in their businesses, a sizable group acts solely on behalf of community projects. The networks of these community entrepreneurs in Sweden are larger or more extensive than those of local business people (Johannisson and Nilsson 1989).

Thus, brokers initiate, and help to maintain, contacts among firms. Most of the network firms we have interviewed had not considered working with — indeed, were not even aware of — other local firms until the network was formed. Particularly for firms in the same industry, who see each other only as competitors, network meetings on common issues prove invaluable as a means to get firms to see their competitors as people and to learn the concerns and capabilities of other firms. Regular meetings are important in this regard (about once per month seems ideal: not too frequent and not too long between), for they permit this interaction. Our interviews with TeCMEN firms in Florida suggest that the ideal meeting provides time before the formal agenda begins, as well as after it, for spontaneous conversations and follow-up on previous discussions.

Networks should exploit natural clusters of firms, where face-to-face interaction occurs (or can occur) naturally (Bosworth and Rosenfeld 1993). The Technology Coast Manufacturing and Engineering Network (TeCMEN) is a group of 30 defense contractors and subcontractors in the Fort Walton Beach, Florida (Okaloosa County), area. These firms first joined forces in 1989, in response

to cutbacks in US defense spending, and still meet monthly. Interviews with executives at five member firms confirm that the more valuable time is the opportunity for "informal networking" before and after the formal meetings. If this network has had less success than it might, it may be attributable to the fact that the network is on its third broker since 1990.

WoodNet is a network of wood products manufacturers on the Olympic Peninsula of Washington State west of Seattle, formed in 1989 in response to restrictions on logging in the region's old-growth forests, the traditional economic base. The Clallam County Economic Development Council received a grant to alleviate the impact of a logging ban caused by loss of spotted owl habitat in the region. This was merely the first of a series of grants which have supported WoodNet's activities.

WoodNet provides an array of services for its approximately 400 firms. These include advice and assistance needed by micro-enterprises and new firms as in ACENet — but care is taken to bring this information to firm owners rather than to provide it at a single location. The sheer size of the Peninsula and the lack of roads in Olympic National Park creates travel times to Port Angeles of over 3 hours from towns along the southern part of WoodNet's territory. This effectively precludes people from participating in evening meetings or presentations. In fact, no gathering of all of WoodNet's members has ever taken place.³ The problem is "solved" by WoodNet staff, usually including the broker, making the drive to the outlying towns and returning home after midnight. The principal effect of this proactive strategy (beyond simply the fact that WoodNet was actually able to serve its entire large 4-county area) is the spontaneous formation of subnetworks in the each of the areas. The subnetwork model has led as well to a group of cabinet-making firms interacting without WoodNet's intermediation. WoodNet's broker describes WoodNet as "a dating service" for firms and a "social glue" for the community of

small-firm owners and their families. It also is described as an economic development organization.

WoodNet's principal service to its approximately 200 members is to serve as an information hub and to provide career and entrepreneurial guidance. For example, WoodNet provided training to craftspeople (one of the two groups identifiable) in preparation for inclusion in a Product Buyers Guide or catalog for wholesale buyers of (mainly craft) products. A second group of building materials firms were being trained in mid-1994 for participation in a mini-trade show for the Seattle building industry. WoodNet members were being trained how to "schmooze" with potential buyers and to present their products and capabilities in a professional manner. Nonetheless, informal networking is as, if not more, critical to the small value-added manufacturing firms of WoodNet as the more formalized collaborative arrangements coordinated by the network. In many cases, the coordinator of WoodNet has been unaware of the collaborative efforts of some of the member firms until after they were already well underway.

"Good pre-existing relationships help networks gain momentum" (Lichtenstein and Girifalco 1992: 2), illustrated also by one firm owner in the WoodNet network who reports that "We were woodnetting ten years ago" several years before to the formation of WoodNet. However, such relationships also can be developed through regular group meetings, which "are the lifeblood of the network" (Lichtenstein and Girifalco 1992: 32-33).

Perhaps more importantly for local economies, networks tend to increase the amount of local purchasing and supply relationships. TeCMEN reports to have increased the amount of local purchasing and subcontracting by a small, unquantified amount, but certainly less than 10 percent. Although WoodNet does not try to quantify the local purchasing attributable to networking, they provide examples of local purchasing and supplier relationships made possible through networking. In many cases, residual or waste material from one manufacturer which would have been discarded becomes raw material for another. For example, a firm specializing in blocks

³A formal membership drive and request for member dues had begun only in mid-1994.

of wood for electric guitar bases uses only 10 percent of the wood it purchases. The remaining 90 percent is usable in other secondary wood products, and readily becomes the source of supply for other wood products firms on the Peninsula.

Quasi-public centers with a key coordinator or broker serve as the hub — and gatekeeper — for a network. The network broker or coordinator, who is likely to be a private consultant or employee of a local economic development agency (rather than a firm owner or manager) appears to be a particularly critical aspect of network success (Bosworth and Rosenfeld 1993). Examples of such brokers include the directors of both ACEnet and WoodNet. Brokers, "the spark plugs who guide the networks into existence," are among the "*sine qua nons*" of networks (Lipnack and Stamps 1993: 152).

The Appalachian Center for Economic Networks (ACEnet) is a nonprofit economic development organization, based in Athens, Ohio, serving a rural 11-county region. ACEnet has functioned since the early 1980s, at first as an advocate for worker-owned enterprises. The European models, especially the Basque Mondragon model, sparked an interest in flexible manufacturing and its cooperative emphasis. ACEnet's region is comprised almost entirely of micro-enterprises, and there are no large local firms on which small firms can rely. Consequently, a major objective of ACEnet has been the provision of several services it deems essential to develop an infrastructure of firms equipped to take advantage of the potential benefits of flexible production. Niche markets, including adjustable furniture and kitchens for wheel-chair-bound residents, and food products for specific markets (organic, special diets, and ethnic foods) are the two primary areas of emphasis. Accessible Designs*Adjustable Systems (AD*AS) is a for-profit subsidiary under ACEnet's nonprofit umbrella. Of these, the Food Ventures (*aka* Community Food Initiatives) is the more ambitious, with a much larger pool of potential clients being assisted toward self-employment. The services ACEnet offers its clients — largely comprised of single mothers with no business experience — include training in how to run a business.

With considerable financial support from the Ohio Department of Development, the Joyce Foundation, and the local business community, ACEnet has provided training to potential workers (enabling them to serve as apprentices in local firms), small amounts of seed capital, computer and bookkeeping skills, and telecommunications, and transitional support for welfare recipients to attain self-employment.

Firms with considerable experience also can benefit from networks, especially for dealing with a rapidly changing market and less predictable relationships with long-time customers. The FlexCell Group, in Columbus, Indiana, fits this description. This group developed out of the needs of a single firm client of the network facilitator. The original mission statement is one to which the other firms have also subscribed: To become a full-service, vertically-integrated, single-source, top-tier network of suppliers servicing major manufacturers with product development and production capabilities.

There are presently five member firms, in addition to the consulting firm, which operates as a member. The network has been described previously as a strategic alliance (Lichtenstein 1992: 20). These firms all focus on industrial customers, mainly, but not solely, for the automotive and industrial machinery industry. All are "job shops" which focus on custom work for much larger customers in the local vicinity (very much the situation described by Young et al. 1994b). One firm describes its market as within 100 miles, but nearly all the firms have already begun to (or are just beginning to) sell to existing customers' facilities in Mexico.

The FlexCell Group formed in 1991, meeting *weekly* from that time and began to charge a regular fee of \$480 per month about a year later. This required degree of commitment prompted a firm to drop out, but other firms have also joined the network. A substantial commitment is demanded of the network's firms in addition to the CEO's (or a regular representative's) presence at weekly meetings. These meetings, as well as real efforts to get each firm to open up its operations, performance, and routines to the other members, are

intended to develop trust among the members. The ultimate goal is to know enough about each other's operations and capabilities that any member can rely on the others to provide not only capacity but capability not present in any firm. The trust developed thus far has generated several instances of sharing facilities, jobs, and employees. Until mid-1994, the network had received no public funding, making it different from the others described here.

Services provided by networks

Despite the varying local contexts — industrial sectors, economic development roles, size and number of members, funding sources — there are some generalizations about the services which networks provide to member firms. Networks provide at least seven categories of services: (1) meetings, (2) information clearinghouse functions, (3) business advice, (4) finance, (5) large-scale marketing efforts, (6) technical upgrading, and (7) training.

Meetings. As has been clear from the descriptions in the previous section, meetings are very important for the building of trust; without them, the close relationships take much longer to develop. Their primary function is to facilitate informal interaction, and the building of trust and understanding of common problems and circumstances.

Information Clearinghouse. In addition to the facilitative role, networks serve as a hub for information from both within and outside the network. The types of information include: technology, market opportunities, and the activities of networks and firms elsewhere. In order to serve this role, the broker must be a gatekeeper connected to outside, constantly filtering and channeling relevant information to member firms. It can be distributed proactively or simply in response to requests and queries. It can be fed selectively to firms requesting it or deemed suitable by the broker, or to all members through newsletters or electronic bulletin boards. All four networks examined have in place, or are implementing, electronic networking for information dissemination. Finally, network brokers perform a "dating service" by matching

firms with each other for complementary purposes, creating linkages that would be unlikely to occur otherwise.

Business advice. This category of service is most important (perhaps only important) for networks devoted to new firms and micro-enterprises. Services described above include accounting and bookkeeping procedures, advice about correspondence, advertising, invoices, and telephone procedures (the latter especially for home-based businesses).

Finance. Financial considerations are significant in two ways: for the network itself, and for firms. The network's existence often depends on funds from public (government) and private (foundation) sources, which require competitive proposals and thus consume a portion of the broker's time (as well as that of some members in most cases). In addition, through the gatekeeper role the broker may learn of targeted funding programs for one or more individual firms, but not the network *per se*. For new firms and micro-enterprises, networks often provide incubator services, such as printing, fax, and a conference room, on an as-needed basis.

Large-scale Marketing Efforts. Marketing is perhaps the main objective of networks in the U.S., according to the tally of objectives in Lichtenstein (1992), where 21 of 27 networks cite this among their purposes. Marketing by a network takes at least three forms: catalog preparation for marketing diverse products of many small firms to customers nationwide, trade show participation (and even the organization of a trade show by WoodNet), and certification of the network as a subcontracting entity with large industrial buyers. All of these are best accomplished cooperatively, and might be impossible for any individual small firm.

Technical upgrading. The computer networking already being implemented for communication purposes is also being tied in some networks to capability to exchange technical data in digital form, which requires some standardization of software and other capabilities, such as CAD and CAD/CAM.

Training. The word *training* encompasses upgrading at several different levels. More detailed

business management training, perhaps including ISO 9000, can at least be introduced to several firms at once. Upgrading of worker skills, especially in a classroom context at a local community college, is often best accomplished for several firms simultaneously. Indeed, without joint effort, it might not be evident that there is sufficient demand for such training. More rudimentary social and business skills can be part of training for first-time trade show participants.

It is clear from these examples that the service needs of established firms differ from those of new micro-enterprises. Indeed, the objectives of networks serving the two groups will differ. In many regions, new firm formation can be a worthy and useful local economic development strategy which can be facilitated by networks so that fewer firms must flounder on their own. Joint activities and the knowledge that one "is not alone" can help new-firm survival rates. Building trust may be easier to imbue in new entrepreneurs whose competitive instincts are not yet sharp, but trust does not exist automatically. Networks help to make cooperation a part of each new firm's normal way of doing business.

Established firms served by networks fall into two groups: (1) those that work hard to remain competitive, using a wide variety of information sources; and (2) those that use few information sources, usually relying on a single major customer or a small number of customers. While both groups can benefit from networks, it is the second group that needs networks more and will benefit most from membership and participation in a network. (The first group can benefit as well, but its survival is less dependent on network services.)

The Challenge of Keeping Networks Alive

This brings us to other elements and issues common to most networks. Money is a serious issue for network formation. Owners and managers of small and medium-size firms do not have the time or the surplus expertise within their firms to simply "volunteer" their time for network creation. This process takes several years, and must be maintained both with regular meetings and with other benefits

tangible to member firms. If a professional broker is hired, the salary must be paid either through some combination of member dues and grants or subsidies from foundations and governments. To "hustle" such funding also demands the time of the broker, beyond the normal activities for the network and its members.

However, it is human capital even more than financial capital which is in short supply in small firms (Britton 1989; O'Farrell and Hitchens 1989). Small firms find that the demands of the market and the lack of resources (time as well as money) available to them keeps them less than fully informed about potential markets elsewhere. Information about potential suppliers of inputs and markets and channels for outputs is a great challenge to small enterprises, as is the struggle to maintain competitiveness as product and process innovation increase in importance (Johannisson 1991; O'Farrell and Hitchens 1989). In this regard, all of the networks we have studied devote great amounts of energy to market (and customer) identification.

The role of local educational institutions is still unclear, and seems to vary significantly from place to place. On the one hand, community colleges would seem to be best-suited to assisting local small businesses. In the USA, these are typically two-year institutions of higher learning, oriented toward teaching vocational skills and trades for firms and residents within a local area. However, community colleges are not always attuned to the needs of small businesses, since their clientele may well be large firms and branch plants, as was the case in North Carolina (Rosenfeld 1992b: 3). In the context of training programs, community colleges are more likely to be successfully involved, as in the case of the North Carolina Precision Metal Fabricators Association (Meade 1992).

However, despite the common elements and concerns among networks, there is perhaps more diversity than commonality among the networks in place in the USA at this time. European models are being explicitly followed in a variety of ways, each attuned to the economic and political environment in which it is found within the country. The

heterogeneity of economic environments across the United States demands that networks are tailored to specific settings. Successful networks must be embedded within the local socioeconomic structures in which they are located (Granovetter 1985). Sabel (1992) describes in detail the workings of several networks in Pennsylvania. He concludes that what matters most is "the social system by which packages of programmes were defined and administered, rather than the precise definition of any single programme or service" (Sabel 1992: 234). This means programs wherein actors define their own needs, based on cooperation among the actors in particular industries in particular locales. It is arguable that each of these successful networks is appropriate for its locale, and has adapted one or more of the network models to its particular circumstances.

Blackburn et al. (1993) suggest that we should therefore expect a great deal of variation in the networking activities of small business owner-managers. Small businesses vary enormously in terms of the types of activities in which they are engaged, their outlook in relation to the external world, and the resources at their disposal for networking.

Designing policies for networks, and policies to "weave" a network, is not a simple matter (Bianchi and Bellini 1991). In designing policies to assist small businesses, the institutions themselves must be entrepreneurial in nature, responding flexibly to the differentiated needs of local environments (Gibb 1993). In some locations, where policies have attempted to encourage networking activity among firms (especially small and medium-size firms), it is difficult to blend the proper mix of private- and public-sector involvement and interaction (Miller and Coté 1987; Pyke 1992; Regional Technology Strategies 1993). Gibb (1993: 11) asserts that it is important to place the entrepreneurial institutional network in non-governmental organizations, such as flexible manufacturing networks. ACEnet's President, June Holley, also believes this is the ideal institutional arrangement. In this way, the firms are able to see themselves as part of a network, rather than as individuals or as isolated firms. The local

community entrepreneur — or broker in the case of flexible manufacturing networks — brings experience and external contacts to an area. What remains a challenge is for brokers to retain their gatekeeper role and to remain informed about the world outside the network — especially about what is being done in other networks.

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