The Network Metaphor as Key to the Analysis of Complex Production and Service Relations in a Global Economy

Wolf Heydebrand*

Nr. 149 / October 1999

Arbeitsbericht

ISBN 3-932013-89-1
ISSN 0945-9553

* Wolf Heydebrand ist Professor für Soziologie an der New York University.
Anschrift: Prof. Dr. Wolf Heydebrand, New York University, Department of Sociology, 269 Mercer Street 411, New York NY 10003, E-mail: heydebrand@socgate.soc.nyu.edu

Akademie für Technikfolgenabschätzung
in Baden-Württemberg

Industriestr. 5, 70565 Stuttgart
Tel.: 0711 • 9063-0, Fax: 0711 • 9063-299
email: info@ta-akademie.de
http://www.ta-akademie.de

Die *Akademie für Technikfolgenabschätzung in Baden-Württemberg* gibt in loser Folge Aufsätze und Vorträge von Mitarbeitern sowie ausgewählte Zwischen- und Abschlußberichte von durchgeführten Forschungsprojekten als *Arbeitsberichte der Akademie* heraus. Diese Reihe hat das Ziel, der jeweils interessierten Fachöffentlichkeit und dem breiten Publikum Gelegenheit zu kritischer Würdigung und Begleitung der Arbeit der Akademie zu geben. Anregungen und Kommentare zu den publizierten Arbeiten sind deshalb jederzeit willkommen.

Table of Contents

Abstract

This concept paper examines the nature and role of social networks in the complex production and service relations of the contemporary globalizing political economy. As structural patterns of social interaction and relations among sets of actors or nodes, strategic networks are conceived as new organizational forms and as alternatives to institutional constructs such as bureaucratic hierarchies, rational or natural systems, democratic associations, governmental polities, and markets. The emergence and operation of networks are seen as instances of institutional transformation or extra-institutional exchange, strategic alliance, and governance at the level of organizations as well as regional, national, and transnational political economies. Contemporary interactive information and telecommunications technology has significantly enhanced the effectiveness and innovativeness of informal, privatized, non-regulated and unaccountable social networks as alternatives to their institutional counterparts in production, research and development, marketing, and transnational, knowledge-intensive business services.

Der Artikel analysiert die Art und Funktionsweise sozialer Netzwerke in den komplexen Produktions- und Dienstleistungsverhältnissen der gegenwärtig sich global entwickelnden politischen Ökonomie. Strategische Netzwerke werden begrifflich als strukturelle Muster sozialer Interaktionen und Beziehungen zwischen Akteuren oder Knotenpunkten erfasst und stellen neue organisatorische Formen dar, sowie Alternativen zu institutionellen Strukturen wie bürokratische Hierarchien, rationale oder natürliche Systeme, demokratische Verbände, Regierungsordnungen und Märkte. Die Entstehung und Funktionsweise von Netzwerken werden als Beispiele des Institutionenwandels gesehen sowie als ausser-institutionelle Formen des Tausches, strategischer Bündnisse, und der Steuerung auf organisatorischer Ebene wie auch auf der Ebene regionaler, nationaler, und transnationaler politischer Ökonomien. Die gegenwärtige Informations- und Kommunikationstechnik hat die Wirkungskraft und Innovationsfähigkeit informeller, privater, nicht-regulierter und unantastbarer sozialer Netzwerke als Alternativen zu ihrem institutionellen Spiegelbild in Produktion, Forschung und Entwicklung, Vertrieb und transnationalen, wissensintensiven, unternehmens-orientierten Dienstleistungen bedeutend erhöht.

1.Introduction

During the last quarter century, social networks - by all accounts a generic and widespread type of social structure found in most historical societies - have gained new prominence and attracted unprecedented attention both in the world of practical affairs and in the social sciences. Networks, the webs and patterns of social ties among sets of actors, have emerged or become newly visible in communities, organizations, business firms, parties, interest groups and political action committees, voluntary associations, art and cultural services, and the worlds of deviance, corruption and crime. At the same time, a renewed interest in this well-known phenomenon among academic social scientists has led to the emergence of the field of network analysis which has attained a fairly high level of technical and methodological sophistication. In spite of a burgeoning literature on the subject, however, there is as yet no coherent theory of social networks which could help to order the vast amount of descriptive material available in terms of explanatory propositions.

The purpose of this paper is to examine the network phenomenon in the context of the effect of economic globalization on complex production and service relations in modern economies. Such a project necessarily involves multiple levels of analysis, ranging from the origins of networks in friendship ties or strategic choice, to the emergence of networks within and between firms, and to national, regional, and transnational financial and service networks. Conversely, social webs and the Internet spanning the globe can be seen as contexts for lower level networks, such as the supra-national “network state”, the octopus-like, hollow “network enterprise”, and the inter-personal ties among clients, sub-contractors, suppliers, and service providers.

The thematic emphasis on production and service networks largely excludes two closely related areas affected by contemporary changes in the political economy: policy networks and illegal networks, even though occasional references are unavoidable. The emphasis on structural patterns as an analytic lens through which to observe micro-, meso-, and macro-social developments of the global economy also precludes an in-depth concern with the technical and methodological aspects of network analysis (but see, e.g., Scott, 1991 as well as other intermittent references to this body of literature).

The paper will focus on the significance of networks (1) as structural rather than merely institutional or cultural representations of organizational phenomena, (2) as historically connected to the rise of services and of the new information and interactive communications technology in modern societies, (3) as particularly prominent in the economic production, service, and exchange relations of the contemporary phase of

economic globalization, and (4) as constituent elements and symptoms of the incipient de-institutionalization and progressive restructuring of national economies and societies. This focus implies that networks are treated as new forms of organizational structures as well as alternatives to the core subject matter of established organizational and institutional theories, such as bureaucratic hierarchies, rational or natural systems, democratic polities and markets. In all of these cases, the emergence and operation of social networks as forms of governance or cooperative competition inside or alongside established institutional forms signal a state of uncertainty and exception ranging from mere interference with the reproduction of institutional forms to their ultimate replacement. For example, in the language of neo-classical economics, social networks are externalities that interfere with the efficient operation of markets. Bargaining in small networks or restricting the exchange of information in privileged cliques would constitute instances of imperfect competition and result in market failures such as oligopolies, monopolies, and other hierarchical interventions. Similarly, the existence of oligarchic policy networks calls into question the legitimacy of organizational hierarchies or electoral polities. At the same time, however, the emergence and operation of social networks may be seen as instances of "creative destruction" insofar as they signal institutional insufficiency, the widening of options and practices, the formation and diffusion of innovative alternatives and, generally, creative institutional transformation. It is this conception of social networks as innovative and alternative organizational forces and as prime "actors" in the transformation of the global political economy that will be the central focus of this paper.

It is instructive to realize that early structural approaches in the social sciences did recognize the importance of network phenomena, but used a variety of different terminologies to refer to network-like relations and structures. Simmel was keenly aware of the web of overlapping social circles and the analytic importance of separating the forms of social relations from their contents. Human ecology used terms like web of life, commensalism, and isomorphism, and precursors to social movement theories treated networks as part of "collective behavior". Political theory recognized networks in terms of coalitions, alliances, federations, clientelism, and neo-corporatism, whereas rational choice approaches referred to networks as "social resources" (Lin, 1982) or used Bourdieu's (1986) distinction between different forms of capital to focus on networks as "social capital" (Coleman, 1988; Lin, 1999). Scott (1991:7) includes psychological theories such as Gestalt and field theory, sociometry, group dynamics, and graph theory as early influences on network analysis. Similarly, early structural-functional approaches in anthropology and sociology had a significant impact on theoretical models of social structure insofar as they sought to separate the effects of formal and structural patterns

from those of their cultural and institutional content. In line with this research policy, the British social anthropologist Clyde Mitchell (1969) tended to distinguish informal networks of social interaction from the formal relations of institutional structures. This important analytical understanding of networks, however, remained limited insofar as it was identified mainly with egocentric interpersonal networks and meaningful "communal" relations, even though Mitchell contrasted such partial interpersonal networks with the 'total networks' of a society which he conceptualized as "the ever-ramifying, ever-reticulating set of linkages that stretches within and beyond the confines of any community or organization" (Mitchell, 1969:12, as quoted by Scott, 1991:31).

In organization theory, Cyert and March (1963) stressed the importance of dominant coalitions in their behavioral theory of the firm, and Karl Weick (1976;1969) contributed the imagery of "loosely coupled systems" and of "organizing" and "self-organization" as ongoing social processes. Organizational network theory builds, to some extent, on structural theories of social action (e.g., Burt, 1982; White, 1992), but it remains distinct from the claims of methodological individualism and theories of individualist rational choice (Coleman, 1990; Williamson, 1985; see also the critique by Granovetter, 1985). Organizational network theory has also been developed further along the lines of neo-Marxist theories of the political economy (Benson, 1975; 1981) and the structure of interlocking directorates and inter-corporate relations (Mizruchi and Schwartz, 1987; see also section 2.1.2, below). Finally, the new institutionalism in organizational analysis has concerned itself with the embeddedness of relational networks in pre-existing cognitive and normative institutional contexts (Powell, 1990; 1991; Jepperson, 1991; Fligstein, 1991). This strand of development will be further discussed below in connection with Powell's research on biotechnology networks (Section 3.4.2).

2. The Nature of Social Networks

As noted above, the purpose of this paper is to locate the phenomenon of social networks in the contemporary context of complex production and service relations. Accordingly, the first substantive section of the paper is devoted to matters of definition and conceptual clarification (beginning with Section 2.1 and ending with Section 2.2.5). Social networks are then examined in the context of industrial production relations, notably manufacturing and research and development in high-tech and knowledge-intensive firms (especially in information technology and biotechnology) and in the context of distribution and marketing (Section 3). Section 4 looks at social networks in complex service relations, with an emphasis on the rise of services and the nature of service networks and the "network enterprise". Transnational and global networking is discussed from the perspective of the international trade in services, the transfer of knowledge and technology through transnational networks, and the growth of business service networks in accounting, advertising, management consulting, and legal services (Section 5). The question of the effect of networks on the qualifications, employment relations, and the structure of labor markets is analyzed in Section 6. Finally, Section 7 provides a summary and conclusion. All literature references in the text are cited in full at the end of the paper.

2.1 Defining Social Networks

A useful first approximation to the definition of networks as special kinds of social structures is the general notion that "social structures can be represented as networks - as sets of nodes (or social system members) and sets of ties depicting their interconnections" (Wellman and Berkowitz, 1988:4). Nodes can represent individual persons, groups, households, corporations, nation-states, or other collectivities. "Ties are used to represent flows of resources, symmetrical friendships, transfers, or structured relationships between nodes" (ibid.). A similarly structuralist definition refers to networks as "the set of social relations or social ties among a set of actors (and the actors themselves thus linked)" and network structure as "the patterning of relations and 'holes' among actors in a network"; content is defined as "the specific nature or type of relation linking actors in a network (e.g., exchange, kinship, communicative, affective, instrumental, or power relations)"(Emirbayer and Goodwin (1994:1447-8). Emirbayer and Goodwin, however, ultimately transcend this structuralist definition by suggesting a

theoretical integration of individual, network, and cultural analysis. A colloquial version of the above definitions of network is that it is "a set of interactions among a number of players who collaborate in order to gain values from their relationship" (Bressand, 1992:85; Kostecki, 1994:223).

A more institutionalist definition, by contrast, refers to network forms of organization as "typified by reciprocal patterns of communication and exchange" that "...entail indefinite sequential transactions within the context of a general pattern of interaction;...sanctions are typically normative rather than legal" (Powell, 1990:301). Note that in this definition, institutional elements are seen as shaping and structuring networks, for example, "typifications", the context of general patterns of interaction, and normative sanctions.

Finally, in a creative effort to integrate structure, agency, and discourse, White (1992:65) speaks of networks as "phenomenological realities as well as measurement constructs. Stories describe the ties in networks." Referring to evolving networks or networking in biotechnology, White (1992:66) claims that "there are social networks of ties spinning out among all the actors, networks sufficient to suggest a community evolving, an industry as economic community. These are ties of contention and of cooperation. Most important among them are contractual commitments between pairs or among sets of actors, commitments as to venture capital or joint development or marketing agencies and the like. There will be many distinct perceptions, many stories about particular ties and interconnections of ties". In addition, White (1992:315) relates his broadly conceived network metaphor to his notion of agency as resulting from efforts to control and "getting fresh action": "Agency is about relations. Agency is the dynamic face of networks". But while innovative with respect to the purely "structural" definitions of networks, White's imagery also displays a great deal of ambiguity in terms of the formal/informal character of networks: terms like "community" , "contractual commitments", joint venture and development serve to blur the boundaries between networks and institutional or institutionalizing structures. Thus, it is not clear whether social networks are seen as blocking action (as in corporatism or clientelism) or as facilitating action (as in "getting action") (White, of 1992: 147, 254; see also Starbuck, 1983 for a compelling analysis of the propensity of organizational routines and programs to block innovative action). If it is true that "any social formation whatever, complex or not, tends to settle into blocking action over time" (White, 1992:255), it would be difficult to discriminate between networks and organizations/institutions as well as between the processes of networking and institutionalization.

Generally, the analytic emphasis in network studies tends to be on patterns of interaction and relationships within and between social structures rather than on the origins,

formation, content, roles, trajectories and transformation of these relationships. It is, therefore, useful to add three elements to the general concept of social networks.

2.1.1 Types of networks

It may be helpful initially to distinguish between different types of networks, especially technical networks (e.g., telephone, Internet) and transactional networks (transportation, trade), on the one hand, and social and socio-technical networks, on the other. Routine communication and transportation networks are, of course, ultimately social or involve the interaction between people and technical systems, including computers, but they require a technical infrastructure the details of which are necessarily of secondary interest in this paper.

Socio-technical networks refer to the small but growing class of social networks that are emerging from social interaction within and through technical information and communications networks such as the Internet, but have distinct interpersonal or inter-firm relational patterns that vary with industry-specific specialized service production and delivery systems. Examples (besides chat groups and virtual communities on the Internet) are computer reservation systems or R&D networks in information technology or biotechnology (Bressand, 1989; Spriano, 1989; Pisano, 1991; Powell, Koput, Smith-Doerr, 1996). We shall see that these types of networks play a decisive role in the work relationships within and between service systems and therefore represent historically and structurally new organizational and economic phenomena. Formal disciplines and limits are imposed on such socio-technical networks only by the nature and characteristics of the technical infrastructure itself and by certain regulatory rules and security regimes built into the protocols of these systems, for example, access codes and mechanisms of encryption (Horning, 1998). Legal and contractual issues such as the protection of intellectual property, compliance, and enforceability of contracts in cyberspace are much more amorphous and ambiguous and have led to the search for the viability of new legal instruments such as electronic contracts and international intellectual property regimes (Kingsbury, 1998; Horning, 1997; Dreyfuss and Zimmerman, 1997; Zimmerman, 1994). The flexibility, versatility, and interactive nature of socio-technical networks, however, also promotes informal styles and patterns of interaction among the network citizens (“netizens”) and among organizations, patterns that ultimately transcend traditional state and legal boundaries of procedural regimes (Dezalay, and Garth, 1996).

2.1.2 Origins of networks

Secondly, the question arises , what exactly are the origins of social networks? As a first approximation, we may define social networks as either emergent (with no particular purpose except association, sociability, and companionship, expressing sentiments and solidarity, or acting on mutual identification or attraction etc.) or established (invented, constructed, constituted) for particular instrumental or strategic purposes, e.g., cooperation, exchange, power, participation, alliance, confederation, or governance. These deliberate contents suggest that inter-organizational networks will tend to cluster in the second category of established or strategic networks, although the fertile role of pre-existing and emergent opportunity relations in the formation of strategic networks should not be discounted.

In **emergent networks**, the causal imagery involved is that of mutual attraction, companionship, or attachment. It favors the Weberian notion of "elective affinity", a choice of interaction and relations based not on kinship or other institutionally pre-determined relationships, but on a broad intellectual agreement among frames and styles of cultural patterns and an emotional correspondence among basic attitudes and predispositions of actors, similar to homophily or heterophily, as the case may be (Marsden, 1987; McPherson and Smith-Lovin, 1987).

Homophily involves attraction, fellowship, and friendship founded on common existential and situational experiences, shared emotional or intellectual predispositions, as well as perceived categorical similarities like age and generation, gender and sexual preferences, socio-economic status (education, occupation, income), ethnicity, religion, and nationality, as in "birds of a feather flock together". These categorical networks are often called "catnets". Although much less studied, **heterophily**, i.e. "liking otherness" or "desiring the other", as in "opposites attract each other" may, of course, also be based on categorical judgments or prejudices and is possibly one of the ingredients in heterosexuality and ethnic/religious intermarriage. It is conceivable that heterophily is involved in the structurally highly important "bridge" relationships or "weak ties" between groups, segments, and sub-networks (e.g., Granovetter, 1973; Blau, 1977).

An added causal factor in affinity and attraction to both sameness or otherness may be the intrinsic dynamics of interaction, as generalized in George Homans' proposition that "interaction leads to liking" (Homans, 1950; see especially the foundational role he accords to "sentiments" in addition to activity, interaction, status, and norms; see also, generally, Simmel's formal sociology which favors cognitive forms and categorical types of interaction and relations over normative content).

Established, instrumental or strategic networks may also use categorical similarities/differences as the basis for establishing secondary social relations or use pre-existing networks to maximize trust or cooperative attitudes, but the overriding collective goal is obviously to achieve specific purposes through informal relations rather than through some set of organizational or institutional channels. For networking strategists (in contrast to mere participants), therefore, homophily or elective affinity is a means to an end rather than an end in itself. Insofar as instrumental networks have a particular focus, theme, or content, they may shade over into certain types of loosely organized voluntary associations or interest associations, especially if the network relationships between members become enduring and routinized. But voluntary associations with a constitution, by-laws, procedural rules, elected officers, and a fixed agenda are no longer networks, but types of organizations.

At the next higher level of structural analysis, in turn, inter-organizational relations may vary from relatively informal, ad hoc, intermittent ties and transitional networks to more long-term, structured relations and from quasi-formal alliances, conglomerates, federations and interlocks to highly integrated legal and authoritative types of organizational and institutional hierarchies into which subunits are tightly incorporated. Intermediate forms like markets vary themselves in terms of formalization, depending on the degree of contractual closure and the structural distance between contractors, sub-contractors, and consumers. The analytical problem thus is not so much the obvious distinction between networks and hierarchies, but between networks and the myriad intermediate forms such as quasi-formal markets, strategic alliances, coalitions, and interest groups (see, e.g., Baker, 1990; Powell, 1990; Powell and Doerr-Smith, 1994; Podolny and Page, 1998).

For example, the conceptual distinction between informal networks and quasi-institutional interlocks or business groups is historically variable and structurally somewhat arbitrary. Granovetter (1994: 454) distinguishes between “business groups” as an “‘intermediate’ level of binding” among a set of legally independent firms from a “legally consolidated” set of firms, on the one hand, and “ a set of firms bound merely by short-term strategic alliances, on the other. If business groups are informal coalitions without legal standing, one wonders about the status of inter-firm strategic alliances and other informal inter-firm networks. Granovetter appears to treat all three of his major categories as structural forms **above** the level of social networks; the latter are seen in one way or another as an example of the process of “how actors mobilize resources through networks of contacts” (454), i.e. as part of a sub-institutional level of action. Nevertheless, Granovetter (1994:455) includes “under the heading of business groups sets of firms that are integrated neither completely nor barely at all; many such groups

operate in the middle range of coalitions and federations - forms that....Chandler (1977; 1990) [has] treated as transitional and unstable at least in capital-intensive industries, where, in his accounts, they must give way to the greater efficiency of large, integrated firms."

Granovetter (1994:461) identifies six dimensions of variation among business groups: legal ownership relations; axes of solidarity (e.g., economic interest vs. ethnicity and other categorical bases of identification); authority structure (vertical vs. horizontal modes of control); moral economy (dominant concepts of justice or mission); finance, capital, and the role of banks; and finally, the role of the state. While these dimensions are analytically independent, there are important empirical and historical connections among them. Thus, business groups hover structurally between strategic networks and quasi- institutional interest groups depending on the context in which they are embedded.

One important type of business grouping is that of interlocking corporate boards and directorates. Since such interlocks are an integral part of the legal form of the modern corporation and the governance of the capitalist shareholder firm, they are relatively "institutionalized" networks. Thus, even though interlocking directorates and other types of interlocks may arise from, or give rise to, informal network relations, the vast literature on this topic will not be considered here in detail (but see Kotz, 1978; Burt, 1979; 1982; 1983; Soref, 1979; Ratcliff, 1980; Galaskiewicz and Wasserman, 1981; Mizruchi, 1982; Palmer, 1983; Roy, 1983; Useem, 1984; Mintz and Schwartz, 1985; Soref and Zeitlin, 1987; Johnsen and Mintz, 1989; Kono, Palmer, Friedland, Zafonte, 1998; see also Fligstein, 1990, and Fligstein and Brantley, 1992; a closely related literature deals with corporate mergers from an economic viewpoint, e.g. Alberts and Segal, 1966 as well as sociological perspectives , e.g. Palmer et al. 1995; Fligstein, 1995; Palmer, Barber, Zhou, 1995; Stearns and Allan, 1996; Davis and Greve, 1997; Davis and Robbins, 1998). Interestingly, the geographical perspective represented by authors such as Cooke, Scott, Storper, Strambach and others has been central to much network analysis, but has been rediscovered by sociologists only recently (see, e.g., Kono et al. 1998).

The topic of business groups and interlocking corporate directorates is, of course, closely related to the issue of policy making networks. i.e. the government-economy (or state-class) nexus (e.g., Domhoff, 1996; Lauman and Knoke, 1987), the earlier community power structure research (e.g., C.Wright Mills, Robert Dahl, or Lauman and Pappi, 1976), the resource-dependence perspective (Pfeffer and Salancik, 1978), as well as research on at least three obvious beneficiaries of the advantages of extra-legal strategic networks: undercover intelligence and clandestine interventionist operations by

government agencies, underground national and transnational activities of radical oppositional groups, and the secret intrigues employed in elite deviance, collusion, corruption, and organized crime (Baker and Faulkner, 1993; Tonry and Reiss, 1993; Walter, 1990; White, 1991; Walton and Cleveland, 1964; Ianni, 1974; Adams, 1990; Simon and Eitzen, 1990; Erman and Lundman, 1992; Della Porta and Meny, 1996; Ruggiero, 1996; Yeager, 1991; Nelken, 1997; Calavita, Pontell, and Tillman, 1997; Castells, 1998, Vol 3:166-205; Rosoff, Pontell, and Tillman, 1998:207-212; Della Porta and Vannucci, 1999; Vaughan, 1999:287-89). In the present paper, the discussion is necessarily restricted to economic networks in production and services even though organized and white-collar criminal networks are a subset of economic networks whose significance as informal, extra-legal social networks extends far beyond the confines of economic action.

2.1.3 Structure and content of networks

Third, in terms of structure and content, and in sharp contrast to organizations and institutions, networks are typically **informal, private, self-organizing, undifferentiated (although often segmented or fragmented), non-contractual, extra-legal, unregulated, unaccountable, non-transparent and, generally, of limited focus, size and duration**. Actually existing, concrete, empirical networks may, of course, vary along these dimensions, e.g. from single to multiplex focus or from transitory to relatively enduring relations. For purposes of this analysis, however, it is useful to acknowledge the initial categorical difference between informal networks and other types of social structures (see also Gartrell, 1987; Podolny and Baron, 1997). Although it is important to recognize the limits of an outright functionalist account of networks as "responses" to institutional stagnation or crisis, informality can be shown to be particularly important for innovative networks. As DeBresson and Amesse (1991:364) put it, "in comparison with other systems... networks of innovators are relatively loose, informal, implicit, decomposable, and recombinable systems of inter-relationships, although some successful ones can last many decades". Similarly, Kevin Kelly (1995:25-27, as cited by Castells:1996:61, fn 71, italics added) argues: "The only organization capable of nonprejudiced growth or *unguided learning* is a network. All other topologies limit what can happen. A network swarm is all edges and therefore open-ended any way you come at it. Indeed, *the network is the least structured organization that can be said to have any structure at all*... In fact, a plurality of truly divergent components can only remain coherent in a network. No other arrangement -

chain, pyramid, tree, circle, hub - can contain true diversity working as a whole". Finally, at the end of his monumental treatise on the "rise of the network society", Manuel Castells (1996:470-71) offers the following definition and description:

> "A network is a set of interconnected nodes. A node is the point at which a curve intersects itself....concretely speaking, [nodes and networks] are stock exchange markets, and their ancillary advanced services centers, in the network of global financial flows. They are national councils of ministers and European Commissioners in the political network that governs the European Union. They are cocoa fields and poppy fields, clandestine laboratories, secret landing strips, street gangs, and money-laundering financial institutions, in the network of drug traffic that penetrates economies, societies, and states throughout the world. They are television systems, entertainment studios, computer graphics milieux, news teams and mobile devices generating, transmitting, and receiving signals, in the global network of the new media at the roots of cultural expression and public opinion in the information age. The topology defined by networks determines that the distance (or intensity and frequency of interaction) between two points (or social positions) is shorter (or more frequent, or more intense) if both points are nodes in a network than if they do not belong to the same network.....Networks are open structures, able to expand without limits, integrating new nodes as long as they are able to communicate within the network, namely as long as they share the same communication codes... A network-based social structure is a highly dynamic, open system, susceptible to innovating without threatening its balance. Networks are appropriate instruments for a capitalist economy based on innovation, globalization, and decentralized concentration; for work, workers, and firms based on flexibility and adaptability; for a culture of endless deconstruction and reconstruction; for a polity geared towards the instant processing of new values and public moods; and for social organization aiming at the supersession of space and the annihilation of time".

While Castells' expansive and sometimes rhapsodic description mixes analytical elements that one might want to keep separate, e.g., social, socio-technical, and technical networks, or networks and systems, it gives an appropriate flavor of the ubiquity and pervasiveness of the network form in the contemporary phase of globalization. Like Castells, many prominent students of networks use the term in an inclusive and often

somewhat colloquial manner. Recognizing the ubiquity of interpersonal ties and informal settings, for example, Camagni (1991) adopts a fairly broad-gauged conceptual strategy in referring to informal networks as "milieu relationships" (including, counter-intuitively, regional and national sub-contracting and supplier networks; see also Lorenz, 1989;1990 who seeks to establish a middle ground between "friends" and "strangers", yet for whom "trust" in such informal networks is a key variable). More formal relationships involved in joint ventures and agreements, on the other hand, are called "networks" by Camagni (1991).

In contrast to a potentially wide-ranging and variable terminology, the present approach to networks is analytically slightly more restrictive and emphasizes their unique, generic characteristics at the lower limits of social structure, indeed, as "the least structured organizations that can be said to have any structure at all". Thus, the present paper shall refer to "formal" (contractual, authoritative, public) relations as inter-organizational **interlocks** or inter- institutional **channels** and reserve the term "network" for informal, private, non-contractual and unaccountable relationships. Social networks, following Homans, are therefore seen as non-institutional or "sub-institutional" phenomena representing "new patterns of social organization" that emerge from the activities, sentiments, and interactions among individual units, although one may not want to limit them, as Homans does, to exchange processes couched in terms of capital, resources, investments, and payoffs nor to interaction at the individual level (Homans, 1961:Ch.16). In sum, unless one uses the term "network" (or "system", for that matter) in a loose, colloquial, non-technical way to refer to any pattern of interrelationships among the different units of a social or organizational field, the definition of network will be restricted to informal, private, non-institutional patterns of relations among social actors, nodes or units.

2.2 Sources, roles, benefits, and contexts of social networks

Under conditions of long-term institutional legitimacy and stability, ample economic resources, established policies, forms of decision making, and routines in production, technology, and markets, and a generally high level of predictability of the social, economic, and political environment, the emergence of social networks would seem to be an occasional, random, or marginal event, a kind of social luxury limited to special social niches, times, and conditions. Whenever networks are found under such conditions, moreover, one would expect them to become routinized, formalized, and

institutionalized within a certain period of time and to fit easily into the institutional structure of the respective society.

By contrast, under conditions of institutional instability and change, relative scarcity, changing markets and increased competition, socio-economic and political insecurity, rapid technological innovation and change, new styles of policy and decision making, and new methods of management and administration, one would expect established social structures to give way to new social and organizational forms as well as to institutional transformation. Social networks of all types would be expected to top the list of "social innovations" under conditions of increased risk and uncertainty insofar as they offer significant advantages over established institutional forms of organizing social relations and doing business.

There is, however, a likely curvilinear dynamic: both institutional over-integration as well as dissolution can be expected to give rise to network-like structures. Political repression by authoritarian regimes may engender clandestine relations and oppositional networks, and over-institutionalized social structures may spawn deviance, corruption, intrigues, and deconstruction all of which would be impossible without the informal, private, unaccountable nature of networks. The more the circumstances of the emergence of informal social networks are specified in historical, cultural, and political terms, the less likely is it that functionalist or purely rationalist explanations will be sufficient or adequate in linking networks to conditions of risk, uncertainty, and crisis.

Nevertheless, the central insight of network analysis as well as the emerging theory of social networks is that small social networks in a changing economy and society can be seen as models of private self-organization and as particularly congenial and cost-effective structures of communication, decision making, transaction, and concerted action. This may be particularly true under conditions of ambiguity, risk, danger, complexity, turbulence, uncertainty, and unpredictability. Whether one looks at these characteristics of networks from a functionalist, rationalist, or even social constructionist perspective, therefore, social networks offer these advantages over institutional structures because they are informal, flexible, adaptive as well as non-contractual, non-regulated, and extra-legal. Networks are also potentially secret, clandestine, and unaccountable insofar as they operate outside of bureaucratic and authoritative structures of control, contractual market relations, and elected public bodies without necessarily being illegal or corrupt

2.2.1 The role of technical and economic benefits

Some network theorists emphasize the convergence of technological uncertainty (the absence of stable technologies, standardized products and long product life cycles) and the absence of clear property rights, i.e. uncertainty in the legal conditions of appropriation (DeBresson and Amesse, 1991:365). Social networks are favored by economic transactions that are risk prone rather than risk averse, high in entrepreneurship rather than routine production, management, and impersonal mass markets, and legally creative and versatile in terms of "relational contracts" (contingent clause contracts) rather than classical or neo-classical contractual forms (Macneil, 1978). In that sense, networks are collective, socially structured extensions and amplifications of the neo-liberal image of the independent, rational, and creative individual entrepreneur who is a master of self-activity and self-determination, and responsible only to him- or herself (see also Schumpeter's "heroic entrepreneur", Ayn Rand's "fountainhead" and "master builder", or Robert Reich's "strategic broker"). According to Powell (1990:323), participants in exchange networks are motivated by the "reduction of uncertainty, fast access to information, reliability, and responsiveness". They have a rational interest in low transaction costs, speed, and accelerated learning by the transfer of tacit knowledge and know-how (ibid., 324).

An important aspect of technological and market uncertainty is that networks may arise as a result of the "systems dimension of technology" (De Bresson and Amesse, 1991: 368; see also Freeman, 1991). This means that new technologies with shorter product life cycles such as computers, micro-electronic products, or information systems and, generally, complex technical production and service systems "require multiple sets of complementary technical developments which necessarily go beyond the scope of even the largest firms" (De Bresson and Amesse, 1991:368; see also Hakansson, 1989). Moreover, socio-technical cooperation among firms can be seen as producing super-additive gains in the sense of a "positive-sum game" (Landau and Rosenberg, 1986). Economic incentives and profits are seen as resulting from the transformation of individual entrepreneurship into a joint endeavor which combines human and technical resources through the medium of cooperative networks (Foray, 1991).

Additional benefits of networks are asset specificity (including "local knowledge"), trust (low opportunism), high exchange frequency, stability through mutual adaptation, flexibility through redundancy (overdetermination and multiplexity of relationships), small size, and the strength of weak ties or minimal obligations (Grabher, 1989). Expanding on the work of Sabel et al. (1989) and Miles and Snow (1986), Grabher (1989:18) suggests that redundancy in network relationships "will secure access to

complementary resources, reduce or eliminate the cost of searching for new exchange partners and of passing through new processes of mutual adaptation", and serves to "create opportunities for sharing the learning experiences of exchange partners resulting from their exchange relations with third parties". These opportunities are expected to produce virtual "learning systems", joint problem-solving, and high trust relations (Sabel et al., 1989; see also Lundvall, 1990; Pisano, 1996; Powell, 1996; Sabel, 1993 a,b; Starbuck, 1992).

Legally speaking, such favorable conditions minimize transactions costs " by freeing the parties from the impossible task of precisely specifying their respective rights and responsibilities through elaborate contracts" (Sabel et al., 1989, as quoted by Grabher, 1989:19; see also Macneil, 1978). There may, however, also be risks and market failures that derive from bilateral transactions under uncertainty, externalities and collusive behavior, and system-wide turbulence. Especially in cases where there are informational asymmetries, conjunctural uncertainty, and other market shortcomings, certain informal precautions or formal remedies may be necessary. Examples suggested by Holmstrom (1985, as cited by Petit, 1991:49) include: (1) contingent contracts, whereby payments will be partly based on the result and not on the effort of the seller; (2) reputation, where an asset of good fame is backing the commitment and ability of the seller; (3) signaling, where obvious signs of competence like educational level ensure the expertise of the seller; (4) certification and monitoring, where regulations and rules are issued by public authorities or professional associations. Most of these concepts refer to implicit contracts between two or more agents, i.e., an informal regime that should be particularly appropriate for network relations.

2.2.2 The role of trust

While the formation of networks does not guarantee the control of risk and uncertainty, most observers agree that it helps to reduce market uncertainties, technological risk, and opportunism, i.e. behavior that is activated by self-interest and special opportunities to place individual goals above collective or organizational goals. A key factor assumed to contribute to the reduction of opportunistic behavior is the prevalence of trust in network relations. The causal relation between durable, informal relations and the development of trust is probably one of mutual influence such that trust generates persistent network relations which, in turn, contribute to expanded trust (see also Saxenian, 1991, whose optimistic appraisal of trust will be discussed in connection with her account of "production networks", Section 3.1, below). Exchange theory asserts that the success of

small, episodic transactions may lead to greater investments in future transactions which, if satisfactory, may serve to confirm the justifiability of trust in still greater and more regular kinds of investments in a given relationship (Blau, 1964). As De Bresson and Amesse (1991:368) put it: "From an agreed upon initial *modus vivendi*, mutually credible commitments are made in networks on the basis of compatible preferences and goals, which can eventually evolve into a mutual dependency and bondage resulting in positive reciprocity, the development of common language, mutual understanding and, sometimes, trust. Although blind trust cannot be bought, there can be a continuum of states of cooperation leading to guarded trust, either within the firm or between firms". Thus, social networks do not and probably cannot operate completely on „blind trust", but are contingent and conditional on some reflexive evaluation of the „performance" in and of the relevant relationships (see also Bradach and Eccles, 1989; and Gambetta, 1990 whose performance-based concept of trust has a similar kind of rational twist).

Trust, then, appears to be not so much an interpersonal relationship, but rather a process (see also Yamagishi, Cook, and Watabe, 1998 who focus on the role of general trust in emancipating actors from the confines of safe, but closed relationships). Trust is based on "the mutual confidence that no party to an exchange will exploit the others' vulnerability" (Sabel, 1993a:104). In Sabel's view, "studied trust", reflexive cooperation, relational contracts, or "deliberative trust" are existential acts, almost like "a leap in the dark". They are based on the assumption "that individuals and groups must, to survive, enter agreements with others which create unanticipated states of the world" (Sabel, 1993b: 103-104).

A similar faith in the role of trust, though less existentialist and more conscious of risks and transaction-costs, is expressed by other students of networks such as Grabher (1989;1993), Granovetter (1985), Lorenz (1990), Powell (1990), and Uzzi (1996).

At the other end of the trust-distrust continuum, Harrison (1994:95-102) discusses the case of Prato, one of the famed "new industrial districts" of the "Third Italy" and once hailed as the epitome of flexible specialization. Sensitive to the negative consequences of excessive fragmentation in the production networks among local textile producers and merchants, Harrison argues that trust, "when it becomes a force for defending old ways, can actually suppress innovation" (Harrison, 1994: 101). While "information on production techniques does diffuse widely and rapidly because owner-operators talk to one another, because families live in the same social context, and because apprentices move easily from one workshop to another", the "impannatori", brokering among merchants and producers, have market and economic information that they are not necessarily willing to share freely in the face of global competition (101-102). Similarly, Saxenian (1990) shows that the economic crisis of the semi-conductor industry of

Silicon Valley in the mid-1980s was partly generated by distrust and antagonistic relations between the producers of silicon chips and their suppliers. Distrust and antagonism, however, may in turn reflect larger dislocations caused by national and transnational economic trends (Harrison, 1994:22)

Thus, the fundamental role of trust which is typically taken for granted in traditional contexts and pre-modern social relations may be historically contingent and highly precarious. It is open to subversion by cut-throat regional competition in modern contexts as well as by the contemporary impact of globalizing forces. As a result, it may be prudent to recognize that the role of interpersonal and inter-firm trust cannot be taken for granted, especially since it is vulnerable in the face of strategic considerations. Contemporary global shifts tend to reduce trust to a barely calculable, but nevertheless highly valued aspect of human capital.

2.2.3 The role of informality and flexibility.

Of particular interest for the question of the adaptive or innovative capacity of social networks is their basis in the structural context of informality and flexibility. As noted above, "networks of innovators are relatively loose, informal, implicit, decomposable, and recombinable systems of inter-relationships" (DeBresson and Amesse, 1991:364). This assessment broaches the issue of formality/informality head on and invites comparisons with other structural terms and concepts as well as varying economic and historical conditions of rigidity/flexibility. For example, analyzing the transition in formerly state-socialist economies and firms, many observers stress the contextual, even "systemic" relevance of informal social networks that are based on reciprocity rather than merely on exchange relationships (Aderhold, 1994:41,55; Sedaitis, 1997; Heidenreich, 1992:335; Grabher, 1995:181-83; and Mushaben, 1997). In the context of East Central European state socialism, these political and economic networks played a particularly important role in the adaptation and survival strategies of actors in the "second" or "shadow economies" (see also Deppe and Hosz, 1989:36-41 on comparing Hungary and East Germany; also pp. 462-66 on the "legalization" of informal intra-firm bargaining processes). Similarly, the establishment of new market organizations after the transition depends heavily on pre-existing as well as newly constituted social networks. In the case of contemporary Russia, for example, strategic social and economic exchange networks often straddle the fine line between entrepreneurial privatization and public-private collusion and corruption (Handelman, 1995; Solnick, 1998). More specifically, Judith Sedaitis shows that "the social network density of

founders shapes both internal organizational processes as well as external, inter-firm ties" (Sedaitis, 1997:137; see also Codagnone, 1994).
But the central issue for the present effort to develop the implications of the network concept is that of innovation in contemporary "production networks"(Saxenian, 1991; Harrison, 1994) and "learning networks" (Lundvall, 1990; Pisano, 1996; Powell et al., 1996) many of which emphasize the formal-informal structural dimension of social networks. Notions such as "innovation clusters" (Schumpeter, 1939:100-101), "innovation poles" (Toedtling, 1995); "development poles"(DeBresson, 1989) and "technopoles" (Scott, 1991) also suggest the importance of the flexibility and interactive capacity generated by ecological and geographical proximity. They recall the structural propensity of Marshallian "nodes" and industrial districts to facilitate flexible interaction and innovation. Innovative, hyper-interactive inter-firm networks provide a broader set of experiences than either cash exchange transactions or Oliver Williamson's "internalization" into a hierarchy. DeBresson and Amesse (1991:368) argue that cash exchange transactions are "impossible because of the embeddedness of technological know-how and the non-exclusive character of its exchange" while internalization "provides a narrower scope of possible combinations because of 'program persistence' and difficulties in maintaining autonomous entrepreneurial sub-units within an organization" (see also Starbuck, 1983, on fixed organizational programs and routines as action generators; Grabher, 1993; Lundvall and Johnson, 1994 on "lock-ins" and similar obstacles to learning; and Eccles, 1985 on intra-firm transfer pricing problems vitiating the putative benefits of hierarchy). Informal networks, by contrast, "encourage learning from other sets of clients and suppliers, leave scope for varied applications and experimentation, and reduce sunk investments and irreversible technical commitments" (DeBresson and Amesse, 1991: 368).

2.2.4 Cultural and institutional context vs. structural dimensions

Cultural differences - i.e. differences in the cognitive meaning and the normative content of social ties - can be expected to play a role in the degree of informalism desired or permissible in social networks (for a similar hypothesis with respect to the cultural influences on technology, see Bartholomew, 1997). Cultural differences may exist in the extent to which markets, in contrast to socio-political institutions, can both be either efficient or inefficient, thus defining the parameters of effective corporate governance or, alternatively, institutional failure and market failure (Thomsen, 1997:59). For example, the Scandinavian and Swedish approach to network studies tends to bring out

the informal, personal, long-term, and practical aspects of inter-organizational networks (Johanson and Mattson, 1987; Lundvall, 1988; Hakanson, 1989; Axelsson and Easton, 1992; Forsgren and Johanson, 1992; Bjoerkman and Forsgren, 1997). On-going interaction in long-lasting business relationships is often seen as an end in itself and in some cases as more important than an instrumentally oriented approach to strategic decision making (Johanson and Vahlne, 1992). Interactive sensitivity and tolerance of diversity and difference may be preconditions for a kind of "inter-cultural competence" of firms as they enter into foreign network relationships in the process of going global (Langhoff, 1997). Similarly, the British cultural context of bargaining and the common law may favor the informal dimension in personal, small group, networking relationships (Cooke, 1988; Dyson, 1996; Smith, Dickson, and Smith, 1991, on research collaboration between large and small electronics firms). By contrast, continental approaches, such as French, German or Italian ones may be more sensitive to the formal, public, contractual, and civil law context of economic network transactions as well as the role of the state in structuring these contexts (Camagni, 1991; Bianchi and Bellini, 1991; Leoncini, Maggioni, and Montresor, 1996; Glasmeier, 1991). Japanese, American and European networks differ on still other dimensions (Freeman, 1987; Gerlach, 1992; Harrison, 1994, Ch.s 7 and 8; Aldrich and Sasaki, 1995; Hicks, Isard, Martin, 1996; Thomsen, 1997:58; Podolny and Baron, 1997, who focus on workplace mobility in a fairly large, California-based high-technology engineering and manufacturing firm; and Yamagishi, Cook, and Watabe, 1998). Differences among Korean, Taiwanese, and Japanese inter-firm alliances depend on the institutional relations between state, economy, and culture, with the state and playing a particularly important role in Korea as compared to large corporate networks in Japan (esp. after World War II), and family-based networks of firms in Taiwan (Hamilton and Biggart, 1988; Kaufman Winn, 1994). In Japan, in particular, the evolution from the family-owned business networks (*zaibatsu)* to the highly diversified post-war bank and industrial networks *(keiretsu)* has led to a rather unique amalgamation of traditional and modern elements, for example, the fusion between the "cultural" priority of the extended family and group (vis-a-vis individual rights and autonomy), on the one hand, and the more recent uses of "rational" quality control and network management techniques in organizations and inter-organizational networks, on the other (Goto, 1982; Lincoln, Gerlach, and Takahashi, 1992; see also the extensive list of references on Japan in Harrison, 1994:288, fn.6).

Analyzing the role of networks in China is complicated by the contemporary instability and intersectionality among political, economic, and cultural transformations. In spite of accelerating economic change in urban China (Zhou, Tuma, and Moen, 1997), personal and political connections still appear to play an important role in job shifts and job

searches (Bian, 1997; but see Guthrie, 1998, who argues that the significance of informal network connections *(guanxi)* in commercial and business relations is actually declining due to the rise of a state-sponsored rational-legal system in contemporary China).

Care needs to be taken, however, in **analytically separating the effects of culture from those of structure and size** even though cultural and structural factors interact at the empirical level. Small networks and/or the networks among small firms may ipso facto favor informal relationships regardless of cultural context (Szarka, 1990; Rothwell, 1991; Smith, Dickson, and Smith, 1991; Perrow, 1992; Granovetter, 1994: 458-61). Large inter-firm networks may be older and thus developmentally closer to more formal types of vertical structuring, integration, and institutionalization (Pisano, 1991; Storper and Harrison, 1991; Langlois and Robertson, 1992; Robertson and Langlois, 1995). Network structure may be primarily a function of business strategy (Gemuenden and Heydebreck, 1995) or reflect the structure of the particular industry within which they are located (Langlois and Robertson, 1992; Swann and Prevezer, 1996).

In an even broader context, the movement toward European economic integration has spawned cooperative ventures in technology transfer and in research and development that involved a variety of public and private actors such as research institutes in higher education, public research establishments, and private firms and laboratories (for Europe, for example, see Charles and Howells, 1992, sponsored by the EC Strategic Program for Innovation and Technology Transfer - SPRINT; see also the European Strategic Program on R&D in Information Technology -ESPRIT; and the work of R.Petrella, C.Freeman, J.Hagedoorn and others for the EC FAST program; for the United States, see the series on Trade in Services sponsored by the American Enterprise Institute, Washington, D.C.). But at the same time that governments assumed a larger role in managing the affairs of their national economies and encouraging cooperative ventures during the 1980s, the movement toward a global economy and financial deregulation began to accelerate with important signposts like the London Big Bang in 1986 and the October 1987 crash of the New York stock market (Bressand and Nicolaidis, 1989, representing the work of the Services World Forum; see also Giarini, 1987; and Giarini and Stahel, 1989, representing work sponsored by the Club of Rome and the Program of Research on the Economics of Services -PROGRES). The collapse of the Soviet empire and the end of the Cold War, in turn, set in motion a full-fledged movement toward globalization which involved finances, production, technology, services and, of course "human capital" (see Howells and Wood, 1993 for the MONITOR–FAST program of the European Commission; Howells and Michie, 1997 (EC Human Capital Mobility Program); Nilsson et al, 1996 for the European Science

Association). The processes of European integration and globalization do not necessarily imply the wholesale homogenization of national cultural differences or the harmonization of social and economic institutions. At the same time, however, they can be seen as structural developments in the form of market and network processes that tend to counteract, override, or simply bypass the (often hierarchical and change-resistant) framework of established social and cultural institutions (see, e.g., Glasmeier, 1995). It is in this sense that the effects of structural dimensions and cultural context should be conceptually separated and their interaction critically analyzed.

2.3 The epistemological status of social networks.

By way of summary of the definitional issues discussed in this general part of the paper, it may be useful to clarify the epistemological status of social networks as generic social structures. In talking about patterns of social interaction and social relations among social units, regardless of their cognitive or normative content, sociologists often refer to the abstract, latent, underlying structure or form of any set of social relations, as compared to the manifest, meaningful operation of concrete groups and organizations. From this perspective, social network analysis is mainly a methodological device to extract the structural skeleton from the rich, concrete body of social phenomena. Such "structural" analysis can produce a wealth of information, knowledge, and insight about the more or less invisible operation of power and dependence, patterns of exchange, the existence of competition and conflict ("structural holes"), the manifest and latent "functions" of social practices, and the ways the dynamics of social interaction produce, reproduce, and transform social structures and institutions. As such, structural analysis has often served as a methodological adjunct of cultural, institutionalist, or functionalist analysis in cultural anthropology and institutional sociology.

Methodology, however, often expands to include epistemological and even ontological claims. An excessive concern with exclusively structural or cultural aspects of social phenomena may signal an ideological interest in asserting the independent existence of normative cultural belief systems as distinguished from "rational materialist" structure, or claiming the causal priority of one over the other (see, e.g., Edelman and Suchman, 1997:481-84 for a reconstruction of materialist-culturalist dualism in the form of two opposed "metatheoretical perspectives").

In contrast to this **dualistic** opposition between normative culture and material structure, I adopt an **interactive approach** in this paper. Accordingly, social networks are conceptualized as social phenomena **sui generis** rather than as the result of a structural

methodology or analysis. Social networks are analytically distinguished from organizations and institutions, markets, polities, and voluntary associations by virtue of constituting alternatives to conventional, institutional forms of social organization. From this perspective, networks are not merely an "aspect" or a latent dimension of institutional phenomena, but concrete alternatives to social institutions. Instead of reproducing the materialist-culturalist dualism of the neo-institutionalist perspective, the present approach to social networks seeks to transcend the material-ideal dichotomy by conceptualizing networks as self-constituted, generic types of social structures that generate their own interactive and relational orders. Empirically, social networks may, of course, under certain conditions also produce their own cognitive self-definitions, shared meanings and emotions, and normative self-justifications (usually by creating "traditions" and claims to legitimacy). They may thus, over time, join the rank of institutionally organized social structures. But they are not, **a priori**, the result of either "materialist" or "culturalist" processes that are constituted or determined by rationalist or normative background forces. Moreover, there is no compelling logical reason to associate rationality with "materialist" structure or to classify Max Weber as a materialist because he is concerned with historical structures of rationality (Edelman and Suchman, 1997:484). Indeed, as Weber's (1978) work suggests, different types of rationality may be seen as operating on at least three analytically distinct levels: the cognitive (practical vs. theoretical rationality), the level of social action (value-rational vs. purposive or instrumental-strategic rationality), and the institutional level (formal vs. substantive rationality as, for example, in economy or law).

While the new institutionalist perspective relegates rational action to the micro level, social networks to the early stages of institutionalization, and organizations to the status of isomorphic representations of the institutional level, the interactive approach outlined here is strictly non-reductionist in that it treats social networks in holistic structural terms, rather than in terms of either methodological individualism or cultural constructivism. The webs and patterns of social networks are holistic structures, not merely an aggregate of individual actors or depositories of cultural patterns or institutional norms. Network holism is therefore part of the general tradition of sociological epistemology in treating as "real" such phenomena as organizations as well as loosely structured relational forms, for example, alliances, coalitions, cooperatives, teams and similar models of collective structures. Methodological holism or "social realism", then, is characteristic of the central tenets of sociology, as shaped by the theoretical frameworks of Marx, Simmel, and Durkheim. Distinguishing between individual and structural or institutional levels of analysis, these theoretical frames are strictly non-reductionist, thus treating networks at the level of project teams, firms, inter-

firm, national, and trans-national social structures as "social facts" **sui generis** and not as aggregates of individual actors, groups, or social categories, or as the result of individual-level, psychological, or subjective processes resulting from socialization (see also Bates and Peacock, 1989 for a critical distinction between models of social structure and mere taxonomic social categories).

There is one branch of network theory, however, that hovers between holism and reductionism: rational choice theory in sociology and in economics. Coleman's (1988) reductionist conception of ego-centric networks as a form of "social capital" implies that socially connected individual actors may construct strategic networks to fit their preferences or find themselves at the center of (open or closed) social networks which they can use for their own purposes through rational, even opportunistic choices. Nan Lin's (1999) "neo-capitalist" theory treats social capital as an investment in social relations with expected returns such as gains in information, influence, social credentials, and the reinforcement of identity and recognition. These methodologically individualist conceptions of strategic social networks as social resources or "social capital" are, in turn, closely related to the economic concepts of networks and **network externalities** which serve to distinguish markets and networks (Economides, 1996; Williamson, 1996). The central idea of network externalities is that "the utility that a given user derives from a good depends upon the number of other users who are in the same network" (Katz and Shapiro, 1985: 424). As a result, there is a mutual interaction between network size and the value of accessible resources as well as incentives to join. Under certain circumstances, network externalities entail a positive feedback loop such that as networks grow, they become more desirable and thus have a tendency to become even larger. A further consequence is that industries with positive network externalities such as computer and software technology, knowledge-intensive producer services and new media inter-firm networks tend to experience periods of rapid growth (Saxenian, 1994; Heydebrand, 1998). Direct network externalities are commonly distinguished from indirect ones. As Farrell and Saloner (1985:70) observe, "there may be direct 'network externality' in the sense that one consumer's value for a good increases when another consumer has a compatible good, as in the case of telephones or personal computer software. There may be a market-mediated [indirect] effect, as when a complementary good (spare parts, servicing, software etc.) becomes cheaper and more readily available the greater the extent of the (compatible) market". The common understanding of "externality" is that it is an aspect of an imperfectly competitive or failing market. Network externalities can thus be related to various aspects of market failure such as vertical integration, oligopolistic and monopolistic formations, as well as standardization and regulation (see also Milgrom and Roberts, 1992:75, and

Economides'(1999) extensive and periodically updated bibliography on the economics of networks at the following Internet web site: http://www.stern.nyu.edu/networks/site/html).

A final consideration in examining the epistemological status of networks is the possibility of **network failure.** Obviously, there is a chance that in spite of their utility and functionality in responding to crisis conditions or solving certain problems of governance, productivity, and innovation, networks may fail in precisely those respects that are seen as their unique strengths: their non-institutional character and their flexible and innovative capabilities. For example, Granovetter (1974) has shown that excessive embeddedness in strong local ties may imply isolation or social closure, hence be dysfunctional for establishing useful, non-redundant contacts outside one's social orbit. Similarly, Uzzi (1996) argues that while embedded network ties are functional for the economic performance of firms in the New York garment industry, too much embeddedness tends to close off opportunities and isolates economic actors from innovative trends outside their immediate social environment.

This theme is further developed by Podolny and Page (1998) who warn against focusing exclusively on the prevalence and functionality of network forms of organizations and ignoring the importance of negative evidence for the falsifiability of network-theoretical propositions. After reviewing the learning capacity as well as the legitimatory and economic benefits of networks, the authors ask: "Why do not all actors within an organizational population rely exclusively on the network form?" (Podolny and Page, 1998:66). In effect, they raise the important issue of why markets and hierarchies persist and why explaining the reliance of some economic actors on networks fails to explain why others do not.

Generalizing the issue of network failure to the level of theorizing the limits of networks, Messner (1995:244-45) suggests a series of analytical dimensions of networks that can lead to network failure. Among these dimensions, Messner identifies the following: (1) the problem of large numbers and the formation of power blocks such that the larger the number of actors in a network, the greater the "danger" of veto-positions blocking decision making; (2) the time dimension of decisions as it relates to long-term vs. short-term interests; mechanisms such as conflict avoidance, cooperation, and the development of social cohesion can contribute to conservative and reproductive tendencies as well as the trend to agree on the lowest common denominator; (3) institutional consolidation through the stabilization of cooperative relations and the formation of common identities and strong internal ties; networks are constantly challenged by the tension between disintegration (weak or conflicted ties) and the formation of a dense, cooperative internal structure that reduces the capacity to innovate;

(4) the problem of coordination and negotiation in view of the tension between trust and strategic action; the dilemma is that a shared understanding concerning the criteria of distribution of "gains and losses" is a condition for avoiding "endless disagreements", but the danger persists that negotiations may be blocked by power plays and vetoes; (5) asymmetric power relations among actors with different strategic resources may generate tensions and conflicts; since networks are not necessarily "democratic" or "egalitarian", power relations within the network and between the network and its environment may have contradictory consequences such as: (a) the strategic externalization of costs to the environment and/or (b) unintended effects deriving from the excessive internal orientation among actors which may seduce them into giving up the "need to learn" and undermine the collective "intelligence" of the network.

In his work on the "network society", Messner (1995) goes farther than most in developing a potentially testable theory of societal governance which includes not only social networks, but also a viable governmental apparatus designed to take up the slack in the coordination among networks. This is not the place to engage in a discussion of the extent to which networks can, in fact, be seamlessly integrated into mechanisms of societal governance, and to what extent both governments and networks are being subjected to a tacit imperative of competitiveness and innovativeness assuming the character of "objective constraints". Suffice it to say that both Castells and Messner have contributed immensely to the articulation of social networks as new and alternative forms of organization in a globalizing economy.

3. Social networks in complex production relations

Cooperative relations between human actors seeking to accomplish a common goal are probably as old as any organized human activity. Insofar as creative and productive activity is not merely an individual, but a social, cooperative, and collective accomplishment, networks can be seen as a source of energy, as an extension of human labor power and, hence, as a productive force. The network form of cooperative work based on informal ties, in turn, can be understood as "integrating" human activities at a primordial, even primitive structural level. This type of "social integration" arguably occurs intermittently throughout history and certainly long before the formation of rules, the division of labor, and institutional authority, in short, before the emergence of complex industrial production relations.

The primordial organization of work as a collective activity and as a social form has, of course, historically been transformed through a variety of forces such as the development of industrial capitalism, technological change up to the contemporary information and communications technology, and collective processes of "organizational learning" by both labor and management. The results have been the institutionalized forms of work organization that we have come to know as craft production well into the 19th century, industrial production since the early 19th century, mass production and Fordism since the 1920's , flexible specialization and "post-Fordism" since the early 1970s, and the rise of services and the so-called "post-industrial" society. This is not the place to review the development of the social organization of work or to sort out the causal links between cooperation, creativity, the extension of labor power through technology, and the mode of production. Suffice it to say that both human collective creativity and the technologies invented in the process have contributed to the intermittent revolutionizing (destruction and creation) of the means of production.

3.1 A "caveat" on technological determinism

The perspective formulated in the previous paragraph is important in limiting the claims of technological determinism which conceptualizes technological progress as a natural, evolutionary process that shapes the economic and social development of society and the organization of work (instead of many, see, e.g., Alcorn, 1997; but see also Castells'

1996 concepts of the "informational economy" and "network society" which give much weight to the impact of electronic networks on social relations and social structure).

The "objective constraints" and limits of technology are often invoked as an ideological veil for the effects of economic decisions. To be sure, once established, technical inventions like the telephone, the automobile, or the computer may exhibit their own, autonomous dynamics reminiscent of the sorcerer's apprentice dilemma: once the magic has been invoked, there seems to be no way to stop it or to control its consequences. But the transformation of technical innovations into methods, products and commodities and the investment of capital into their production and application is always the result of decisions that are influenced by choices about uses and profitability as well as the potential for obsolescence (see, e.g. Noble, 1977; 1984; Stern, 1960).

While a case can be made that many particular forms of doing work and providing services were influenced by the technology adopted for that purpose, a sociological approach to the organization of work tends to emphasize the interaction between collective, practical skills and knowledge, scientific innovations and technical applications, and the policies and decisions made in organizations and institutions in shaping and regulating the performance of productive work and services (see also Castells, 1996:240). For example, innovations in computer hardware through the micro chip, in software, and information and communications technology, generally, were developing and available since the early 1970s, but it was not until the onset of the contemporary phase of economic globalization after 1989-91 that the new information technology was fully activated and afforded the historic opportunity for integrating the mutual advantages of technical possibilities and transnational economic expansion. New labor markets and occupational specializations in advanced producer services developed, in turn, as a result of the new technologies and methods of creating and providing services. These new methods included "internal networks" bridging subunits within firms as well as "external networks" mediating between producers and users and between global markets and local "agglomeration", the clustering and density of "external economies" (Scott, 1997:333-34). Technology, as an established system, must therefore be sharply distinguished from technological innovations as an emergent force and as potentially disrupting and revolutionizing large technical systems, just as institutional forms of work and bureaucratic authority are being transformed by the "productive force" of informal social networks.

3.2 Does the regulatory state foster competition or cooperation?

In addition to the dynamics of technology, the state has been an important actor in the promotion and justification of cooperation as a societal force of production during much of the 2oth century. Anti-trust legislation in the early part of the century and especially since the New Deal in the 1930's and early 40s was initially directed at an illegal form of "cooperation" between firms, namely clandestine agreements on prices ("price-fixing"), the establishment of economic dominance and market control through both corporate centralization and sheer concentration, the suppression of innovations to protect sunk costs and investments, financial speculation and manipulation, and other "informal" anti-competitive corporate strategies that led to what was usually called "market failure", i.e., the breakdown of competition and the formation of oligopolistic trusts and holding companies. Anti-trust measures and the administrative programs of the regulatory state were designed to maintain a version of 19th century style inter-firm competition, if possible, and to prevent the kind of centralization and economic concentration that marked the transition from competitive to corporate capitalism around the turn of the century and accelerated after WW I (Skowronek, 1982). This policy stance lasted until the late 1950s and early 1960s when the Kennedy administration, especially Robert Kennedy as U.S. Attorney General, sought to roll back economic concentration and price-fixing in the electrical industry (Walton and Cleveland, 1964; Baker and Faulkner, 1993). But the Cold War, in general, and the Vietnam War, in particular, had already made inroads on the resoluteness of American policymakers to maintain a strict regulatory position, and the economic paradigm shift from neo-Keynesianism to unbridled neo-liberalism in the early 1970s conspired with the policy of deregulation and military expansion of the Reagan administration to dismantle certain aspects of the regulatory apparatus built up since the New Deal and during the post-war decades of "Pax Americana" (Breyer and Stewart, 1985:159-60; Fennema and van der Pijl, 1987; see also Fennema, 1982). Although the trend toward deregulation had already begun in the 1970s under Presidents Ford and Carter and took off under Reagan, we now know that regulation was not abolished, but rather redefined and redirected under new auspices (Seidman and Gilmour, 1986; Heydebrand, 1990; Heydebrand and Codagnone, 1998;). While welfare programs and other social expenditures were curtailed since Reagan and Bush, and law enforcement and the military budget strengthened, economic and industrial policy favored the increasingly open cooperation between government and economy under the impact of globalization and the "new world order". Cooperation, private networking, and public-private partnership - this

time above board and for all to see - are explicitly encouraged under a new conception of regulation and sanctioned by both local public authorities and the "competitive state" (see also Bianchi and Bellini, 1991; Hirsch, 1995; Esser and Noppe, 1996). This neo-corporatist regional and transnational economic and industrial policy involving "global webs" operated by "symbolic analysts" has been articulated by President Clinton's former Secretary of Labor, Robert Reich (1991), refined with respect to "risk regulation" to combat "regulatory gridlock" (Breyer, 1994), and justified in terms of the ideology of privatization and cooperative competition (see also Yergin and Stanislaw, 1998: 339-53; Garud, 1994; Powell and Brantley, 1992; Rosenfeld, 1996).

What is remarkable here is the emergence of a new doublespeak with respect to cooperation and competition. The new lingo redefines market competition - once seen as indicated by "structural holes" in otherwise cooperative networks (Burt, 1992) - to include inter-corporate cooperation in the form of local, regional, and global networking, economic concentration (although not necessarily centralization), and global regulation, all under the auspices of an international, presumably self-regulating market regime. As a result, the original analytic oppositions between self-preservation and co-existence, competition and cooperation tend to disappear or are being redefined under the more inclusive category of "co-opetition" (Brandenburger and Nalebuff, 1996; Comerford, 1998; see also Best, 1990; von Hippel, 1987). Co-opetition, like public-private partnerships under the aegis of a neo-corporatist "managed competition", is no longer encumbered by unnecessary and inefficient tensions between individual entrepreneurship, private ownership, and the public interest. Under the strategic leadership of "alliance managers" (Comerford, 1998:73; see also Iwabuchi, 1992, and Moulaert, 1996 on the management consulting firm of Arthur Andersen), ground rules are set to manage and monitor cooperative projects (Farr and Fischer, 1992, as cited by Clegg et al. 1996:225). Moreover, rules are needed to permit everybody in the field to "get to yes" without giving in (Fisher and Ury, 1991; see also Sabel's, 1993a; b; 1994, concepts of "studied trust", "negotiated loyalty", "learning by monitoring", and the "fusion of monitoring and consultation" in "constitutional orders", anticipating some of the functions of the "alliance manager").

3.3 Industrial Manufacturing and Production Networks

The half century between the early 1920s and the late 1960s is generally known as the age of mass production for large, relatively stable markets. The assembly line for the mass production of automobiles introduced by Ford came to symbolize the

characteristics of a mature industrial economy**.** "Fordism" is based on the manufacture of large quantities of standardized products by means of specialized machine technology and the use of semi-skilled and unskilled labor that became unionized in the 1930's and 40s. The large automobile manufacturers were bureaucratically organized corporations with rigid production schedules, internal labor markets, relatively long product life cycles, and large mass markets shared with a few other oligopolistic competitors (Doeringer and Piore, 1971). Production technology was based on established, increasingly capital-intensive and vertically integrated systems that changed only slowly through incremental innovations produced mainly by in-house research and development (R&D). Similar production relations could be found in other industrial and manufacturing segments such as machinery and electrical equipment, the latter notorious for anti-trust violations in the 1950s.

Ancillary to the relatively stable and government regulated core economy dominated by large-scale manufacturing firms was a more competitive and volatile periphery of small manufacturing and service organizations. It was much less unionized and regulated than the core and more vulnerable to the effects of economic recessions. It also offered less job security, lower wages, and fewer non-wage benefits to a predominantly female, minority, and immigrant labor force. This dual industrial structure, premised on a sharp distinction between production and services, came to be known as the "dual economy" or "industrial dualism" (Averitt, 1968; Noyelle, 1987; Gordon, Edwards, and Reich, 1982).

World War II and the quarter-century of post-war prosperity and American hegemony during the first phase of the Cold War served to consolidate the dominant technological regimes and to cement closer relationships between industry and government, especially the department of defense (the so-called " military-industrial complex" which President Eisenhower belatedly [1959] acknowledged as posing a potential threat to the political and democratic integrity of the United States). The quasi- institutional interlocks (rather than merely networks) between the department of defense and production as well as R&D in strategically important private corporations since World War II and the Vietnam War were reactivated especially by the second phase of the Cold War and the rise of military expenditures under the Reagan administration (Adams, 1982; Seidman and Gilmour, 1986; see also Harrison, 1994:117-122). As mentioned at the beginning, the literature on business groups and quasi-institutional interlocks in the sense of interlocking corporate boards of directors as well as the "iron triangle" (Deparment of Defense, Congressional Committees, and the defense industry) is closely related to the study of inter-firm networks.

The development of the aerospace-electronics industrial complex of Southern California between 1940 and 1960 provides a good example of the nature and consequences of these quasi-institutional interlocks(see also, generally, Harrison, 1994:150-88; Castells, 1996:40-60). In a compelling study of this development, Allen Scott (1991) shows how the earliest beginnings of the missile and military electronics industries coincided with the war period from 1940 to 1945. The geographical area in question is defined by a set of about a dozen high-technology industrial districts or "technopoles" extending from San Diego in the South through Los Angeles to Santa Barbara. Each technopole consists of "an elaborate production network in association with a dense local labor market" (Scott, 1991:439). Scott shows how these high-technology production networks rested on "agglomeration economies", an "endemic undergrowth of small subcontract shops and input suppliers providing specialized (often customized) services to high-technology manufacturers... these smaller firms were engaged in the production of such outputs as printed circuit boards, transistors, electronics assembly services, molded plastics, aluminum foundry work, and so on" (453). This industrial agglomeration and structuration also had a significant effect on the surrounding high-tech labor markets, specifically a "steady bifurcation ...with a well-paid managerial, scientific and technical stratum at the top, and a poorly paid unskilled stratum at the bottom...primarily composed of Hispanic and Asian immigrants (including large numbers of women)" (453).

The growth of the Southern California high-tech production networks was driven by an almost uninterrupted stream of prime contracts awarded to large aircraft and electronics corporations by the Department of Defense from the 1940s on. This financial stream of government sponsorship of the California defense industry continued after 1960 in spite of political attempts by other states like Texas, Connecticut, New York, and Washington to increase their share of the pie (Scott, 1991:453-54; Scott and Drayse, 1991; Scott and Mattingly, 1989). The term "network" is therefore appropriate in describing the linkages among defense contractors and between them and the federal government because formal and legal ties were overshadowed by financial and political considerations involving the relative power of congressional districts and the exigencies of the Cold War. Nevertheless, insiders argued that these networks consisted partly of traditional institutionalized interlocks in which what was good for the industry or particular firms was also seen as "good for the country" and therefore legitimate and legal.

In contrast to Scott's work, a more technologically oriented and business-centered conception of "production networks" emerges from Saxenian's (1991) analysis of the corporate dynamics of Silicon Valley. Nevertheless, the government-defense industry

nexus appears to be as important for explaining the rise of the Northern California districts as it is for Southern California (Harrison, 1994: 117-125; Ratti, Bramanti and Gordon, 1997; Markusen, Hall, Campbell and Deitrick, 1991; Markusen and Yudken, 1992). Certainly, the development of the computer industry and the INTERNET itself can be traced to the decisive impact of Cold War military procurement policy since the 1960s (Warf, 1995).

From a more narrow, endogenous industrial perspective, however, three key forces can be identified as driving the formation and success of production networks in such industries as computer systems firms, contract manufacturing, strategic alliances in semiconductor (silicon chip) manufacturing, and joint product development in the microprocessor industry: rising costs of product development, increasingly shorter product life cycles, and increased speed of technological innovation and change. Strategic production networks are crucially dependent on outsourcing as well as new kinds of relationships with suppliers, confirming the widely shared insight that "it is virtually impossible for one firm to produce all ...[needed]... components, let alone stay at the forefront of each of ...[a number of]... diverse and fast changing technologies" (Saxenian, 1991: 425). Similar to other high-tech settings, Silicon Valley firms focus on their own highly specialized production or assembly capacities and acquire the rest of their inputs from the dense infrastructure of suppliers. Saxenian argues that this supplier networking strategy marks a fundamental shift from the vertically integrated approach to computer production used by IBM and other large firms prior to the 1980s. It is a radical break with the "arms-length relations of a mass production system, in which suppliers manufactured parts according to standard specifications and competed against one another to lower prices, and in which portions of production were subcontracted as a buffer against fluctuations in market demand, output, and labor supply "(Saxenian, 1991: 427; see also Holmes, 1986; Scott and Angel, 1990). The new supplier relations among systems firms in Silicon Valley are based on "a network of long-term, trust-based alliances with innovative suppliers" and represents "a source of advantage for a systems producer which is very difficult for a competitor to replicate. Such a network provides both flexibility and a framework for joint learning and technological exchange" (Saxenian, 1991: 430). Saxenian notes that such networks of collaborative supplier relations have been documented also for American and German automobile makers (Sabel, Herrigel, Deeg, and Kazis, 1989), the French machine tool industry (Lorenz, 1988) and the Japanese electronics and auto industries (Freeman, 1987; Smitka, 1991).

Two important additional points emerge from Saxenian's research. First, **geographical proximity** facilitates the emergence and maintenance of effective personal collaborative supplier relations. As Saxenian put is (1991: 430): "Face-to-face interaction allows firms

to address the unexpected complications in a supplier relationship that could never be covered by a contract". As the president of a power supply manufacturing firm puts it: "I don't care how well the specifications are written on paper, they are always subject to misinterpretation. The only way to solve this is to have a customer's engineers right here. There is no good way to do it if you are more than fifty miles away" (quoted by Saxenian, 1991: 430). In another case reported by Saxenian, the chief executive officers of two collaborating firms usually meet for breakfast once a month to insure that trust is maintained at the top and policy problems are addressed. Meetings may occur even more often (weekly and daily) among the planning, engineering, purchasing and marketing staff from the respective firms, resulting in highly personalized relationships. Thus, "the trust, information exchange, and teamwork which are the basis of collaborative supplier relations require continued interaction which is difficult to achieve over long distances" (ibid.). It will, however, become clear later in the context of the discussion of service networks in global advertising and marketing that electronic networks do make inroads on face-to-face interpersonal contact and that the nature of social relations via the Internet is being transformed by the medium itself.

A second, related point concerns the quasi-formal or **informal nature of the business relationships** in inter-firm production networks. The close personal interaction just quoted suggests that the partnership relations of such strategic alliances and joint ventures resemble those of a "quasi-firm" (Eccles, 1981) in which the formal-legal nature of the inter-firm relations is subordinated to their economic and commercialized ties. Saxenian (1991: 429) makes the point that "non-disclosure agreements and contracts are normally signed in these alliances [although] few believe that they really matter (especially in an environment of high employee turnover like Silicon Valley). Rather, the firms accept that they share a mutual interest in one another's success and that their relationship defies legal enforcement".

This assessment accords with my personal conversations with Richard Horning, a senior partner in the law firm of Tomlinson, Zisko, Morosoli, & Maser, LLP, specializing in Silicon Valley legal business (see also Horning, 1997). Horning, in turn, implicitly confirms Macneil's (1985) notion that, in case of misunderstandings, disagreements, or non-performance, "relational contracts" (complex contingent clause contracts) are self-executing and usually re-negotiated or settled through out-of-court negotiation or arbitration rather than litigated, adjudicated, or enforced in a court of law (see also Salacuse, 1991; Dezalay and Garth, 1996). Similarly, Saxenian (1991:429) quotes Apple Computer's Manager of Purchasing to the effect that "we have found you don't always need a formal contract...If you develop trust with your suppliers, you don't need armies of attorneys...In order for us to be successful in the future, we have to develop

better working relationships, better trusting relationships, than just hounding vendors for price decreases on an annual basis".

But while personal trust plays no doubt an important role in well-functioning inter-firm relationships and networks, Saxenian repeatedly emphasizes that though "interdependent", the parties to such relationships are "careful to preserve their own autonomy" and to avoid too much dependence on one another (Saxenian, 1991: 429; 434). "Most Silicon Valley firms" Saxenian asserts, " will not allow their business to account for more than 20% of a supplier's product and prefer that no customer occupy such a position" (429). Collaborating suppliers are therefore forced to find outside customers in order to avoid the possibility that dependence on a single account may put them out of business.

One may conclude that the kinds of production networks described by Saxenian and others operate under the constraints of a sociological paradox. These networks are obviously based on informal relations that enhance their viability and their effectiveness for collaboration, joint ventures, co-production, mutual learning, and complementary innovation. At the same time, however, they appear to be successful only to the extent that these informal ties develop into long-term relations of an organizational, even institutional nature. Saxenian(1991:435) argues that Silicon Valley's crisis conditions in the 1980s were merely "failures of coordination" and "do not signal inherent weaknesses in network forms of organization, but rather the need for the *institutionalization of inter-firm collaboration* in the U.S." (emphasis added). If network relations, however, are useful only to the extent that they eventually become institutionalized, their efficacy and value qua networks must be attributed to an underlying mechanism that analytically overrides their attributes as networks or institutions.

This mechanism, it can be argued, is the strategic, short-term utilization of both traditional, formal-legal as well as non-traditional, non-legal, i.e. informal inter-firm relationships in the early phases of innovation and production, depending on context and opportunity. Eventually, however, both types of relationships are transformed into commercial relations of dependence and dominance that are subject to impersonal financial controls and sanctions. This means that both traditional and formal-legal relationships are transformed into economic relationships, and that privatized and essentially unaccountable forms of coordination and governance replace institutional ones.

Saxenian's "institutionalization" does not necessarily refer to the maintenance of the relative equality and autonomy of the erstwhile network partners, but to the establishment of a stable, reproducible, and economically controllable (interdependent) relationship regardless of whether it is "traditional" or "formalized". This ambiguity in

the nature of "interdependence" (i.e., as hovering between dependence and independence) also marks the informal network relations of the "Emilian model": "the more continuous and long term the exchange relations between economic agents, the less likely is the need to formalize them legally" (Lazerson, 1988:340). But whose "need" is at stake? Lazerson (1988:333) asserts that "the dense web of market relations, often marked by long-established reciprocal relations and interfamily connections, is one of the strength of the Emilian model" as well as that "employers opposed firm-level [labor union] contracts because of a desire to maintain a direct relationship with their employees and avoid rigid work rules" (337). Is it old-fashioned traditionalism and neo-patrimonialism, or is it the strategic realization that legal contracts become superfluous over time as economic concentration "institutionalizes" erstwhile informal, interdependent relations among truly equal collaborators (or competitors) by transforming the balance of power between them into a relationship of relative dependence? This question, while triggered by Lazerson's particularly clear and provocative formulation, applies equally well to other critiques of Williamson's approach which conceptualize networks as an alternative to the market-hierarchy distinction, e.g. those of Grabher, Granovetter, Lorenz, Powell, and Sabel, to name just a few.

As Saxenian (1991:435-36) rightly asserts, "proposals to replace Silicon Valley's decentralized system of production with an 'American keiretsu' - by constructing tight alliances among the nation's largest electronics producers and suppliers [citing Ferguson, 1990] - would sacrifice the flexibility which is critical in the current competitive environment". It is that quest for flexibility which fuels both the informality of inter-firm networks and the open-ended collaborative relations between producers and suppliers. "In Japan as in Silicon Valley", Saxenian argues, "a loosely integrated network form of organization has emerged in response to the market volatility of the 1970s and 1980s"(436). But ascribing the "continued dynamism of Silicon Valley" solely to the "proliferation of inter-firm networks"(436) conceals the underlying dynamics of economic globalization which engenders what Bennett Harrison (1994:171) calls "concentration without centralization" among inter-firm production networks in Japan, Europe, and the United States. Production networks thus turn out to be prime examples of strategies of networking that reflect a historically specific economic policy as well as conditions of growth conducive to joint ventures and cooperation. It is this success-oriented reasoning rather than merely a cultural taste for informality, flexibility, and open-ended relationships that seems to explain the "clear trend for computer systems producers to prefer local suppliers and to build the sort of trust-based relationships which flourish with proximity", even though it is acknowledged that "the

region's firms rely heavily on global markets and distant suppliers" (Saxenian, 1991: 436). It is no doubt true that, as Saxenian(436) concludes, regional vitality is "enhanced as inter-firm collaboration breeds complementary innovation and cross-fertilization among networks of autonomous but interdependent producers". But this optimistic assessment hides the underlying forces of global competition that may undo yesterday's interdependence and autonomy tomorrow.

In this respect, then, Harrison's (1994:22) analysis of Silicon Valley's production networks is far more realistic without denying the powerful impact that network forms of organization have on enhancing productivity and innovation. Today, for example, thirteen years after the 1985 crisis of the semiconductor industry in Silicon Valley (as well as in Europe, as Hagedoorn and Schakenraad's [1992:165, Fig.2] data suggest), a second economic slump is threatening this industrial district, this time reflecting the crisis of East Asian economies which in the past have provided important markets for the California high-tech industry (CBS Evening News, Aug.8, 1998). The current situation illustrates the fact that "while networks and strategic alliances may have improved the coordination of global *production*, they can do nothing by themselves to stabilize and coordinate global *demand* (Harrison, 1994:30, emphasis in original). Clearly, the scope of the current crisis and its effect on the nature of production networks are not yet known, but it can be anticipated that the fallout of intermittently deteriorating economic conditions may continue to accelerate the trend toward economic concentration and the restructuring of the industry under the dominance of fewer, but larger and possibly more integrated inter-firm networks.

Economic concentration without centralization is the crucial diagnosis emerging from Bennett Harrison's analysis who provides by far the most comprehensive and recent treatment of production networks (see also Castells, 1996 whose analysis builds to some extent on Harrison's). Harrison concedes that small, flexible firms have been proliferating in certain industries during the past two decades and may play a part in the early phases of product development. But he sees their role in economic development more as followers rather than leaders. "Rather than dwindling away, concentrated economic power is changing its shape, as the big firms create all manner of networks, alliances, short- and long-term financial and technology deals - with one another, with governments at all levels, and with legions of generally (although not invariably) smaller firms who act as their suppliers and subcontractors" (Harrison, 1994: 8). Network firms thus constitute a new organizational form where production is geographically and organizationally dispersed. But their "strategy, marketing, and finance [are] ultimately controlled by (or in the case of the Italian districts, coming increasingly under the control of) the big firms" (Harrison, 1994: 22; see also Amin and Robins, 1990;

Hagedoorn, 1995a; Hagedoorn and Schakenraad, 1992:168, Table 1; Castells, 1996:152-168; Cohen and Levin, 1989; Martinelli and Schoenberger, 1991).

3.4 Innovative R&D Networks in High-Technology and Knowledge-Intensive Production

Of particular and immediate interest for the purposes of the present analysis is the transformation of predominantly in-house R&D and the emergence of inter-firm networks of innovation in the context of high-technology and knowledge-intensive production regimes (Mowery, l983; 1988). The use of external sources of scientific, technical, and market information by business corporations is not new; information, however, tended to flow from relatively formal inter-organizational relations and interlocks such as joint ventures, direct investment, joint R&D and technology exchange agreements, as well as from membership in research corporations and associations (Camagni, 1991; see also Carter and Williams, 1959).

The nature and direction of transformation of these information sources is particularly dramatic in the context of modern high-tech and knowledge-intensive industries. A useful starting point is provided by Chris Freeman's (1991:500) review of what he calls "one of the most comprehensive empirical studies of innovations", viz. Project SAPPHO which analyzed paired comparisons between successful and unsuccessful innovations in the chemical and scientific instruments industry (Rothwell, 1974). Sensitive to the significance of the formal-informal dimension of networks, Freeman (ibid.) explicitly emphasizes that the role of "informal networks appeared to be the most important" in this study even though they are difficult to classify and measure. He argues that informal networks "have a role somewhat analogous to 'tacit knowledge' within firms" which is "often more important than codified formal specifications, blue-prints, etc. [citing Pavitt, 1986]. Because tacit knowledge is so difficult to communicate, the movement of people, in addition to documents and drawings, is usually essential for effective technology transfer; hence behind every formal network, giving it the breath of life, are usually various informal networks"(Freeman, 1991:503; see also von Hippel, 1987; 1988; Erikson and Hakansson, 1990; Johanson and Mattson, 1987).

The following hypotheses systematically discriminated between success and failure of the innovative characteristics measured.

1. User needs and networks. - Successful innovators made determined attempts to develop an understanding of the special needs and circumstances of potential users

of the new process or product. The critical importance of user-producer linkages has been confirmed by others, e.g. Lundvall, 1988; Orlikowski, 1988; Nelson, 1993).

2. Coupling of development, production and marketing activities. - Successful innovators developed intra-firm techniques and internal networks of communication to integrate these activities at an early stage of the development work (besides several Japanese examples, e.g., Freeman, 1987; Freeman and Soete, 1990, Pisano, 1991; 1996, and Fairtlough, 1994 on networks in biotechnology).
3. Linkage of basic in-house research with external sources of scientific and technical information and advice (a major resource on European public and private "technology transfer" and R&D networks is Charles and Howells, 1992; on the U.S. biotechnology sector, see Powell, Koput, and Smith-Doerr, 1996; Pisano, 1991;1996).
4. Concentration of high quality R&D resources on the innovative project. - While firm size did not discriminate between success and failure of innovations, the size and resources of the R&D project did. Both quality and quantity of R&D work complemented the importance of external networks.
5. High status, wide experience and seniority of the "business innovator". - The business innovator is the person chieflly responsible for the organization and management of the innovative effort - effectively the Schumpeterian "entrepreneur". The fact that successful innovations were led by older individuals was interpreted as indicating that innovation could not succeed without the strong commitment of top management particularly in large organizations, and that the role of internal and external network coordination was very important.

In the following, networking in two different sets of technologies will be discussed because they exhibit certain common structural characteristics: both are rapidly changing, knowledge-intensive technologies, and both are generic and have broad systemic applicability (Barras, 1985; Castells, 1996:204 who refers to the revolutionary impact of information technology as *informationalism*). As Imai and Baba (1989) put it: "Information technology exerts a strong impact on the entire range of existing products and services. Eventually it renovates the total system. The dominant mode of innovation is systemic...The interactive process of information creation and learning is crucial for systemic innovation. Interaction includes three dimensions: between users and suppliers, between R&D, marketing, and manufacturing, and between physical products, software and services". Freeman (1991:511) adds: "IT [information technology] not only greatly facilitates various forms of networking, but has inherent characteristics such as rapid change in design, customization, flexibility and so forth, which, together with its systemic nature and the variety and complexity of applications, will lead to a permanent

shift of industrial structure and behavior". Similarly, Powell et al. (1996:123) point out that "biotechnology is not an industry per se, but a set of technologies with the potential to transform various fields - pharmaceuticals, chemicals, agriculture, veterinary science, medicine, even waste disposal". Let us first turn to information technology.

3.4.1. Information technology networks

Research on the various types of cooperative inter-firm arrangements such as joint ventures, R&D collaboration and agreements, technology exchange agreements, licensing arrangements, management contracts, sub-contracting, production-sharing, and outsourcing shows that most large firms use several of these modes of networking and that many firms use all of these forms, including informal contacts and networks. Freeman (1991:502) reports that almost all of the top twenty information technology firms in Europe, the United States, and Japan each made more than fifty cooperative agreements in the 1980s and that some made more than a hundred.

To gauge the scope and development of innovative R&D networks and other cooperative arrangements in Europe and the United States, it is instructive to look at the growth of newly established technology cooperation agreements in information technology over the twenty-year period from 1970 to 1989 (Hagedoorn and Schakenraad, 1990). The number of strategic technology alliances in information technologies (computers, industrial automation, microelectronics, software, and telecommunications) stood at over 50 in the 1970-74 period. In 1980, there were already over one hundred agreements. The early 1980s saw a rapid rise in the level of development, which flattened out from 1984 to 1987, increased sharply to 350 in 1988 and then declined to about 225 in 1989.

An analysis of the different sub-fields among information technologies during the 1980s reveals a more differentiated patterns of growth among the newly established strategic technology alliances (Hagedoorn and Schakenraad, 1992:165). Thus, in software, there was an accelerating rate of increase from about 5 agreements in 1980 to 80 in 1989. In telecommunications, the number increased gradually in spite of intermittent ups and downs. In computers, new alliances grew steadily, but then doubled between 1987 and 1989. In microelectronics, rapid growth in the early 1980s was followed by a slump in 1985 and, after that, by a fairly steady number of new agreements up to 1989.

The slowdown in some sub-fields (except software) after the mid-1980s and the downturn after 1988 may have been due to a certain degree of corporate density as well as incipient concentration in the information technology market, i.e., "the fact that a

great deal of strategic re-positioning for the single European market had already been completed" (Freeman: 1991: 509; see also Castells, 1996:40ff on the historical sequence of development of information technology).

Among the 2,718 agreements during the 1980s, the leading types of cooperation were (in declining order): joint R&D projects (N=749 or 27.6%), one-directional technology flows (581 or 21.4%), joint ventures and research corporations (458 or 16.9%), direct investments (357 or 13.1%), technology exchange agreements (328 or 12.1%), and customer supplier relations (245 or 9%) (Hagedoorn and Schakenraad, 1990, as quoted by Freeman,1991:504, Table 2).

Hagedoorn and Schakenraad's analysis generally supports Harrison's conclusions concerning the domination of networks by large corporations. For networks or "clusters " in information technologies as a whole, large firms in Europe, the United States and Japan appear to dominate the field during the 1980s. There is a slight shift away from concentration in computers (from five to seven clusters) and microelectronics (from two to three main clusters), but a movement toward concentration in industrial automation and software, and a shift from national to international groups in the telecommunications industry (Hagedoorn and Schakenraad, 1992:168, Table 1).

A somewhat different picture emerges if one looks at network density among the 45 most networked firms. Network density is measured by "the ratio of the actual number of links between companies (k) to the possible number of links 1/2n (n-1) where n denotes the number of points in the network" (Hagedoorn and Schakenraad, 1992:183). This index shows that density in the information technology networks increased from 23% in the first half of the decade (1980-84) to 40% in the second half (1985-89). There was a slight decline in density for the computer industry networks (from 10% to 8%), but an approximate doubling of the network density in industrial automation, microelectronics, software, and telecommunications. In addition, the authors show that the relative positions of networked firms in the rank order changed during the 1980s, and that some new contenders appeared in the second half of the decade while others had dropped out. For example, for the first half of the decade the rank order is Motorola (53 ties), Siemens (51), IBM (48), Sperry (47), Fujitsu (46), Olivetti (42), Control Data Corporation (41), Intel (41), Philips (40),and Nippon Electric Corporation (39). For the second half of the decade the following rank order emerges: Siemens (134), Philips (127), Olivetti (110), IBM (108), Hewlett-Packard (96) Digital Equipment Corporation (95), AT&T (90), Thomson (83) Fujitsu (78), and Motorola (68) (ibid., 184, Table 3). In other words, European firms took the lead in networking after 1985.

The authors conclude that "the growth in the number of strategic alliances in information technologies parallels an increasing intensity and complexity of inter-firm technology

cooperation in which particular companies appear to take a more active role than others" although the partnering patterns of leading firms are not necessarily close to their core activity (Hagedoorn and Schakenraad, 1992:185). For example, in the late 80s, Siemens led with 134 networking agreements, of which 45 or 34% were in telecommunications, 36 or 27% each in microelectronics and software, 7% in industrial automation, and 5% in others. In general, it is clear, however, that in spite of the rise of networking during the latter half of the 1980s, there has also been a trend toward vertical integration. While large firms and clusters of firms continue to use cooperative agreements with smaller firms, they increasingly dominate the field in terms of Harrison's "concentration without centralization".

3.4.2 Biotechnology networks

A second important example of innovative R&D networking is the relatively recent field of biotechnology. Two basic technologies central to the field are genetic engineering (recombinant DNA) and cell fusion (hybridoma technology) used to form cells that produce antibodies. Both technologies are basic to research in medical and pharmaceutical research and to the development of drugs and procedures in a variety of settings linking universities, research laboratories, and commercial ventures. As mentioned above, biotechnology has this broad, generic applicability in many different areas in common with information technology (see also Barras, 1985; 1996 on the importance of generic technologies). We shall see that the development and distribution of organizational forms characterizing the biotechnology field are somewhat similar to those of information technology as well, although technological factors may be more important in information technology and a strong science base more in biotechnology (Swann and Prevezer, 1996).

According to Pisano (1991:239), small new firms, often founded by or in conjunction with university scientists, were the dominant source of R&D in biotechnology in the earliest years of the industry's development (1976-81). Pisano ascribes this development to the fact that "the basic technologies underlying the new [technological] regime were largely public and widely diffused" (ibid). Few large chemical and pharmaceutical corporations, among them Monsanto, DuPont, and Eli Lilly, had in-house biotechnology programs by 1978, and such programs did not take off in other established firms until 1981 and after. "Much of the established firms' investments in biotechnology R&D were channeled to biotechnology specialist firms through R&D

contracts, equity investments, and joint ventures" (Pisano, 1991:239; see also Pisano, Shaw, and Teece, 1988).

These early "network" relationships were advantageous to the new firms because they provided access to capital and to the possibility of forward vertical integration, i.e. access to established facilities in manufacturing, clinical testing, regulatory processes, and marketing. Pisano points out that both of these factors were especially important in the human therapeutic segment of the industry, a segment studied for its "learning networks" in a later period (1990-94) by Powell et al (1996).

The large established firms, in turn, profited from acquiring R&D knowledge in biotechnology from outside and being able to manufacture and commercialize the products. Since the small new firms were either founded by, or were able to attract, top scientists from the relevant academic fields and offered them a congenial research environment as well as equity-based financial incentives, they constituted a set of advantages for the large firms attractive enough to provide capital and form partnerships and innovative networks.

The parallels between these developments in biotechnology and some of the other types of network processes discussed above such as the Northern Italian industrial clusters or Silicon Valley are suggestive. As Pisano (1991:240) notes: "Perhaps not by the intention of the founders of NBFs [new biotechnology firms], the biotechnology industry, in its early years, took on the characteristics of a specialized R&D supply sector. Indeed, it could be argued that the biotechnology industry emerged as a market for R&D, with NBFs on the supply side and established chemical and pharmaceutical enterprises on the demand side".

The growth of newly established technology cooperation agreements in biotechnology from 1970 to 1989 seem to bear out Pisano's hypothesis as well as the observed shift after 1981. In the period from 1970 to 1974, there were only a handful of such agreements. By 1980, there were over 50 agreements which had doubled by 1982. After a slight decline from 1982 to 1983, there was an increase to 150 agreements in 1985. From 1986 on, however, the growth curve flattens out and declines from 160 in 1987 to less than a hundred in 1989 (Haagedorn and Schakenraad, 1990, as reported by Freeman, 1991: 503). The decline continues to about 25 alliances in 1991, but increases rapidly to 125 by 1992 (Hagedoorn, 1995b, as cited by Walsh, 1997:118).

Among the 1,213 biotechnology agreements during the 1980s, the leading modes of technology cooperation were (in declining rank order): joint R&D (362 or 29.8%), direct investment (234 or 19.3%), customer - supplier relations (186 or 15.3%), one-directional technology flows (183 or 15.1%), joint ventures and research corporations (164 or

13.5%), and technology exchange agreements (84 or 6.9%) (as quoted by Freeman, 1991:504).

Subcontracting ("outsourcing"), production-sharing, and supplier agreements constitute, of course, a particularly important category of networking in many different industries. As a 1981 survey of the Japanese electronics industry shows, for example, the reasons for large enterprises to use contractors are as follows (in declining order of importance): 1. subcontracting enterprises have specialized technology and equipment; 2. the parent company's production capacity is insufficient; 3. the production lot is small and outside orders are more efficient; 4. reduction of personnel costs and the unit price of products; 5. use of sub-contractors enables more flexibility toward fluctuations in lot size; 6. enables savings of capital for plant and equipment investment; 7. strong capital and personal ties with sub-contractors; 8. parent company does not have to hold excess inventories; 9. other reasons (Van Kooij,1990, as quoted by Freeman:1991:505, Fig.2; see also Sako, 1989). As this ranking shows, technological specialization in this particular context and time period turns out to be more important than factors like cost savings on capital investment and inventories.

The importance of access to specialized knowledge and the opportunity for learning from network partners also emerges as the key finding from Powell et al's (1996) research on the networking patterns of 225 independently owned firms in one segment of the biotechnology industry, human therapeutics and diagnostics. The R&D ties studied represent formal, contractual agreements although the authors share the general assumption of other researchers in the network field that formal relationships emerge out of "myriad informal arrangements" (126) and that "beneath most formal ties...lies a sea of informal relations"(120). Besides R&D ties, the closely related non-R&D ties include financial, investment/joint venture, manufacturing, marketing licensing, supply/distribution, and clinical trials relations which are conceptualized as non-R&D network experience. The following hypotheses are formulated and largely supported by the analysis:

1. the greater the number of R&D and non-R&D alliances at a given time, the greater the number and diversity of subsequent non-R&D alliances, controlling for prior levels (by including time- lagged dependent variables);
2. the greater a firm's centrality in a network at a given time, the greater its number of subsequent R&D alliances, controlling for prior R&D alliances.
3. the greater a firm's network centrality and total ties at a given time, the more rapid its subsequent growth (increase in size), controlling for prior growth;
4. the greater a firm's network centrality at a given time, the greater its number of subsequent R&D alliances, controlling for prior R&D alliances.

Although the authors conceptualize firm size and age as proxies for rival theoretical explanations (size as an indicator of hierarchy in transaction-cost analytical terms; age as a predictor in population-ecological terms), they use size as an independent variable only once, in relation to clinical trials, and otherwise mainly as a dependent variable (growth) where it is most strongly influenced by prior size. The role of age is not significant which could, however, be due to the generally young structure of the field and other extraneous influences.

The authors conclude that they found evidence for "a path-dependent cycle of learning in which an early choice of exploration elicited positive feedback" (Powell et al, 1996:142). In this cycle, "two processes of learning are occurring simultaneously and recursively. First, firms are increasingly using ties to enhance the inflow of specific information, resources, and products. Second, firms are becoming much more adept at and reputed for the general practice of collaboration with diverse partners" (143). As a result, the authors argue, the boundaries between firm-level and industry-level practices are "becoming ever more permeable. In contrast to the much-discussed liability of newness hypothesis...there appears to be a liability of unconnectedness" (ibid., 143, citing Baum and Oliver, 1992, who also argue for an "institutional embeddedness" perspective on organizational populations and networks; also see Uzzi, 1996).

While Powell et al. (1996) present a suggestive conception of networks as an institutionally embedded locus of learning and innovation, the results of their analysis are neither compelling nor conclusive since they depend largely on definitional fiat, highly result-oriented hypotheses and tests, and a creative, but one-sided interpretation of the findings. Given the high degree of interrelation of the variables used, their causal connection and direction is ambiguous and, therefore, not necessarily inconsistent with Pisano's and others' research on biotechnology and other networks (see, e.g., Swann and Prevezer, 1996). But Powell et al's framing of their analysis and the interpretation of their findings does not so much confront as exclude the perspectives of more structurally or market oriented network research. For theoretical reasons which have to do largely with the new institutionalist predilection for social construction and the postulated impact of institutionalized patterns and codes on learning and the conditions of organizational learning (ibid, 117-18), the authors reject the intentionalist, strategic interpretation of networking by other network researchers in favor of a constructionist view.

This new institutionalist agenda is well summarized by three points in Powell and Smith-Doerr's (1994:370) comprehensive review of the literature on economic networks: (1) there are essential linkages between economic and organizational practices and the institutional infrastructure of a region or a society; (2) industrial development

need not involve vertical integration or standardized mass production but may rely instead on horizontal networks of production; (3) trust, mutual forbearance, and reputation may supplement and/or replace the price mechanism or administrative fiat (see also Bradach and Eccles, 1989 on price, authority, and trust).

In its treatment of networks, the new institutionalist perspective emphasizes learning by participation in (relatively long-term) relationships, practices, and activities (note that this perspective on learning could be theoretically enriched by the more interactionist "differential association theory" of the acquisition of knowledge and skills, for example in the area of deviant or criminal learning, which emphasizes selective participation and interaction in peer groups and occupational networks as a source of criminal knowledge and action, e.g., Sutherland and Cressey, 1978; Becker, 1963; Akers, 1985).

Communication and exchange in networks are thus seen as occurring "within the context of a general pattern of interaction" (Powell, 1990:301) and "within a learned and shared code" (Powell et al., 1996:118). The decision to "make-or-buy" (internalization vs. sub-contracting) under conditions of competition and uncertainty which plays such a crucial role in Coase and Williamson's rationalist transaction cost framework of markets vs. hierarchies (see also Granovetter's, 1994, introduction to his paper on business groups) is thereby reinterpreted in institutionalist terms. To be sure, there is nothing wrong with invoking an institutionalist and constructionist explanation of organizational learning and innovation; in fact, institutional context has long been thought influential for theorizing innovation (e.g., Nelson and Winter, 1977). Powell et al's (1996) conclusions, however, are shaped by a particular, a priori interpretation rather than a rigorous test of rival hypotheses about the explanatory power of strategic action in networks and clusters vs. isomorphic behavior in institutionalized organizations vs. the role of the science base or market structure (Prevezer, 1996). Thus, early on in their paper, the authors argue that "...organizational arrangements that provide access to knowledge quickly and reliably produce competitive advantage. But rather than seeing such activity as calculative or strategic, we draw on a long line of research that stresses the centrality of building skills and exercising routines in organizations" (ibid., 118). One might argue, of course, that networks may be superior sources of learning and innovation precisely because they do not rely on organizational routines and institutional procedures.

In addition, however, **market factors** and the **nature of the knowledge base** in different sectors of the biotechnology field may provide explanations for network formation and growth that Powell et al's (1996) research design does not accommodate. For example, Swann and Prevezer (1996:1156) hold that " demand effects have been particularly strong in biotechnology, with entry of new firms into diagnostics and

equipment sectors probably attracted by the creation of new markets both in the therapeutics industry and in research establishments for new instruments and diagnostic kits to aid research. The supply side links whereby firms enter into a cluster in order to absorb knowledge spillovers or technical tacit know-how are possibly relatively weaker than attraction through the creation of new markets". In a more general comparison with computing, however, the authors argue that "the science base is more important in biotechnology in attracting entry of new firms" and to explain firm growth in networks (ibid, 1156).

The nature of the knowledge base and the distinction between formal-theoretical learning and informal-practical learning-by-doing in networks discussed above may also be relevant to the timing of knowledge transfer. Pisano's previous work pits Williamson's vertical integration in hierarchies against the transitory nature of the early biotechnology inter-firm networks. In a recent paper on the comparative development of process technology in biotechnology and chemical pharmaceuticals, he emphasizes the importance of timing in the process of technology transfer, i.e. sequential "learning-before-doing" in contrast to simultaneous "learning-by-doing" (Pisano, 1996:1097). Learning-by-doing may be appropriate and efficient in fields like biotechnology where, as he argues pointedly, "underlying theoretical and practical knowledge is relatively thin". By contrast, in fields like "chemical synthesis where underlying theoretical and practical knowledge is deep enough to enable the design of laboratory experiments that effectively model future production experience" (ibid.), learning-before-doing may be more effective.

Pisano's distinction recalls the differences between the professional model of learning in which application follows theory, as compared to the craft model where learning occurs by practice and application, and where theory remains largely implicit and is often transformed and developed by practical applications and inventions (Mok, 1973). Innovative R&D networks would seem to favor the latter process of applied research, whereas the development of paradigmatic knowledge may be submerged, even inhibited, by the pressure to achieve short-term, practical results (Heydebrand, 1990:289-96). By comparison, basic research and paradigm development may require more formal institutions and a more lengthy learning process (Freeman, 1992). In many interdisciplinary fields, however, such as biochemistry, biotechnology, neuroscience, microbiology, artificial intelligence, and systems engineering, the conventional boundaries between basic and applied research have become blurred and superseded by new forms of disciplinary integration and autonomy. The emerging theory of social networks itself is perhaps the most recent example of such a newly integrated,

interdisciplinary field spanning the boundaries of the social sciences and information and telecommunications technology.

Nevertheless, the distinction between learning-by-doing and before-doing remains implicit in the managerial problem of "how to cultivate embryonic industry" (Clegg et al, 1996:218-26). Among the range of strategic forms such as chains, clusters, and strategic alliances, networks take an intermediate, but important position. "Network organization improves immeasurably the probability that understanding is maximized through *learning by doing* in the network and through its synergistic strategies" (ibid, 222). The advantages of networks include (1) risk spreading and resource sharing, avoiding costly duplication of independent effort, (2) enhanced flexibility compared to other forms of integration, such as takeover or merger, particularly where product life-cycles are short, and (3) increased access to know-how and information through *collaborative relations at the pre-formal knowledge stage* (Clegg et al, 1996: 222, all italics added). The notion of a pre-formal knowledge stage, again suggests the affinity between network informality and the applied or tacit knowledge model, whereas formal, paradigmatic knowledge may favor more organized or hierarchical forms of learning and knowledge production.

The question of "networks of learning" and the structural locus of innovation in a "learning economy", as we will see shortly, has still another meaning and even more pervasive ramifications in the context of services (Lundvall and Johnson, 1994).

3.5 Marketing networks as extensions of R&D and production

One of the newest conceptions of the function of networks is that they facilitate the integration of research and development, production, subcontracting and outsourcing, distribution, marketing, and all the associated services. What was once an elaborate, differentiated, and well-institutionalized system of division of labor, specialization, and hierarchical coordination has now become a chain of flows that connect a series of interdependent processes from conception to execution, invention to application, production to service (e.g., Midgley, Morrison, and Roberts, 1992 on the Australian life insurance industry; Uzzi, 1996 on the New York garment industry). "Successful innovation", argue DeBresson and Amesse (1991:365), "requires setting up a network and the generation of collective knowledge in order to establish the public norms and standards of the new market". In effect, marketing networks increasingly involve the interpenetration of markets and hierarchies where the informal structure of networks, as an independent third mechanism of socio-economic integration, plays an important role.

A salient case well recognized by consumers around the world is that of Benetton, a flexible and electronically linked production and marketing network of some 200 small firm production units and some 2500 franchised distribution outlets (Perez, 1985:454, as cited by Clegg, 1990:121; see also Belussi,1989a and 1989b; Castells, 1996:162; Harrison, 1994:89-95). Perez describes how each point of sales is "furnished with specially designed electronic cash registers that transmit on-line full data about which items are being sold, their sizes, and their color. This information is centrally received and processed for decisionmaking at the design and production end" (Perez, 1985:454 as quoted and discussed by Clegg, 1990: 120-125). The "hollowness" of Benetton has certain parallels in other giants of the garment industry, for example, Manchester's Tootal (see, e.g., Peck and Dicken 1996:109-129).

Most research on strategic social and socio-technical networks in marketing uses examples with a somewhat narrower focus than the one suggested by the Benetton model and occupies a special niche among network analysts (Berkowitz, 1988; Teubal, Yinnon, and Zuscovitch, 1991; Iacobuzzi and Hopkins, 1992; Baker, 1993). Thus, the concept of network marketing refers not only to the distribution of goods and services through networks of more or less independent entrepreneurs. Merchant-entrepreneurs running smaller businesses may engage in full-time marketing themselves. In larger operations such as the pyramid-like Amway sales organization, others are recruited on a continuous basis to expand the sales effort. While the Amway system represents a hierarchical leadership system buttressed by an ideology of heroic entrepreneurship that transcends the usual informal network structure, the pyramidal system is widely advocated and promoted by marketing experts and by businesses building their own sales networks. Variants of this model are the "network marketing store" and the MCI "Friends and Family" campaign (Arabie and Wind, 1994:255). The network marketing store is a chain of brokerage firms which permit people interested in selling and distribution to contact relevant producers. The "Friends and Family"campaign of the MCI phone company "offers discount calls to residential customers when dialing a telephone number from a list prespecified by the customer, which in turn must furnish MCI with the names and other information about the 'targets' on the list. The latter are then contacted by MCI's sales force in an attempt to induce them to enroll in the discount plan" (Arabie and Wind, 1995:255). Competing phone companies have criticized this sales method as "an invasion of privacy and as an imposition by one friend or family member upon another" (ibid.)

Arabie and Wind (1994:256-59) propose a suggestive typology of social networks in marketing. The dimensions of this typology are whether the members of a marketing network are consumers or stakeholders, and whether the networks are under the control

of the firm or not. The two examples mentioned above belong to the first cell of this typology, namely consumer networks under the control of (or initiated by) the firm. The authors note that the creation of user and referral networks for marketing purposes is not limited to consumer markets, but is also popular in industrial markets. Moreover, as firms are becoming more marketing oriented, they seek to establish multiplex relations between themselves and the members of client organizations.

A second cell refers to consumer networks not under the control of the firm. "Networks in this category include buying centers, the social networks created by those engaged in word-of-mouth communication as part of any diffusion of innovation process, affinity groups that have been the target of many credit card companies, direct marketing buying club efforts, and the growing number of networks of users of electronic bulletin boards" (ibid., 256).

The third cell of the typology refers to stakeholders' networks under the control of the firm. Here the authors refer to the now familiar shift from traditional hierarchical, bureaucratic organizations to flatter, cross-functional and group-empowered forms often associated with post-Fordist and post-modern types of organizations (see also Boyer, 1991; Bergquist, 1993, esp. Ch. 10 on "the intersect organization" with "ambiguous boundaries", pp.210-228; Braczyk and Schienstock, 1996; Clegg, 1990; Galbraith, Lawler, et al., 1993, esp. Jay Galbraith's chapter 2 on the "business unit of the future", pp. 43-64, and Susan Cohen's chapter 8 on "new approaches to teams and teamwork", pp. 194-225; Harrison, 1994; Heydebrand, 1989; Wind and West, 1991). Arabie and Wind (1995:258) argue that organizations are increasingly viewed as networks of smaller networks, project teams, and task forces. "Although the firm has final control over its quality circle or other cross-functional teams... the control is not via traditional authority lines but through the creation of a shared vision and culture" (ibid.) One might add here that this cultural vision of control, which is similar to Ouchi's (1980) notion of "clans", is probably undergirded and augmented by interactional and relational mechanisms inherent in the structural properties and interest dynamics of networks (Galakiewicz and Wasserman, 1981; Mizruchi and Galaskiewicz, 1993; Uzzi, 1996). Thus, exchange and power relations in networks can be seen as generating their own control structures which may or may not become routinized over time (Cook, 1977; Blau, 1964) and which may or may not be linked via "weak ties" to other networks (Granovetter, 1973; Blau, 1977).

The fourth type of marketing networks is in many ways the most interesting one for the purposes at hand. It refers to stakeholders' networks not under the control of the firm and can therefore be said to constitute the quintessential network organization. "Companies are adopting the concept of the hollow corporation [citing Wilson and

Dobrzynski, 1986] which suggests that through strategic alliance and outsourcing, the firm can obtain many of the functions it requires without having to perform all of them internally, and there is increased interest in the ... management of a network of organizations" (Arabie and Wind, 1995:258). Clearly, there are important analytical parallels between the notions of the "hollow corporation", the "borderless enterprise" (Picot et al., 1996), the "virtual enterprise" (Davidow and Malone, 1993), and the "lean supplier system" (Weber, 1995). The hollow corporation has an octopus-like morphology in that a shallow center (in terms of depth of production) is supported by an array of supply- intensive and distributive arms extending outward as, for example, in the case of Benetton (Belussi, 1989a) and Tootal (Peck and Dicken, 1996).

A network organization is in part created by the need to manage the relationships with key stakeholders, especially where there is a focus on customer-driven production and services. A development of fundamental importance to which we will return in the context of discussing service networks is that in network organizations which integrate production, marketing, and servicing, "the voice of the customer" is internalized into the organization, i.e., it is incorporated into research and development as well as other crucial activities of the firm. This internalization of the market into the organization means that the analytical borderline between market and hierarchy theorized by Williamson (1975; 1985) is becoming permeable and that the conventional borders between organization and environment are increasingly blurred. It should be noted, however, that this blurring of the boundaries between market and organization is not necessarily due to the kind of institutional isomorphism invoked by the new institutionalism of Meyer and Rowan (1977) and DiMaggio and Powell (1983). Rather, it is the operation of market forces and the preferences and actions of networked consumer-clients which are mediated by relational networks and other interfaces between firm and market (such as "profit centers" , e.g. Eccles and White, 1986;1988) and which serve to deconstruct the traditional boundaries between markets and institutional structures.

Brian Uzzi's (1996) study of the networks of 23 apparel firms in the Manhattan garment district helps to specify the dynamics as well as the limits of the market - network interface as mediated by the level of social capital embeddedness. "When firms keep arm's length ties with one another, the pattern of exchanges produces a market-like structure; when they maintain embedded ties, the pattern of exchange produces a network"(Uzzi, 1996: 676). Uzzi's study shows that social embeddedness generates unique opportunities relative to markets and that firms organized in networks have higher survival chances than do firms which maintain arm's-length market relationships with trading partners. The relationship, however, is not monotonic but curvilinear

insofar as “contractors that transact with low-embedded or highly embedded networks have an increasing likelihood of failure, while contractors that transact with moderately embedded networks have a decreasing likelihood of failure” (Uzzi, 1996:692). In other words, successful networks manage to integrate both embedded and arm’s length ties, thus optimizing the balance between organizational learning, risk-sharing, and speed-to-market. Network failure, by contrast, can be seen as a function of excessive closure, embeddedness, and institutional consolidation (see also Messner, 1995: 221-26).

To be sure, the ideological impact of consumerism and the pervasive effect of trends, fads, and fashions in markets can be seen as activating the preferences and mobilizing the actions of consumers. But their mediation and transmission by production, service, and marketing networks and their internalization into the organization itself is also driven by the strategic use of such networks for purposes of expanding and penetrating markets as well as amplifying the reach and effectiveness of the sales effort. It is perhaps for this reason that the positive effect of embeddedness reaches a threshold beyond which a highly embedded and closed network becomes vulnerable to larger market forces such as transnational competition and globalization.

Since marketing and sales networks can be seen as an aspect of services, their discussion constitutes a natural transition to a central topic of this paper, namely the nature and significance of service networks. This topic will be discussed in the following sections.

4. Social networks in complex service relations [mainly in the 1980s and 1990s.]

Historically, we have come a long way from the assumption of the 19th century political economists that the long-term prospects for economic growth lie in industrial production and the extended accumulation of industrial capital. Consistent with the propositions following from this assumption, for example, James Stuart Mill, Adam Smith and later Marx believed that only industrial production involves truly productive and value-creating labor and that what we call services today, such as professional work, administration and financial transactions were essentially unproductive forms of labor, or not labor at all (Nusbaumer, 1987:65).

4.1 Definition of services vs. production.

A private service delivered to a client by a provider is inherently an act of cooperation even though the client typically pays the provider. Whereas in industrial production, the process and the product could until recently be analytically separated and empirically measured, in services the process is the product. Moreover, the process of "producing" a service is typically one of social or socio-technical interaction between providers and clients and, more generally, among a host of actors and agencies that constitute modern service systems. As Fuchs (1968) observed, the service consumer is a factor in production, "a cooperating agent in the production process" (194). Since services tend to be labor intensive and consumer-oriented and have no tangible product except the process of service delivery itself, "production and consumption of services occur at the same time" (Singlemann, 1978:126; Fuchs, 1968:16; Gershuny and Miles, 1983:12-13; but see Nusbaumer, 1987a:12-18 on the distinctions between primary, intermediate, final services, as well as **non-durable services** [transport, wholesale and retail trade, recreational and personal services]) and **durable services** [financial, insurance, real estate, administration] in which case simultaneity of production and consumption would not hold.

Wood (1990:4-6) points to four additional characteristics of services which significantly augment and integrate the above definitions: (1) services constitute expertise required to support other economic activities, (2) the economic output, productivity, and contributions of services must be measured in relation to the benefits they bestow, directly or indirectly, on other activities, including other services; for example, the use

of business services in manufacturing reflects their contribution to the overall production process, rather than the technology of service production itself; the worth of financial services relates to the specialized form of knowledge involved, the scale of resulting profits, and the operation of a world network of other service functions; (3) contrary to the notion that services are primarily competitive, small-firm activities, control over the patterns of both private and public services is increasingly dominated by large, multi-divisional and multinational corporations; (4) employment growth in services reflects the persistent pressures to improve labor productivity and to reduce job numbers and leads to the bifurcation of services into a highly skilled, specialized, and differentiated sector of professionals, experts, and technicians, and a sector of low-skill, low-cost, routine jobs (Noyelle, 1990). This polarization has also led to a new flexibility in the role of large and small firms and to a search for specially qualified workers.

The question of whether the production and consumption of services occur not only at the same time, but also in the same place and territorial context depends on a variety of variables, including type of service, the kinds of networks involved, and the role of information technology. Scott, Saxenian and many others feel that close geographical proximity, local social embeddedness, and the possibility of face-to-face interaction remain important for the self-organization and maintenance of collaborative, co-productive network relations. Even though the relative use and diffusion of advanced information technology is clearly a key intervening variable and a potential challenge to traditional time-space configurations, announcing the "death of geography" is premature (see the geographically informed work of Daniels, 1985, and 1993:120-22 on urban service networks; Wood, 1988; Daniels and Moulaert, 1991; Castells, 1996:151-200; Sassen, 1994:53-76; Amin and Thrift, 1995; Maillat, 1993; 1995; Moulaert and Scott, 1997; Strambach, 1997a).

Services are interactive even in the marginal case of self-service which can be seen as an internalized symbolic act of cooperation between the self as both provider and consumer and illustrates the intrinsic problem of measuring productivity in services (Gershuny, 1978). Only in some public services such as policing, social control (total institutions such as mental hospitals, prisons etc.), and military service does interaction tend to be conflictual, custodial, and coercive.

Singelmann (1978:127) adds that a consequence of "the intangible nature of services is the lesser standardization of their products. As a result, the assembly line process of production is less appropriate for services, there is less segmentation of the work tasks, and more case-by-case decisions are required...". Yet there are, of course, tendencies "to organize service industries in a fashion similar to that in manufacturing industries"

(ibid.; see also Levitt, 1972; 1976 on the industrialization of services, and Ritzer, 1993, on the "MacDonaldization" of society).

Insofar as the interactive process of providing a service is itself the product, one may speak of the cooperative interaction between two or more actors as co-production, as, for example, in buying and selling, teaching and learning, consultation, therapy, management, translation, the performing arts, and many intimate personal service activities involving the body.

The key medium of co-production is communication and information transfer. Providing a service is therefore by definition an interactive and cooperative venture involving the constant use of language and symbolic interaction. Examples (usefully classified by Singelmann) range from the **distributive services** of transportation, communication, wholesale and retail trade to **producer services** such as banking, credit, and finance, insurance, real estate, architecture, design and engineering, advertising, accounting, management consulting, and legal services as well as **social ("people-processing") services** such as medical, health, and hospital services, education, welfare and religious services, the cultural and political services of non-profit organizations, and the category of **public services** such as government, postal, and military services. Finally there is the cluster of **personal services**, e.g. domestic, hotel, restaurant, repair, laundry, cosmetic, entertainment and recreational(travel, sports, tourism) services. In personal services, know-how, skill, and performance standards are often implicit and tacit, although no less constituted by language, speech, and symbolic interaction than in other services.

It is because of the centrality of language and communication that service delivery and co-production are profoundly affected by changes in information technology, from word-of-mouth and face-to-face communication and interaction to the telegraph and telephone, the dictaphone and tape recorder, Fax, computer, email, video and Internet. In short, innovations in the means of communication and information technology possess a generic quality and thus have a revolutionary, transformative impact especially on services (see also Nusbaumer, 1987a:29 on "services as functions of communication and information").

4.2 The rise of services.

As is well known, modern industrial society was characterized by mass production in manufacturing which grew to unprecedented proportions in the first two-thirds of this century, specifically between the 1920s and the 1960s. From the late 1960s and early 1970s on, industrial

employment and the growth in output began to shift not only to high-technology sub-sectors, but to the service sector. While industrialized countries differed slightly in the rate and speed of that shift, it appeared to be a near-universal process of transformation and restructuring of industrial production and labor markets that gave rise to the slightly inaccurate, but popular term "post-industrial society" (Bell, 1976). The accelerating shift to services was predicated on the expansion of transnational markets (mainly the triad of Europe, Japan, and the United States, see Petrella, 1996), the introduction of new technologies, especially in the production, processing, and distribution of information (Porat, 1977), a demand for a more highly educated and skilled labor force, and a trend toward neo-liberal economic policies, including deregulation (see also Stanback et al., 1981; Inman, 1985).

To provide a comparative background for this development, let us look at this historic shift for the four most important economies - the United States, Japan, Great Britain**,** and West Germany in terms of two time periods, 1920 to 1960, and 1970 to 1990 (see Table 1, based on Castells, 1996: 282-310, Table 4.1 to 4.13; and Singelmann, 1978).

Clearly, the 1970-90 period shows an accelerated growth of services, with Britain jumping 20 points, Germany 10 points (to 1987), the U.S. 8 points, and Japan 6 points, ending up in third position at the end of the period in 1990. Updated figures for the U.S. and Germany between 1987 and 1995, however, suggest that the gap in services between the two countries is not closing and that the growth of services in Germany has remained relatively stable. In 1991, the share of services in Germany was 52.9% and in 1995 it was 57.8 % (Strambach, 1997a:84, Table 6-1; note that these figures are even below the 58.5% reported by Castells for 1987).

Table 1: **Percent Employment in services by country and time period**

	1920	**1960**	**1970**	**1990**
U.S.	52.0	61.8	66.0	74.2
Japan	53.7	56.6	57.9	64.2
U.K.	47.0 (1921)	49.1 (1961)	50.6	70.4
Germany	40.9 (1925)	43.8 (1961)	48.6	58.5 (1987)

The differences depend, in part, on what is included in services. According to Cornelson (1994, as cited by Haisken-DeNew, Horn, Schupp, and Wagner, 1996), services in Germany had climbed to 68% in April 1993, compared to about 72% for the United States. Moreover, based on an analysis of actual service related activities, including those of underemployed and dual employed persons, a 1994 Socio-Economic Panel

(SOEP) survey by a Berlin based economic institute (DIW) found that 73% of all employed persons worked in some service capacity. Clearly, the U.S.-German differences between aggregate statistics reflect different methods of classification and data-collection (e.g. census vs. household surveys) and should probably be taken with a grain of salt.

A further comparison of employment in producer services and social services by country and time period is instructive (Table 2; based on Castells, 1996, Appendix A, 4.1-4.8, pp. 282-95). Producer services (now often referred to as business services) include banking, insurance, real estate, engineering, accounting, legal services, and miscellaneous business services (for example, market research and management consulting). Social services include medical, education, welfare, public and other miscellaneous services. Again, the U.K. leads in terms of the rate of growth in the 1970-90 period, jumping by 7 points in producer services (reflecting a large increase in banking and miscellaneous business services, e.g., advertising), and 9.5 points in social services. The U.S. jumps almost 6 points in producer services (also due to banking and miscellaneous business services), but only 3 points in social services. Japan is next with an almost 5 point increase in producer services and a 4 point growth in social services. Germany shows an almost 3 point growth in producer services in the 17 year period from 1970 to 1987, with banking and miscellaneous business services the main factors. In the social services,

Table 2: Percent employment in producer and social services by country and time period

	1920	**1960**	**1970**	**1990**
Producer Services				
United States	2.8	6.6	8.2	14.0
Japan	0.8	2.9	4.8	9.6
U.K.	2.6 (1921)	4.5 (1961)	5.0	12.0
Germany	2.1 (1925	4.2 (1961)	4.5	7.3 (1987)
Social Services				
United States	8.7	16.3	22.0	24.9
Japan	4.9	8.3	10.3	14.3
U.K.	8.9	14.1	17.7	27.2
Germany	6.0 (1925)	12.5 (1961)	15.7	24.3 (1987)

however, Germany shows an 8.6 point jump, with government, medical and education the strongest factors, similar to the U.K.'s 9.5 points, although here the ranking of factors is the reverse: education, medical, government.

An update for German producer services between 1987 and 1995 suggests a fairly high degree of continuity (Strambach, 1997a:88, Table 6-3). Employment in technical services, the largest category, stood at 32.9% in 1987 and 32.4% in 1995. During the same period, business services rose slightly from 27.8% to 28.6%. Miscellaneous business services (which includes data processing, market and opinion research, and management consulting) rose from 21.5% to 23.8%, the largest increase among the categories reported. Legal services declined from 11.2% to 8.9%, and advertising from 6.5% in 1987 to 6.2% in 1995. Clearly, combined business services were the most active categories and accounted for over half (52.4%) of all producer services in 1995. Growth rates in advanced producer services employment between 1987 and 1995 present a similar picture (Strambach, 1997b: 237, Table 1). While the total growth rate in knowledge-intensive producer service employment for this 8-year period was 66.7%, miscellaneous producer services had a growth rate of 84.8% , followed by business services and tax consulting (71.5%), technical services (64.1%), advertising (58.2%), and legal services (32.3%). Clearly, combined (regular business and miscellaneous) producer services have the highest growth rate even though the technical services sub-sector, while growing more slowly, retains a share of almost one-third of total employment in producer services.

The problem of low productivity and high labor costs in services

An issue that throws further light on the significance of these comparisons is that of the unbalanced nature of productivity growth, i.e. the fact that the average productivity of labor in services consistently lags behind that of manufacturing. As economists have known for some time, the average growth of prices or "cost" in the service sector tends to outstrip the growth of prices in manufacturing, a phenomenon labeled the "cost disease" by William Baumol (1967; see also Griliches, 1992).

A comparison of the growth rates of productivity and prices in services for the 1970-90 period in the four national economies considered above shows that the imbalance is greatest in countries with the largest sectoral share of employment and output in services, i.e. the United States, Britain, and Japan. By contrast, in Germany, the relatively lower share of employment and output in services produced the most balanced growth of overall productivity and the lowest rate of growth in the average price of

services among the 12 OECD countries compared; indeed, the productivity growth in services is only 2/10th of one percent lower than that in manufacturing, and the rise in labor costs only 1.1% higher. The relevant data for this comparison presented in Table 3 come from the OECD (1996) and have been compiled by Jeff Huther (1997).

Based on empirical tests of the effects of differential productivity growth on labor costs in manufacturing and services in 12 OECD countries, Huther (1997) shows that the widespread phenomenon of unbalanced productivity growth has, indeed, led to unbalanced growth of real labor costs.

But there are important structural differences among national economies and among the different sub-sectors of services (Huther, 1997). Between 1970 and 1990, service labor's share of income hovered around 55% in the **U.S.** But while productivity and compensation in telecommunications tended to increase in tandem during this 20 year period, they declined in finance, insurance and real estate services (FIRE), in retail and wholesale trades, the hotel and restaurant business, and in social services.

Table 3: Average growth of productivity and prices in manufacturing and services by country, 1970-90.

	% Employment		% Serv. Output		% Prod. Growth	% Price Growth
	1970	**1990**	**1970**	**1990**	**1970-90**	**1970-90**
U.S.A.						
Manufg.	29	19	-	-	2.9	4.4
Services	55	67	56	65	0.5	6.3
Japan						
Manufg.	29	25	-	-	8.4	2.3
Services	40	54	45	54	3.4	6.7
U.K.						
Manufg.	42	25	-	-	3.9	8.9
Services	40	61	46	58	0.4	10.8
Germany						
Manufg.	44	39	-	-	2.8	3.4
Services	34	46	32	43	2.6	

It stands to reason that the gains in productivity in telecommunications were due to advances in information technology and computerization, but they do not (yet) show up in the FIRE services, a situation that may change once detailed data on advanced producer services and miscellaneous business services after 1991 become available.

In **Japan** during the same period**,** the share of service income rose from below 50% in 1970 to above 60% in the mid to late 70s, but tended to decline to below 60 % by 1990.

Except for retail and wholesale trade which accounts for the rise in the seventies, productivity and compensation tended to decline in the FIRE and social services as well as in transportation.

In the **U.K.**, the share of income from services hovered around 60% with a slight upswing in 1990. Here, there was a general decline in average productivity and compensation in the trades, FIRE, and social services. Only telecommunication showed an increase in productivity which peaked in 1985. Interestingly, there was a slight increase in compensation in 1990 which was independent of productivity in all service areas except for telecommunications where a jump in both productivity and compensation could be registered.

In **Germany**, the share of income from services hovered around 60% in the early 1970s, increased to about 63 % in 1975, but then tended to decline to slightly above 50 % in 1990.

Germany shows the strongest inter-sectoral variation of productivity and compensation throughout the 70s and 80s. Telecommunications registered a strong increase in productivity followed by a weaker rise in compensation. In finance and insurance, productivity remained relatively stable, but compensation tended to be below par and dropped sharply between 1980 and 1984. From 1985 to 1990, however, compensation in this sub-sector rose and began to catch up with the level of productivity. While compensation in the social services declined consistently between 1970 and 1990, average productivity was low but stable between 1975 and 1990. The hotel and restaurant sector showed consistent decline of both productivity and compensation throughout the 20 year period. The greatest amount of turbulence occurred in the retail and wholesale trades. Not only were there considerable disparities between productivity and compensation which generally stayed above productivity; there was a decline in productivity from 1970 to 1985, followed by a significant increase only between 1986 and 1990. Compensation in the trades showed a fairly erratic pattern throughout the period.

Huther concludes that the results of his analysis provide strong support of Baumol's theory of "cost disease" in low-productivity growth sectors such as services. The strong relationship between slow productivity growth and rising prices suggests that the relative cost of services will continue to rise. Huther (1997:18) predicts that "to the extent that low productivity growth sectors, such as health and education, are provided or financed by the public sector, financing of these services is likely to become an increasingly contentious issue". Moreover, "the continued relative productivity growth in the manufacturing sector is likely to lead to continued declines in aggregate productivity

growth in many countries as employment continues to shift into the lower productivity service sectors" (ibid.).
Given the paradox of rising services and labor costs and potentially lower productivity, let us examine the nature of service networks to see how new types of collaborative practices and interactive information technologies may be related to productivity, labor costs, innovation, and flexibility, all factors that can be said to determine competitive advantage.

4.3 The nature of service networks

From the discussion of R&D, marketing networks, and the nature of services above, it should be obvious that the conventional boundaries between production and services and between production, marketing, and consumption have become blurred and that the old distinctions are no longer adequate. Functions like communication, transportation, administration, accounting, product development, and sales, while always important, were usually treated as separate and ancillary activities and subordinated to the primacy of production. They were often organized into separate corporate divisions and housed in separate quarters. The rise of innovative R&D, the advances in information and communications technology, the centrality of financial accounting and management in corporations bent on productivity and a lean labor force, and the crucial ability to respond accurately and flexibly to rapidly changing markets and rising competition due to deregulation and economic globalization - all of these changes have had the effect of placing service functions at the heart of production activities. Moreover, the needs, preferences, and viewpoints of individual and business consumers are increasingly being incorporated into the corporation itself, i.e., into "the production and sales of complex packages ('compacks') in which goods coexist with services" (Bressand, Distler, and Nicolaidis, 1989:17). The new "productivity frontier" explored by corporations "calls into question the old dichotomy between manufacturing and services" (ibid, 18). Many observers feel that "the blurring of the boundary between production and transaction", i.e. between hierarchy and market, points "toward a new organizational and wealth-creation paradigm centered on networks and networking strategies" (ibid., 18).
As a result of new network relationships between producers, suppliers, joint production alliances, joint services (services produced as complements to be consumed jointly, e.g. the catering and transportation services of an airline), distribution networks, and customers, there is a need to focus on the increasing volume and the demand for attention and response of the network of relationships. This new managerial demand has

led to the development of what has been called relationship management, connection management, or alliance management (in addition to the references on alliance management cited above, see the burgeoning literature on service management and marketing strategies for services, e.g. Mills, 1986; Groenroos, 1990; Teare, Moutinho, and Morgan, 1990; Kostecki, 1994; Clegg and Palmer, 1996). For example, Vandermerwe (1994:49) points out that service networks consist of the interactions and relationships between (1) the players (from individuals to firms), (2) their activities which may be either "transformational" (combining the resources, expertise, and know-how of the players and thus improving the offering) or "transactional" (linking providers and receivers), and (3) the resources, consisting of the physical infrastructure and IT, and the players, their knowledge, expertise and skills, together with the information they possess or can acquire. They are grouped either formally or informally. Activities are coordinated by a combination of account management and alliance or relationship management built around a particular client or network of clients.

The development and diffusion of information technology usually ensures significant productivity gains from relationship management. Productivity is improved in quantitative terms, i.e., by the ability to manage a greater number of relations by handling a higher number of parameters (see, e.g. Bressand, 1989 on computerized airline reservation systems; also Reutlinger, 1994). Information technology also improves the depth and quality of the management of relations, e.g., through "real-time electronic interactions... in the customization of holiday packages or the fine-tuning of financial instruments to specific tax, currency, cash flow and risk preferences" (Bressand et al, 1989:19). Rather than products and marketing demanding and creating network relations, the relations in the value-chain constitute "independent economic variables" in that a diversity of actors and their interconnections in the co-production process contribute to the creation of value (ibid, 20). Thus, in information management in banking, financial services, insurance, and airline operations, and many other advanced producer services, consumer-oriented strategies and customer relations become important resources even as they attract greater resources to the improvement and expansion of infrastructural information systems. As mass customization is made possible by incorporating transactions and relations into the computerized process of service "production", transaction costs are reduced. As a result, information technology (IT), flexibility, and the relational components of networking contribute to gains in productivity and the lowering of costs. One may reasonably hypothesize, therefore, that future productivity and cost statistics in IT-driven and highly networked advanced producer services should reflect the kinds of improvements visible up to 1990 only in telecommunications where, in 1984, according to Miles (1990:80, Table 5.1)

information technology in the U.K. had by far the highest proportional investment intensity (61.74%) among all industry categories.
In sum, socio-technical service networks are factors of production and productivity. But texts on service marketing and "total customer service" leave no doubt that the networking game is a deadly serious strategic matter. In a section entitled "ties that bind", Davidow and Uttal (1989:174-76) make clear that "highly specialized service factories act to unite company and customer in an economic bear hug". In spite of the optimistic belief that "instead of circumstances being made to suit the [bureaucratic] structure, the [network] structure is made to suit the circumstances" (Vandermerwe, 1994:50), the realistic view is that "infrastructures need to be as flexible as possible because of the classical difficulty of matching service capacity to service demand" (Davidow and Uttal, 1989:176). But since it is also difficult and expensive "to build infrastructures that are flexible enough to accommodate fluctuating demand, most companies with extensive customer service operations strive to shape demand to fit their infrastructures. Peak and off-peak pricing are the usual tools. Airline, hotels, and car-rental agencies offer special rates on weekends when demand from businessmen is low and they are stuck with idle capacity"(ibid). A flexible social network service to compensate for the relative inflexibility of the service infrastructure would be very expensive (Giarini, 1989; Dickinson, 1989).

The network enterprise

The causal complexity of the relationships between advances in information technology and the emergence of network-like organizations is well captured by the concept of the network enterprise (Castells, 1996: 168-72). Castells rightly considers both processes as relatively independent developments, arguing that advances in computer technology in the absence of fundamental organizational change merely aggravated some of the dysfunctions of rigidly structured bureaucratic organizations and did not necessarily improve productivity. For example, early studies of the effects of computers on work organization and productivity showed that the new technology merely extended the degree of control of the existing authority relations over the workplace rather than transforming it (Applebaum, 1985; Shaiken, 1985). Nor did it necessarily improve the productivity of labor (Attewell and Rule, 1984). In fact, Koppel, Applebaum, and Albin (1988:134) argued that computer technology changed work organizations into "algorithmic" systems that utilize computer-controlled operations to limit skills, reduce the role of knowledge and judgment, and are designed to minimize human intervention.

They leave the existing work and authority relations intact and thus serve to extend and augment bureaucratic control. Algorithmic systems grew on particularly fertile ground in insurance companies, utilities like telephone and electricity, the internal revenue service and similar highly routinized work settings.

By contrast, socio-technical arrangements that combine computer-integrated services with fundamental changes in the organization of work are "robust" in the sense that they enhance the skills and learning capabilities of workers and service providers. Robust systems do not only use computerized service systems for purposes of "informating" (Zuboff, 1988), the simultaneous processing of services and of information about the servicing process itself. They are also becoming flexible and adaptive and can respond quickly to internal problems like errors and failures as well as external challenges. In robust systems, the social organization of work and authority is significantly altered in the direction of reducing or eliminating hierarchical control and developing informal, flexible, relatively autonomous and self-directing subsystems (see Amin, 1994 on "flexible production" and post-Fordism) or relational networks oriented toward learning and development (Hirschhorn, 1984; 1985:172-90). In fact, one could argue that robust socio-technical service systems permit, even encourage a symbiotic relationship between information technology and network-like social relations (Heydebrand, 1989:341). Many of the formal rules, procedures, and external controls found in previous organizational forms are now incorporated into the technical language, codes, and protocols of software. The new information technology, then, has certain unanticipated social consequences insofar as the internalization and condensation of formal rationality, calculability, and procedural protocol engenders the development of informal social and work relationships. Significantly, none of the early texts on services cited above speak of "social capital" or "networks" as such, although the importance of provider-client interaction and cooperation are, of course, widely recognized.

The rather unique nature of service delivery organizations and networks in the private sector, then, consists in the fact they do not have much of a permanent organizational structure apart from the IT infrastructure and the service delivery process itself. The flexible practices and processes of providing the service constitute and activate the structure which is essentially implicit or dormant when not in use. Small private service networks, therefore, tend to be hollow and borderless social structures that do not need to solve the problem of organizational maintenance independent of providing the service. Whatever efficiency they may possess lies increasingly in their capacity to terminate organizational functions as soon as service tasks have been completed and part-time or temporary employees have been dismissed or put on hold. Controls are exercised not as a matter of organizational authority, but are a consequence of service

practice. In this sense, service networks are much like anarchist work organizations that constitute and organize themselves on demand, but abandon the maintenance of organizational structure as an end in itself.

Clearly, this model of privatized services differs from conventional non-profit public and governmental delivery systems which must hold themselves ready for providing services almost continuously, i.e., they must maintain an elaborate infrastructure and labor force even when there is little demand for service. Obviously, any "privatization" of such public service delivery systems cuts heavily into the concept of the "public interest" or the "public good" and contributes to the transformation of government into governance. Conversely, insofar as large, private transnational service corporations aspire to assume governance roles and have to maintain expensive IT equipment, offices, and infrastructure, they have to sacrifice a portion of the gains they may derive from a flexible, networked labor force, or else, cut down on the services they provide.

The "network enterprise" is, therefore, something of an ideal type of a socio-technical network which emerges from of the interdependence between a highly advanced information-technical infrastructure and the social and service networks that surround it and emerge from it (see also Grenier and Metes, 1992). The fusion of structure, service, and output is typical. It is not accidental that the software giant Microsoft claims this fundamental integration of "product" and "service" as part of its current legal defense against the charge of anti-trust violation by the U.S. Department of Justice. Delivering a service via both technical and social networks constitutes an ambiguous, grey area in which it is arguably difficult to maintain the distinction between competition and cooperation.

In contrast to bureaucracies, Castells (1996:171) defines enterprises as "organizations in which goals, and the change of goals, shape and endlessly reshape the structure of means". The performance of network enterprises depends on their "connectedness" (their structural ability to facilitate noise-free communication between its components) and their "consistency" (the extent to which there is sharing of interests between the network's goals and the goals of its components). It follows that successful network enterprises are "able to generate knowledge and process information efficiently; to adapt to the variable geometry of the global economy; to be flexible enough to change [their] means as rapidly as goals change, under the impact of fast cultural, technological, and institutional change; and to innovate, *as innovation becomes the key competitive weapon"* (Castells, 1996: 171-72, italics added; Howells and Michie, 1997).

The new advanced producer services thus give rise to networks that are not only interactive learning environments, but self-directed, pro-active, productive and transformative structures. One may conclude that, in theory at least, the integration of

(1) advanced information technology and (2) informal, flexible, and collaborative work relations in strategic, socio-technical (2a) firm-based and (2b) inter-firm production and service networks contributes significantly to (3) the improvement of productivity, (4) the lowering of costs, and (5) the enhanced capacity to innovate. Effective empirical testing of this general, multivariate proposition will probably not be possible until research can make use of the accumulated statistical evidence of the 1992-2002 decade, i.e. the first complete decade of full-fledged economic globalization.

5. Transnational and Global Networking

The recent economic expansion of regional economies in Europe, the United States and Japan (triadization) and the newly industrializing countries (NIC's) around the Pacific rim has largely occurred through the transnational transfer of capital and technology, the trade in services, and the development of advanced producer services networks (Bressand and Nicolaidis, 1989; Charles and Howells, 1992; Cox, Clegg, and Ietto-Gillies, 1993; Howells and Wood, 1993; Kostecki, 1994; Nilsson et al, 1996.) In describing these processes, some observers have proposed distinctions between their different functional, regional, and historical aspects. For example, in Petrella's(1996:63) view, "[t]he internationalization of economy and society refers to the ensemble of flows of exchanges of raw materials, semi-finished and finished products and services, money, ideas and people between two or more nation-states. Trade (exports/imports) and population movement statistics are the most visible instruments to measure and monitor the nature, scope, and direction of internationalization". Interfirm strategic technology partnering, however, can also be seen as an aspect of internationalization. For example, Duysters and Hagedoorn (1996:6-8) propose a "relative internationalization index" (RIIi) of strategic technology partnering in information technology (computers, microelectronics, and telecommunications). This index is calculated for each sector (here: information technology) as the relative distribution of intra-regional alliances (RAi) and inter-regional alliances (IAi) divided by the relative distribution of total intra-regional alliances (TRA) and total inter-regional alliances (TIA) : RIIi= RAi/IAi /TRA/TIA. Applying this index to the triad of Europe, US., and Japan, the authors show that "strategic technology partnering [in information technology during the 1980s] has become relatively more concentrated within major regions of the triad instead of becoming overwhelmingly international" (Duysters and Hagedoorn, 1996:8).

The inclusive concept of "internationalization" draws attention to the historical ubiquity and continuity of the process, but it blurs the differences between pre-modern, modern (nation-state-centered), and contemporary (transnational, post-national, and global) phases (which the above research does not address). By contrast, the notion of multi-nationalization or transnationalization of economy and society focuses on "the transfer of resources [capital, labor] from one national economy to another. A typical form of multi-nationalization in the economy is the creation of production capacities of a firm in another country via direct subsidiaries, acquisitions, or various types of cooperation (commercial, financial, technological, and industrial)....[b]ecause corporations are seen as powerful and influential economic actors from a foreign country, they often acquire

the capacity to control the host country's economy...[t]his is why, contrary to internationalization processes, multi-nationalization provokes a strong cultural and political nationalistic reaction to the presence of 'foreign-owned enterprises' and 'foreign investments' " (Petrella, 1996:63-64; see also Andersson and Johanson, 1997:43 on the distinction between international and multinational enterprises). One consequence of this reaction has been the selective use of protectionist economic policies, affecting especially the relations between the U.S., Japan, and Europe.

Multinational and transnational practices emerged particularly after World War II and grew rapidly in the 1960s and 70s (Sklair, 1993). Besides production and distribution, their significance extends to their innovatory capacity based on the development of global R&D networks, selective foreign direct investment in large and economically secure markets, and favorable technological and macro-organizational policies pursued by the respective host governments (see, e.g., Dunning, 1994; and Miller, 1994 who discusses the regional and multi-regional R&D strategies of "post-national corporations" in the automobile industry and shows that global networks are constrained only by communication difficulties, travel time and cost, and by indigenous pressures for regional autonomy).

Finally, Petrella shares this author's position that globalization and "glocalization" (the interdependence between global and local processes) are of more recent origin and can be said to characterize developments especially since the early 1990s. Here, the main referents are the interpenetration of financial markets at a global level (Barfield, 1996); corporate strategies of collaborative ventures and global networking in global production and technology (Howells and Wood, 1993; the worldwide diffusion of technology, R&D, information, and knowledge(Howells and Michie, 1997); the transformation of consumption patterns into cultural products with global consumer markets (i.e. the development of spatially variable "cultural economies", Scott, 1997); Moulaert and Scott, 1997), the emergence of new managerial and regulatory patterns in the global political economy (Michie and Smith, 1995), and the "diminished role of national governments in designing the rules for global governance" (Petrella, 1996: 64; Ohmae, 1993; Held, 1996; McGrew, 1996).

The relevance of the network metaphor for global processes is well expressed by Anthony McGrew and Paul Lewis (1992:22, as cited by Petrella, 1996:64):

> "Globalization refers to the multiplicity of linkages and interconnections between the states and societies which make up the present world system. It describes the process by which events, decisions, and activities in one part of the world come to have significant consequences for individuals and communities in quite distant parts of the globe. Globalization has two

> distinct phenomena: scope (or stretching) and intensity (or deepening). On the one hand, it defines a set of processes which embrace most of the globe or which operate worldwide; the concept therefore has a spatial connotation. On the other hand, it also implies an intensification in the levels of interaction, interconnectedness, or interdependence between the states and societies which constitute the world community. Accordingly, alongside the stretching goes a deepening of global processes".

It goes without saying that the concepts of globalization and global interdependence have an ideological dimension insofar as they underplay the centrality and power of some regional or global network actors relative to others and thus hide the potential dependence and inequality generated or aggravated by globalization (see Ohmae, 1990; Ruigrok and van Tulder, 1995; Sassen, 1998). Similarly, the term 'globalization' implies the complete or balanced penetration of all national economies by capital flows, direct investments, trade in manufactured goods, and interfirm strategic technology alliance when, in fact, the bulk of these processes is highly uneven and concentrated within the triad, thus by- passing or "de-linking" many of the newly industrializing countries (NIC's) and almost all of the less developed countries (LDC's) (see Petrella, 1996: 77-81; Duysters and Hagedoorn, 1996; but note that these data show developments only up to 1989/1990, thus omitting changes between 1990 and 1998 that might alter this bleak scenario).

5.1 Trade in Services and the International Transfer of Knowledge and Technology

In 1970/72, the exports of services (in OECD categories: travel, transportation, government services, processing and repair, insurance, advertising, films, and television) amounted to 28.8% of the exports of goods in the Western OECD countries (Bairoch, 1996:174). This figure dropped to 24% for 1979/81 and rose to 27.4% for 1990/92, growing from 3% of GDP (gross domestic product or Bruttoinlandprodukt) in 1970/72 to 4% in 1990/92. Exports of goods increased by two thirds, whereas exports of services grew only by one-third. In the U.S., however, exports of services grew more rapidly during this period than in other economies, and "since 1986 the United States has enjoyed a growing surplus in the balance of payments for services (about 21% in 1991)" (Bairoch, 1996:174). The increasing globalization of export trade appears more pronounced in the U.S. than in Europe, but in the early 1990s the United States just

reached the level that Western Europe was at in the early 1970s, a divergence that Bairoch attributes to an empirical regularity to the effect that "ceteris paribus, the larger a country is, the lower its rate of exports" (ibid). Thus, while the level of service employment is highest in the U.S., as we saw above, the American level of service export did not take off until the early 1990s. It is likely that the growing surplus of American balance of payments for services since 1986 largely reflects the results of the Multilateral Trade Negotiations under the auspices of the General Agreement on Tariffs and Trade (GATT) in Punta del Este, Uruguay in September 1986. The U.S.-initiated negotiations of the so-called Uruguay Round resulted in a liberalization of trade in services and in the formulation of new trading rules for different kinds of services (Giarini, 1987; Nusbaumer, 1987b; Nicolaides, 1989; Kraus, 1994; see also Bressand and Nicolaidis, 1989, Ch.'s 9-12). The American Enterprise Institute for Public Policy Research in Washington commissioned a series of studies on international "Trade in Services", i.e. trade liberalization, deregulation, and globalization in such areas as aviation and air services; banking and financial services; business services such as accounting, advertising, law, and management consulting; ocean shipping; construction, design, and engineering services; telecommunications services in information and data processing as well as trade in motion pictures, television, and pre-recorded entertainment (see Feketekuty, 1988 for an overview). Similar policy reforms on trade in services had been set in motion in the European Community in financial services, telecommunications, transportation, and professional services (Nicolaides, 1989:60-79; for the transition from GATT to the WTO [World Trade Organization] in Geneva, see especially Hoekman, 1995; Paemen, 1995; and Krueger and Aturupane, 1998). In its effort to create a single European market, the European Commission has long pursued a policy of encouraging business cooperation across national frontiers and to eliminate fiscal and legal obstacles to transnational networking (Swann, 1991:89; Castells, 1998, vol.3:310-334 on the European "network state"). Given this general background on the transnational trade in services, let us look briefly at the role of networking in business and advanced producer services.

5.2 Business Services Networks

One of the most important phenomena in the growth of business services is the simultaneous development of internationalization and networking. Expansion of services and the transnational trade in services in the last quarter century has given rise to large service firms and network enterprises that may use any of several strategies to sell services to foreign clients (Feketekuty, 1988:12-17). They may serve foreign customers out of the home office or regional offices in third countries. They may establish local service and distribution networks in the importing country or contract with local businesses to sell the services. Most importantly, they may form an international association, franchise, partnership or other cooperative arrangement with independently owned local service firms in the importing country, provided local rules and regulations permit it. "Such an association or partnership can be no more than a mutual referral service, or it can establish common standards and offer common administrative services to its members. Many international professional firms in law, accounting, consulting, executive recruiting, and real estate are legally international associations of national partnerships" (ibid, 14).

Communication services based on advanced information technology obviously play a crucial role in these arrangements. Multinational banks operating in a variety of countries and locations, for example, need data processing, accounting, legal, economic information, data entry, computer programming, and advertising services. Other multinational corporations, in turn, need banking and other financial services, in addition to the usual business services such as accounting, advertising, management consulting, and legal services. The mutual needs and dependencies among different services thus create the agglomerations and spatial configurations of banks, legal offices, advertising agencies, management and accounting firms typical of large cities (Daniels and Moulaert, 1991; Moulaert and Scott, 1997; Scott, 1997). Obviously, technical and social networks as well as formal and informal, legal and extra-legal, local and global networks intersect each other in such settings and create the kind of "cultural economy" described by Scott (1997).

The shift towards services does not mean that modern economies are no longer producing goods, but that goods and services are being produced in ways that are different from earlier periods (Noyelle and Dutka, 1988:Ch.3). Thus, in addition to changes in what is produced, the significance of services reflects changes in how both goods and services are being produced (Stanback et al, 1981). Business services, in particular, grew in response to new ways of doing business nationally and internationally, largely under the dominance of British and American firms (see Table 2,

above, on the growth of producer services). Apart from the fact that certain financial audits and legal documents are required periodically by law and thus help multinationals to position themselves favorably in a given environment, they also improve financial control. For example, auditing services result in better accounting control systems and, in turn, improved controls over costs and productivity. Similarly, new methods of market research targeting specific market segments and well-defined consumer groups result in more accurate knowledge of consumer behavior and demand. Advertising, in turn, uses opinion and market research to probe into the details of consumer tastes and preferences in order to activate, mobilize, and influence them more effectively. Social scientific methods of sampling as well as open discussion in focus groups are being used to test the acceptance or rejection of goods and services and to explore potential consumer preferences concerning future products.

In all of these areas, business services expanded through an increasing externalization of service functions by user firms. Services were increasingly contracted out rather than produced in-house, leading to the formation of chains and networks of service suppliers. Thus, historically, the growth of the industrial multinationals paved the way for the expansion of the business service multinationals and their networks.

5.2.1. Accounting

Accounting is one of the professional and licensed business services that has long been central to the model of rational management in business corporations. Once a purely in-house entrepreneurial activity, it became increasingly professionalized and relegated to external accounting consultants and specialized accounting firms (Kotz, 1978; Fligstein, 1990; Johnson and Kaplan, 1991; Prechel, 1994). The most important linkage between the accounting service and the client firm is the financial audit which is usually mandatory and required for raising capital (Davis, Hanlon, and Kay, 1993.) As a result, “the traditional linkages between the Big 8 Anglo-American firms and New York or London-based financial institutions is giving those firms a formidable comparative advantage over other accounting firms” (Noyelle and Dutka, 1988:48). The authors quote an insider to the effect that ”the accountant is in and out of his customer’s premises on a weekly basis and benefits from having a unique access to the customer’s books. In turn, this puts him in a remarkably favorable position to suggest additional tax or management consulting services” (ibid.).

As large accounting firms expanded internationally, they had to comply with the requirements of many countries that branch offices be set up in partnership with locally

licensed accountants. As a result, “large accounting firms expanded principally by joining forces with existing local accounting partnerships, which they then brought under a a more or less binding federating structure called an ‘affiliation’. Typically an affiliation structure provides a legal framework under which certain training and development costs can be shared among affiliates, personnel can be exchanged, and a unique brand of accounting methods can be offered worldwide” (ibid.,36-37). Since 1982, some of the largest firms like Arthur Andersen, Peat Marvick, Coopers and Lybrand, Price Waterhouse and Arthur Young dominated the accounting services market; others such as Deloitte Haskins & Sells and Touche Ross later merged to form one of the world’s largest accounting firms, Deloitte and Touche.

Some of these transnational affiliations constitute relatively long-term networks out of necessity, not choice. As Noyelle and Dutka (1988: 39) point out, “the pressure to stay with large multinational clients is fundamental to understanding the pattern of international expansion. Mergers among affiliations often are driven by the need to expand smaller networks into larger ones if the needs of key clients are to be satisfied. For example, the 1957 merger of Coopers (U.K.), Lybrand (U.S.), and McDonald (Canada) which resulted in the creation of Coopers and Lybrand, was dictated in part by Lybrand’s need to follow Ford in Europe and Coopers’ to follow Unilever in North America....this seemingly never-ending drive to build large international networks has resulted in a high degree of market concentration among the largest firms. In 1983, the world’s nine largest firms controlled probably over one third of the world’s accounting business”.

Not all accounting firms have the same organizational pattern or follow the same transnational trajectory. For example, Arthur Andersen (AA), one of the oldest accounting firms (founded in 1913 and incorporated under the current name in 1921), has a relatively centralized organizational and affiliation structure. Organized as a worldwide cooperative organization, AA has two major business units, Arthur Andersen (AA; auditing and accounting with over 18,000 personnel in 1992) and Andersen Consulting (AC; consulting with over 22,000) and is coordinated from Geneva and Chicago (Moulaert, 1996:76; see also Iwabuchi, 1992). Both units realize about half of their business volume outside the United States. A number of activities are coordinated at the global level, e.g. corporate strategy (finance and investment, technology, human resources), R&D (consulting and training methodology, information and media technology, software development methodology), and training. AA’s human resources and training policy, in particular, shows a strategy of centralized organizational culture (Moulaert, 1996:83; see also the AC magazine “Outlook” which is used to diffuse common precepts and policies throughout its affiliated networks). This centralized

organizational policy approach is accompanied by a fairly high degree of de facto organizational flexibility. Moulaert (1996:86) argues that there is a trend "towards sectoral and methodological specialization as a function of client needs in particular cities and regions. This professional flexibility or flexible specialization at the local level is possible not only because of the human resources policy and the methodological approach, but also because of the flexibility of organization...it is guaranteed through the application of a number of principles which could be considered as proper of the adhocratic business structure [citing Mintzberg]....Among these principles are the lightness of administration, the horizontality of communication and cooperation, and the creation or dismantling of business functions, task units, or groups depending on the objectives of AA as a worldwide organization". Part of the actual functioning of this flexible service organization is that it includes not only its own corporate(in-house) training program (located at St.Charles near Chicago where all AA professionals pass through), but also its own R&D service operations like training and methodology, operations which themselves reflect the rules of flexible organization. Thus, service R&D in accounting and consultancy is oriented toward creating new consulting methodology, systems development tools, training methods, and relevant technology.

5.2.2. Advertising

Similar to accounting, "close firm-client relationships" and the need to retain the accounts of large and important clients have fueled the transnational expansion of adverting agencies in tandem with the multinationalization and globalization of their corporate clients (Noyelle and Dutka, 1988: 39-40). Advertising is proverbial in its use of project networks that include not only the ties between firm and client, but also between firm and suppliers of market research, graphic, audio, video, and computer services. The advertising agency resembles a loosely coupled network of activities both internally as well as in its external relations. Independent management consultants and trend researchers who specialize in market trends and forecasting may put together a network of enterprises around a particular project or client, or client-generated networks may be established temporarily for purposes of producing wide-ranging, transnational advertising campaigns involving music, dance, film, promotion, and public relations. Short-term technical services from the local labor market may be provided by temporary and part-time workers and freelancers who often develop personal relationships with creative personnel and with each other, thus contributing to the transfer of tacit knowledge and technical know-how. In one study of cooperative ties in knowledge-

intensive service networks, 73% of the advertising agencies were found to have high-frequency cooperation with other units, followed by 48% of units in other business services (Strambach, 1994). Significantly, a large proportion (up to 80%) of these cooperative inter-firm relations were not regulated by formal legal contracts. While many of these agencies were relatively small and local, the tendency has been for adverting enterprises to grow rapidly in scale and scope and to cross national boundaries where ties can be both formal and informal.

Today, large multinational advertising agencies dominate the field, similar to accounting and other business services. Notwithstanding the fact that out of the 30 largest worldwide advertising agencies in 1983, 23 (or 77%) were U.S. based, their gross income outside the U.S. tended to represent a large proportion of the total income (for example, 37% for Ted Bates Worldwide; 50% for J.Walter Thompson; 41% for Ogilvy and Mather; 68% for McCann Erickson; 38% for Leo Burnett). Already in 1973, however, the gross income of most of these advertising giants tended to be concentrated in the developed countries, i.e. the triad of Europe, the United States, and Japan. The next largest group, Latin America and the Carribean, constituted less than 10 percent of the gross income generated by the triad, and Africa and the Middle East constituted less than 1%. Comparable figures for inter-firm strategic technology alliances suggest, if anything, a deterioration of the situation throughout the 1980s (Freeman and Hagedoorn, 1992:41, as cited by Petrella, 1996:78). Although there is little systematic information on how large service firms in advertising, accounting, management consultancy and data processing operate in third world countries, Noyelle (1991) suggests that the main impact is in the areas of employment creation, technology transfer, and forward interlinkages, i.e. the demand for further inputs from business service firms.

In sum, the most important linkages between advertising agencies and their clients are based on notions such as ‘total marketing’ and ‘global advertising’. “Total marketing implies that advertisers look at their promotional budgets in their totality, that is, in terms of the trade-offs among advertising expenditures, public relations dollars, discount campaigns (for instance, coupons in the food industry, cash rebates in the automobile industry), and other promotional techniques. With global advertising, multinational advertisers attempt to target markets on a customer segment basis rather than on a geographical basis and to project a unique image to a particular target segment across borders... [t]o offer total marketing, advertising agencies must be able to offer concurrent and complementary services - market research, advertising, public relations and so forth. To offer global advertising, advertising firms.... must offer a worldwide network of agencies to carry out local campaigns consistent with [global] concepts” (Noyelle and Dutka, 1988: 49).

5.2.3. Management consulting

Although developing in the United States since the 1950s in conjunction with accounting, tax, and other types of consultancy, the field of management consulting did not take off until the late 1960s in tandem with the advances in information technology made possible by the rapid development of microprocessors and computers and the rise of knowledge-intensive services. Thus it was not so much the algorithmic extension of administrative capabilities made possible by computers, but the shift to computer-aided and computer-integrated flexible production and service systems as well as the associated management information systems that gave a decided impetus to the expansion of management consulting services (Orlikowski, 1988). Management consulting involves an intense and often long-term relationship between the consultant (or a consulting firm) and the client corporation. Once established, however, there may be less of a need for a network structure in the provider-client relationship. This may be the reason that when management consulting firms first went international, they tended to establish branch offices in foreign capitals, financial and government centers. Later on, however, they also developed the kinds of local affiliations and partnerships mentioned by Noyelle and Dutka (1988:37;54-55) and Feketekuty (1988).

In 1984, there were fewer than sixty members of the Association of Management Consulting Firms, “a close-knit group including a limited number of the largest and/or most prestigious independent management consulting firms (Noyelle and Dutka, 1988:41). Throughout the 1960s and 1970s, management consulting firms or the consulting divisions of previously mentioned accounting firms expanded internationally, “with the number of firms with international offices growing from four with a total of four foreign offices among them in 1961 to nineteen firms with 139 foreign offices among them in 1980" (ibid). In 1984, the six largest U.S. management consulting firms or divisions were Booz Allen & Hamilton with worldwide revenues of $150 million, SRI ($123 million), Arthur D. Little ($121 million), Arthur Andersen MAS ($114 million), McKinsey ($100 million), and Coopers & Lybrand ($83 million) (Noyelle and Dutka, 1988:36, Table 3-8). Today, the dynamics of the management consulting industry seem to be influenced more and more by developments in other business services, for example, consulting firms specializing in strategy or market research may experience growing competition from accounting, advertising, and financial institutions.

5.2.4 Legal Services

Similar to accounting, legal services constitute a highly professionalized and licensed business service. With the growth of large corporations towards the end of the 19th century, attorneys were increasingly retained as in-house counsel on a permanent basis. This practice has survived to this day even though corporate law firms have grown in number and size to match the increasing interconnection among financial institutions and corporations. In a path breaking study of the structure of the legal profession, Heinz and Laumann (1982) show that a large segment of lawyers and law firms are predominantly defined by their orientation to the corporate clients they serve. To be sure, there is another, more traditional segment of the legal profession that is organized in small partnerships or solo practices and handles personal clients and divorce and personal injury cases. But by far the largest and most lucrative part of the profession is the corporate client sector, dealing with large corporate clients, banks, unions, and regulatory and government agencies and handling antitrust, business litigation, real estate, tax, labor, securities, commercial and financial cases (Heinz and Laumann, 1982:48). The legal profession is virtually segregated into two separate hemispheres, where corporate lawyers and their firms interact, collaborate or share specialized activities in one hemisphere and general practice lawyers dealing with personal clients in another (ibid., 51). While networks of association, organizations and political activities are concentrated within each of the two hemispheres, there are few ties or bridges between them (ibid., Ch's 7-9). As the proportion of solo practitioners has declined, the relative volume of corporate house counsel (in-house lawyers), associates or partners in law firms, and government lawyers has increased. One of the main functions of in-house counsel, of course, is to select and maintain connections with outside corporate law firms (ibid., 367-69; Abel, 1989:168-72). As Heinz and Laumann (1982:16) state, " the decline of the individual, general practitioner who makes his living through service to a number and variety of clients, and the great increase in the full-time employment of lawyers by a single client, usually either a corporation or a government agency, are probably the most significant changes in the nature of law practice in this century" (see also Galanter and Palay, 1992; and Seron, 1992; 1996).

An argument can be made that the pattern of internationalization of law practice and law firms differs from that of accounting, advertising, and management consulting firm, especially with respect to "following the client" (except banks). "Rather than being driven by relationships with major multinational industrial clients, law firms during the post World-War II period have tended to locate branch offices where major banks and financial institutions are found... This is so because financial institutions have become a

principal source of referrals to law firms, and because legal work demanded in the preparation of financial and like documents has become a staple for many large business law firms" (Noyelle and Dutka, 1988:42). Thus, major financial centers like Paris and London managed to attract multinational law firms, and so did Brussels because of its increasing importance as the seat of the European Commission, a connection that should now also show up in the rise of legal services around the European High Court in Luxembourg. The internationalization of law firms was also driven by the presence of the International Chamber of Commerce (ICC) in Paris and similar institutions for international commercial arbitration in London, Stockholm, Cairo, and Hong Kong (Dezalay and Garth, 1996; see also Dezalay, 1990; and Martinelli, 1991 on the general tendency for producer services to be concentrated in the metropolitan centers of the developed world).

There is no apparent uniformity, however, in the way law firms become international. One insightful participant observer (Ulmer, 1994:163-72) distinguishes between (1) the centralized "one-firm" concept (unified management, common name, uniform standards, centralized revenues); (2) the decentralized "one-firm" concept (one-firm identity, but significant internal decentralization and local autonomy of offices and branches); (3) the "alliance" concept which does bear a comparison with the international spread of the large accounting firms like A. Andersen (Ulmer, 1994:164-166). Firms may retain their names and identities, but also present themselves as being part of an alliance of various firms in different countries. Typically, the alliance provides for exclusive or preferential dealings and joint referral programs between the firms in the alliance. "In a looser variation on this system", Ulmer says, "some firms from different countries are linked by 'gentlemen's agreements' which are generally non-exclusive. Such arrangements encourage cross-referral, cooperation and provide some framework for handling international legal problems, but do not involve their members in the overheads and management complexities of financial or practice integration across international borders"(165). One possible consequence of the internationalization of large law firms is that individual lawyers may spin off and set up their own smaller, personalized ("boutique") firms with lower overheads and less institutionalization.

In addition to these organizational variations, however, regulatory barriers are an important variable in both internationalization and networking (Arkell, 1994). "Regulatory constraints have played a greater role in shaping the internationalization of large law firms than is the case with other business services" (Noyelle and Dutka, 1988:42; see also Cone, 1986; but see Rossi, 1986, on the resistance to networking by government and profession in accounting as well). The authors argue that in contrast to England, and France, "West Germany did not capture a share of the legal activity

commensurate with the importance of its economy and the size of its banks. A highly restrictive regulatory environment locked out foreign firms, closed out options for the emergence of large local firms, and confined the bulk of legal work to only a few of the large in-house legal departments of the large German banks. Paris benefitted from West Germany's relative protectionism in legal services as Paris-based firms picked up some of the German business" (ibid, 42; see also their Ch. 5 on "Impediments to Trade in Business Services: Restrictions on the Licensed Professions [law and accounting]").

5.2.5 Financial Services

Transnational and global financial services are clearly among the most important of the advanced producer services, but also the most complex and dynamic ones. The so-called FIRE services (finance, insurance, real estate, as discussed above in connection with Table 3) have long played a central role in the growth of this segment of the services industry. From a historical perspective, multinational banking strategies were developed already during the period of 19th century British imperialism and "had reached industry maturity by 1914" (Jones, 1993:45). After World War I, however, global banking had shifted from British to American predominance. Between 1914 and 1960, banks generally had to adapt to changing corporate strategies and declining trade as well as a great deal of political and economic turbulence. In the U.S., the New Deal brought banking regulations such as the Glass-Steagall Act (1933). The Bretton Woods agreements of 1944 imposed a degree of international monetary stability, albeit under American leadership. From about 1960 on, however, global currency and capital markets began to resume their interrupted trajectory with the rise of foreign direct investment, a process that accelerated during the 1970s after the uni-lateral suspension of Bretton Woods by the Nixon administration in 1972 (see also Jones, 1993:55; Fennema and van der Pijl, 1987; Bairoch, 1996; Eichengreen, 1996). As Barras (1990:229) put it, "following the first wave of deregulation in the beginning of the 70s, the second and more drastic wave of deregulation and concentration of financial services in the 1980's has now created a very different and much more competitive institutional regime".

Moreover, the widespread computerization of banks and other financial institutions and their integration with the information processing capacity of other business services such as insurance and real estate revolutionized the provision, marketing, and internationalization of financial services. Banks have begun to encroach on other fields of business service such as accounting, tax counseling, insurance, and recently even

retail trade, a process that is typically both competitive and cooperative. Significantly, while international trade in banking (Dermine, 1996) and the organization and marketing of financial services have changed enormously since the 1980s (Morgan and Piercy, 1990; Petit, 1991; Levine, 1996), one of the fastest growing sub-specialties in the world of banking and finance capital is corporate risk management (e.g., Dickinson, 1989; Schauerman, 1990).

In his partly historical, partly "structural" analysis of innovation in financial and business services, Barras (1990:229) offers a view of the emergence of "new network services". Retail banking, in particular, began to offer "package(s) of personal financial services which also includes mortgage lending, insurance, taxation, and investment advice" (ibid.). Most importantly, "the formation of integrated financial conglomerates or 'financial supermarkets" attempting to offer the fullest possible range of services" (230) led to increased competition in traditional markets and expansion into new ones. Barras (1990:230) observes that "just as some banks have bought chains of estate agents to extend the span of their business, so competing alliances are now being formed between building societies and insurance companies, and while the banks continue to promote their credit cards, so the large retailing chains have responded by offering their own". It goes without saying that the banks' corporate computer networks are constantly being upgraded to operate as "integrated systems based on real time, on-line transaction processing" (ibid.).

In addition to network services, the importance of social networks in financial services such as portfolio management can be gleaned from the methods used to reach potential investors and to establish joint ventures. Odier and Lenhard (1994:119) observe that one of the major methods of gaining access to potential clients are "attempts to influence intermediaries and advisors (attorneys, accountants, financial planners, and tax advisors in the case of individual investors, consultants in the case of institutional investors". Another method is to use "existing client referrals" . This is "probably the best source of new clients, as satisfied clients often mix primarily in their peer group. For most established firms, referrals from existing clients based on competence and investment performance represent the biggest single source of new business and compare very favorably with publicity" (ibid., 120).

When it comes to establishing joint ventures, partnerships or alliances, "combining one's current services with an existing provider can expand the capabilities of both parties and allow them to share both costs and profits. This strategy has two major advantages: it is less expensive initially and usually provides immediate cash flow" (Odier and Lenhard, 1994:120). The authors illustrate this strategy by relating the particulars of a joint venture which combined one firm's know-how in US domestic institutional fixed-

income portfolio management with another firm's opportunity to attract new business and expand the range of services to global fixed-income portfolio management (ibid, 120).

The description of the internationalization of financial services networks could easily assume the form of separate papers, especially since independent analyses could be made of the insurance industry (see, e.g., Midgley et al, 1992; Marbacher, 1994; Lehmann, 1994; Skipper, 1996), the urban and inter-city real estate industry (Daniels, 1993; Daniels and Moulaert, 1991; Moulaert and Scott, 1997), as well as the many illegal forms of international financial transactions (e.g., Walter, 1990; Calavita, Pontell, and Tillman, 1997) Suffice it to say that there seems to be a definite affinity between networking and the needs of different kinds of financial markets.

Today, in the context of the contemporary phase of globalization since 1992, much of what is called economic globalization is driven by an insatiable appetite and frantic search for low-cost investment capital on the part of corporations and competitive nation-states. In a world of expanding economic horizons and highly seductive options, the demand for investment and venture capital, rapid decision making and transactions, and a high level of liquidity and capital mobility is unprecedented. But if the need for capitalization and the profits resulting from the financial transactions involved appear to be the driving force of contemporary regional integration and globalization, they are also its Achilles heel, as some observers have pointed out (see, e.g., Soros, 1998:47-58; 101-134).

In one scenario, observable to some extent in California's Silicon Valley as well as the new media industry of Silicon Alley in New York, the emergence of inter-firm networks can be interpreted as a response to the demand for venture capital as well as the paradoxical willingness of venture capitalists to invest in promising and highly valued, but not yet profitable start-up enterprises (Bankman, 1994; Bankman and Gilson, 1999; Malmude, 1998). As Malmude (1998) argues, network-producers have formed these networks in response to increasing competition, among would-be recipients, for available investment (financial) and skills (in-kind) capital. They have formed their networks to increase their attractiveness to venture capitalists. Network-actors realize that in the post-modern world, development capital is allocated and provisioned according to several criteria:

(1) competitive business planning and "grant-making" standards by a capital community which includes government units, non-profits/foundations, for-profit investors, credit-rating agencies, and "floating skills communities" (e,g., programmers, scientists, and consulting engineers);

(2) a shift toward smaller numbers of more powerful capital sources, like transnational banks or large corporations which are positioned to select their grantees from
(3) greater pools of regionally, trans-regionally, and supra-nationally dispersed network-actor applicants who, in turn, are increasingly driven to share the benefits of financial and skills capitalization to optimize their attractiveness to capital sources.

In other words, this scenario assumes that networks constitute a cooperative, informal, ad-hoc "pseudo-trustified" response to the post-modern realities of highly competitive and regionally dispersed capital formation. It is conceivable that venture capitalists share some of these beliefs and see themselves, together with lawyers, accountants, and entrepreneurs, as belonging to a kind of "cooperative community" which, paradoxically, generates and engenders competition. The secret of this imaginary "community" is that network-actors do not think they can compete without selectively, but substantially collaborating with fellow actors in the network; hence, entrepreneurs operate without profits, lawyers give advice without billing their clients, venture capitalists are prepared to pour millions of dollars into ventures repeatedly without definite expectations of short-term returns, or with the assumption that only one in ten start-ups will be successful in the long run (see also Suchman and Cahill, 1996, who ascribe to lawyers the role of an invisible hand in guiding these communities toward institutional integration, stability, and ultimate success, and who also see these communities as locally constituted and geographically circumscribed). There is some evidence that Silicon Valley is grounded in local traditions and path-dependent events, whereas Manhattan's Silicon Alley has a less clearly defined business culture and may be more interconnected with global dynamics.

The puzzle is the patent and contradictory co-existence of rational and non-rational elements in the motivation and action of these netizens, as well as the structured co-existence of cooperation and competition ("co-opetition), autonomy and dependence, rational interest and suspension of rational beliefs, local commitments and global aspirations in their networks..

To return to the issue of the "Achilles heel" of globalization, Malmude (1998) believes that one effect of this paradoxical trend of transnational collaborative competition is the networked penetration of institutional hierarchies and infrastructures, including states and national governments, by the emergent capital-enabling networks and the self-expansive tendencies of finance capital. This does not mean that every globally embedded state is powerless (Weiss, 1997). But the deconstructive process envisioned here runs counter to the long-assumed trend of structural differentiation and institutionalization in modern societies. It accounts for the current inability of many authoritative structures to maintain standards of legality, contractuality, and regulatory

effectiveness. Whether the capital-enabling networks themselves would be exempt from this deconstructive effect, or else, might collapse by virtue of participating in a self-contradictory force field remains an open question. Some of these speculative considerations, however, are being formulated as empirical hypotheses as well as specific policy issues and are currently discussed in the context of regional and global regulation, deregulation, harmonization and competition (Barfield, 1996; Hoekman, 1994; 1995; White, 1996; von Furstenberg, 1997).

5.2.6 Interim conclusion on advanced producer services networks

In summing up the findings of their important and far-sighted study of international trade in business services, Noyelle and Dutka (1988: 46-50) emphasize several critical factors underlying the creation of comparative advantages by large multinational business service organizations and suggest important questions regarding the nature of competition in some of the business service markets. The main objectives in the strategic development of large multinational networks are "the search for greater economies of scale and scope as well as the desire to raise costs of entry and competition for others in the market. The strategy used to reach these goals is the creation of special linkages, both geographical and institutional, that encourage clients to use an ever expanding diversity of services from the same supplier while making it costly for these clients to switch over to competitors or to multiply the number of their suppliers" (47). Advanced information technology is playing an increasing critical role in integrating the various affiliates within a network enterprise through growing inter-office and inter-firm flows of information and by changing the nature of the services delivered to clients, including the constantly changing and upgraded training of both service personnel and clients. Inter-firm information flow and the diffusion of know-how and innovations is, of course, also a function of the conditions and limits of labor mobility, as the comparison of different industrial districts shows.

Economies of scope are also a crucial factor in the formation of large networks. As Noyelle and Dutka, 1988:48 note, "in services...clients have very limited means of assessing the quality and usefulness of the product that they are purchasing until they have indeed done so. Service firms must invest considerable resources in building their reputations and in enhancing their clients' trust in the professionalism of their work. They may need to spend a considerable number of non-billable hours with prospective clients negotiating, discussing, and explaining the firm's service offering. This is the impetus behind the attempts of service firms to recoup some of these costs by trying to

expand the scope of their offerings, a trend often further reinforced by the maturing of traditional markets...Putting together greater scale and greater scope assumes that the firm is able to establish unique linkages with clients that competitors may not be able to reproduce". It should be obvious that this dimension of "asset specificity" also plays a role in Oliver Williamson's analysis of hierarchies and thus could be seen as a factor shared by both hierarchies and networks.

In sum, we can conclude that the network concept makes an inordinately significant contribution to the analysis and understanding of complex service networks. Strategic innovations in technology and transnationally evolving forms of organizations, as well as the achievement of market scale and scope can, indeed, be accomplished at the present time only through flexible networking among enterprises, high labor mobility, and a supportive inter-firm context. As Moulaert and his associates put it, "such networking involves professional synergies, interactive learning, and therefore, loose coupling among agents [citing Grabher, 1993:10]. It can be achieved only by pursuing what Johannisson (1990) has called 'economies of overview', that is, the systematic externalities that become available in network forms of organization [Grabher, 1993:11] or the 'virtual agglomeration economies' of networks or network firms [Camagni and Salone, 1993:1054]. In the contemporary world, these networks may range in spatial extent from the local to the global, from the network city to networks of cities" (Moulaert, Scott, and Farcy, 1997:106).

It is worth repeating, however, that the mutual attraction of networks and venture capital is occurring in a specific historical context, viz. the current phase of globalization since 1992 which has sent the U.S. stock markets to unprecedented heights and has created a euphoric sense of great expectations. Financial markets and their network externalities, however, are not stable and may experience intermittent crises. As a result, the current boom in networking may recede or give way to a new wave of economic concentration and even corporate centralization, as Harrison (1994) suggests.

6. Qualifications, employment relations, and the structure of labor markets

The overwhelming evidence on the rise and centrality of the network form of organization in production, services, and their new combination and post-dualist integration in "producer services" raises the question of the effect of these changes on skills and qualifications, employment patterns, and the structure of labor markets. Since there are no data or empirical studies that would allow one to analyze the specific contributions of the network form in comparison with previous or alternative patterns of organizing work, it is unavoidable to operate with the assumption that the network form is an implicit and integral part of the spectacular rise of producer and business services. Therefore, it is instructive to look at the relationship between these specialized services and certain structural aspects of their labor markets. There is no one-way causality implied in this exercise. The rise and internationalization of business services networks in conjunction with advanced information and communication technologies have, no doubt, contributed to the restructuring of the labor market in services. But changes in educational qualifications, skills, transnational migration and life styles have also helped to make the network enterprise a viable alternative to previous forms of work organization, notably hierarchical and meritocratic forms of which professional and collegial structures are only one sub-type. Nor does using business services as a proxy for the network form imply that there is no variation in the propensity toward network formation or in the actual density and distribution of networks among these services. The point is that in the absence of specific information about the nexus between networks and the labor force characteristics of people working in networks, one has to be content with estimates and educated guesses. The following three sections will take up this challenge with respect to qualifications, the employment relation, and the structure of labor markets.

6.1 The question of skill, knowledge, and qualifications of networkers

While the size of the U.S. labor force increased by 35% from 87.3 million in 1973 to 118.1 million in 1987, the proportion of college graduates more than doubled (108%), from 12.4 to 25.8 million. For college-educated women, the increase was 150% which reflects, in part, the rise in female labor force participation, in part the feminization of

services. During the same period, there was a corresponding increase in the number and percentage of college-educated workers in information and knowledge-intensive services. These figures, compiled by Appelbaum and Albin (1990:61, Table 3.14), reveal the intimate connection between educational qualifications and the network-intensive services described above. For example, all information and knowledge-intensive services experienced an increase of 44.2% in college-educated workers between 1973 and 1987. Among sub-categories, finance, insurance, and real estate (FIRE) services increased by 10%, business services by 7.8%. It is likely that these figures increased sharply in the last decade in line with the trends reported for producer services in Table 2, above.

6.2 The contingent work and employment patterns of networkers

The informal, flexible, and contingent nature of networks in business services has had a profound impact on the labor mobility and employment relations of people working in these services. With the rise of services, a variety of patterns of contingent work have emerged: part-time jobs, temporary work, employee leasing, and self-employed independent contractors or subcontractors (Christopherson, 1990:12-21; see also Olmsted and Smith, 1989; Callaghan and Hartmann, 1991; Parker, 1994). Almost one quarter of the jobs added to the U.S. economy in the 1970s and 80s were part-time. Of the new jobs, 66% were filled by women, and a majority of people entering the labor force during the last decade have been minorities such as African American, Hispanic, and Asian as well as legal and illegal immigrants (Sassen, 1995; Jasso, Rosenzweig, and Smith, 1998) There has been an increase in the year-to-year variation in total work hours, with white women working fewer hours per year and black workers more hours. These trends reflect the increasing bifurcation and stratification of the work force in services already noted above (see also Tilly, 1990; Christensen, 1991; Applebaum, 1992). One may conclude with Christopherson (1990:13) that “fewer adult Americans hold stable full-time jobs and receive pay for 40-hour work weeks...within these general patterns of work reorganization in the United States, two trends stand out: an increase in the variability of working hours and an increase in flexible jobs, including part-time jobs, temporary work, and self-employment”.

While about one sixth or 17% of the American work force is part-time, a much larger proportion (up to twice as many) are employed part-time at some point during the year. A growing proportion of the part-time workforce is underemployed involuntarily

(30%), compared to the majority who work part-time voluntarily, although the definition of "voluntary" conceals the fact that about 20% of part-time workers hold multiple jobs, no doubt mainly for economic reasons (in the early 1990s, there were more part-time jobs than part-time workers because of multiple part-time job holding - Kalleberg et al, 1996:260). Voluntary part-time networkers in service occupations thus have to absorb certain economic costs while, at the same time, "providing employers with a certain degree of flexibity not only because their working hours could be altered in response to seasonal, weekly, or daily demand but also because of their high turnover rates and interchangeable skills" (Christopherson, 1990:15).

In contrast to part-time work, temporary help services are increasing at three times the growth rate of the service industries and eight times the rate of all non-agricultural industries (Christopherson, 1990:15). The growth rate of the temporary help industry has been estimated at 5% annually between 1989 and 1995 compared to 1.3% for all industries. Temporary work contracts can vary from a short-term job to a long-term job with no employment security, lower pay, or no benefits. They can also be part of structured internal temporary worker pools common in universities and hospitals. Workers in the temporary help services industry are predominantly young and female. In terms of the distribution among occupational groups, the largest proportion of temporary workers is, of course, in technical, sales, administrative support and clerical jobs, but in 1985, 10.8 % were in service occupations. Non-office temporary help, however, appears to be growing faster than the clerical component.

Still another category is "temporary leasing" which is typically found in smaller firms where it may, however, constitute a larger portion of the firm's labor force. The leasing company performs all the functions of an employer, from hiring and firing to salary reviews. One reason for the expansion of this form of contingent labor has been a tax law provision that encourages small businesses and professional offices to transfer employees to external employers.

This externalization of employment functions constitutes a transition to still another important type of contingent work, the self-employed independent contractor. Two categories of self-employed workers can be distinguished: those who are sole proprietors and partners of unincorporated businesses, and those who own a controlling interest in an incorporated business (Christopherson, 1990:18-19). In the mid-1980s, approximately 7.5% of the labor force were unincorporated self-employed workers, and 2.6% operated incorporated businesses. In addition, side businesses were operated by about 2.5% of the work force. In 1983, 4% of the total of 12.8 million business owners owned more than one business (ibid, 19).

Approaching the issue of contingent employment relations from the perspective of the employing organizations, Kalleberg and Schmidt (1996:253-75) essentially confirm the earlier analyses of Noyelle, Stanback, Appelbaum, Christopherson and others (see Noyelle, 1987; 1990). Based on a sample of about 725 diverse organizations throughout the U.S., the National Organizations Study (NOS) shows that of the 524 service organizations, 76% used some type of contingent work (Kalleberg and Schmidt, 1996:266,Table13.1). This was further broken down into organizations using any part-time (67%), temporary (16%), and subcontracting services (22%). Larger organizations were more likely to use contingent workers, as were those organizations that anticipated labor shortages. "From an employer's point of view, contingent work provides some important advantages, such as greater flexibility and lower payroll costs, especially with regard to fringe benefits. Employers may also find it easier to control their workforces by using contingent workers because they are less likely to unionize and their employment can be easily terminated" (ibid., 273).

The negative consequences of contingent employment and flexible network relations for unequal compensation and fringe benefits, employment insecurity, low autonomy, and a division between stable insiders and contingent outsiders is widely recognized and acknowledged (e.g., Smith, 1994; Harrison, 1994). The new bifurcation of services, however, also means that there is a high end in the distribution that is particularly important for the advanced producer services segment. As Susan Christopherson (1990:23) points out:

> "Independent contractors...are an important source of high skilled professional workers for industries needing short-term specialized services. Independent contractors are prevalent in electronics, chemicals, and business services, and among a set of professional occupations, including graphic design, engineering, technical writing, systems analysis, and programming. These occupations have some common characteristics that make them amenable to independent contracting. They are highly skilled, but their skills are not industry specific. They can move across industry boundaries with relative ease. At the same time, they frequently work on projects that are non-routine and carried out within a definite time frame. They increase their employment opportunities by concentrating in industrial regions such as the Santa Clara Valley in California or Route 128 in Boston....Another major group of small firms is characterized by the ephemeral nature of their production activities. Industries in this category include those such as publishing, advertising, and entertainment which use highly skilled labor and those such as apparel or electronics which use low-

> skilled labor to complete one-time orders through "fly-by-night" sweat shops. These firms often are not enduring entities but project-oriented, organized to last only for the duration of a particular production project. This type of production requires a highly localized labor force. The need for firm- or industry-specific knowledge is low while the need for highly personal or specialized skills (in advertising, publishing, entertainment) or connection with a combined social-economic network is very high. These are the ultimately flexible firms in which a group of people are brought together to produce only one component or product".

This description makes the intimate connection between network structure and labor market explicit and is, of course, consistent with the work of Scott, Saxenian, Harrison, and others discussed above (see also Pfeffer, 1994; Heydebrand, 1998).

In short, the significance of the trends and figures presented above is that the flexible and continuous restructuring of work, especially in business services, entails the restructuring of employment relations and ownership patterns, and vice versa: new forms of inter-linkages and relationships among owners and employees in service markets engender the transformation of production organization and the patterns of demand and supply in labor markets for services. Without as yet using the terms "networks", "social capital", or "collaboration" explicitly, studies on contingent and temporary work patterns and limited term contracts in self-employed independent contracting and subcontracting in the late 1980s and early 1990s implicitly describe or refer to the kinds of work and ownership relations that have arisen in conjunction with advances in information and communications technology and the growth of network enterprises in service networks. The explicit recognition of the connection between the rise of networks and shifts in labor mobility as well as work and employment patterns is therefore of relatively recent origin, or else was tacitly subsumed by references to the operation of technical and socio-technical networks in the literature on advanced information technology. Economic geographers were most likely to articulate the connection between social and technical networks and to point to the sociological significance of the new service networks among enterprising firms and network enterprises.

6.3 Inter-firm networks and the new labor market segmentation

The development of a massive, post-fordist and flexibly specialized service economy, in general, and of a rapidly growing information- and knowledge-intensive segment of advanced producer and business services, in particular, suggests that "industrial dualism" (an industrial core and a service periphery, as described in section 3.3 above), has been effectively transcended. This does not mean, however, the end of production or the replacement of production by services, but the emergence of a new type of integration of work under the auspices of information and communications technology, a fairly radical restructuring of work organization from hierarchical to decentralized network forms, a demand for educated contingent labor, and a newly segmented labor market. Nor does this transformation mean the end of earnings inequality: on the contrary, a new bifurcation of jobs and incomes within services has occurred (Jacobs, 1992). What has been emerging during the last decade, then, is a transnational mode of production and a new service-industrial class structure the contours of which are slowly becoming visible (Castells, 1996, Ch.4; Tilly and Tilly, 1994; Harrison, 1994:11-12; Esping-Andersen, 1991; but see Blossfeld, Gianelli, and Mayer, 1991).

The new labor market segmentation consists of core workers, skilled contingent workers, and low-skilled contingent workers (Noyelle, 1990:212-24). Networked firms seek to reduce the number of **core workers** whom they employ on a full-time, long-term basis. While this core of professional, managerial, and technical workers is being "downsized" as much as possible, it remains an essential part of the skeletal structure of the new decentralized and internationalized inter-firm networks. The professional and managerial members of this core are dispersed among the different parts and geographic locations of network enterprises. As Noyelle (1990:220) argues, "in banks, insurance companies, local telephone companies, retailing organizations, and other service firms, core workers are usually recruited carefully to match the special characteristics of the firm and are then placed in restricted trainee programs. Others are integrated into the core on an ad hoc basis, having joined the firm originally under contingent terms". The generalization that most in-service training is directed at core employees is confirmed by Knoke and Ishio(1996), although their concept of "core" includes middle and lower level white collar and blue-collar workers.

Castells (1996:217 and Appendix A) shows that there is considerable variation in the information-intensive managerial, professional, and technical core among the triadic economies, ranging from about one third of the labor force in the United States and

Canada to about one-quarter in France and Germany to 15% in Japan (these variations reflect, in part, differences in definitions and classifications).

A second group of **skilled contingent workers** consists of a wide range of professional and paraprofessional occupations such as nurses, teachers, accountants, lawyers, systems analysts, programmers, and computer specialists (Noyelle, 1990:221). This second segment is highly significant in the United States, Canada, and Germany, in contrast to Japan, France, and Italy where there are stronger residual concentrations of traditional professions, crafts, and commercial activities (Castells, 1996:217). Noyelle points out that workers in this segment are operating predominantly under professional objectives and standards, rather than under firm-based criteria. "Mobility among skilled contingent workers is achieved at least as much through lateral job-hopping and additional education and training as through moves within a given firm, partly because the needed range of individual skill and experience is larger than what a single firm can offer. The turnover rate among skilled contingent workers is high and organizational commitments and contracts are short-term. For all these reasons, the role of user-firms in organizing this segment of the labor market is declining, while the role of professional associations, educational institutions, and professional/personal networks is growing. Most importantly, the supply of contingent labor is increasingly structured by organizations such as nurse registries, headhunter agencies, and specialized temporary work agencies (Noyelle, 1990:221).

The third segment of **low-skilled contingent workers** is also growing, contributing to a polarization of the service labor force in terms of educational and skill qualifications. Here, too, it depends who and what is counted as constituting a low-skilled contingent work force. Based on the projections of Silvestri (1993), Castells (1996:225) argues that the group of low-skill, low-pay service occupations is growing at a somewhat lower rate (1.1%) than the top group of managers and professionals (1.6%), while the middle categories of technicians, crafts, sales, clerical workers, and operators are declining slightly. By contrast, Noyelle (1990:222) argues that those categories of workers who, despite their limited skills, used to be part of the internal labor markets of firms, are now relegated to lower tiers of the contingent labor market. Harrison (1994:11) gives as an example the "back offices" of the labor market for business services such as "big insurance companies, banks, and corporate headquarters...these facilities house masses of typically poorly paid, overwhelmingly female clerical workers, tucked away in suburban 'office parks', far from the downtown corporate headquarters to which they are linked, where their companies' higher-level functions are performed". Harrison here touches on the paradoxical features of the U.S.labor market for services which is proportionately bigger than in most other economies, but includes large portions of low-

skill, low-wage, temporary and part-time jobs, a problem identified as “working poverty” in which “people work for a living but do not earn a living wage” (ibid., 12; see also Braham, 1996:327 who emphasizes the structured inequality of the contemporary international “division of labor” as an additional dimension of the new labor market segmentation).

6.4 The reactions of employers and unions

Since the acceleration of deregulation in most industrial economies during the past quarter century, employers have understood that in addition to restructuring work in terms of more **flexible** arrangements and improving **productivity** by means of information and communications technology, it was also desirable to reduce labor and transaction costs by **downsizing** the work force and to improve overall competitive advantage through fast learning and **innovativeness**. Insofar as the network form of organization has responded to these exigencies on all four counts, employers have embraced it. The bulk of this paper has detailed the dimensions and forms in which these strategic benefits have been pursued. The two central dimensions of network effects have been the ways in which networks have provided access and opportunity as well as power and influence (Powell and Smith-Doerr, 1994:372).

As to facilitating access and opportunity with respect to employment, cooperation, and innovation, network processes are clearly beneficial through the “strength of weak ties” (Granovetter, 1973), the trading of tacit knowledge and the brokerage of technical know-how, the mobilization of capital and resources, and the diffusion of innovative techniques and practices. Networks are also useful as instruments of coordination and governance. Here, the crucial dimensions are the transformation of social exchange into power relations via the centrality of the position of actors in inter-organizational networks, the conversion of resources into power and relative independence, and the class-based structure of cohesive corporate elites, business groups, and interlocking directorates (Powell and Smith-Doerr, 1994:377). Still another dimension is the conceptualization of the structure of organizations and of inter-firm networks in terms of agency theory, i.e. the view of business firms as networks of contracts and treaties(Alchian and Demsetz, 1972; Jensen and Meckling, 1976). From this perspective, a more or less permanent process of restructuring can be achieved through the strategic use of networks and their social effects and consequences. The key concepts here are that a relatively free and unregulated flow of information is made possible by the informal character of network relations, that organizational hierarchies

are flattened and dis-aggregated through economic processes such as deregulation and "concentration without centralization" (Harrison, 1994), that networks may engender not fully anticipated dynamic processes of cooperation, innovation, and learning, but that they may also facilitate the formation of coalitions and rival alliances which in turn affect the probability of joint inter-firm competition and collaboration (co-opetition) (see also Powell and Smith-Doerr, 1994: 382).

Finally, it is obvious that cooperative networks constitute a force of production of unparalleled historical importance in that much high-tech, R&D, and business service production is conducted through complex production networks and service networks. In this context, Powell and Doerr-Smith (1994:386) point to the frequently cited benefits for regional development through flexible specialization and small-scale but highly networked local industrial clusters and nodes, the development of "common technological communities", cohesive business groups exercising "benevolent authority", and strategic alliances, joint ventures, and partnerships. To what extent these networks and groupings are held together by trust, mutual obligations, and norms of reciprocity or, alternatively, by "calculative, common dependencies" and strictly strategic considerations, or by both in the form of intermittent co-opetition is, of course, largely an empirical question.

From the point of view of employing organizations and management, the most important outcome of the developments considered here is the critical combination of the social network form and information technology. In this context, Castells (1996:243) argues: "Since the two main features of the predominant organizational form (the network enterprise) are internal adaptability and external flexibility, the two key features for the work process will be the ability to generate flexible strategic decision making, and the capacity to achieve organizational integration between all elements of the production process...Information technology becomes the critical ingredient of the process of work as described because it largely determines innovation capability; it makes possible the correction of errors and generation of feedback effects at the level of execution;[and] it provides the infrastructure for flexibility and adaptability throughout the management of the production process". The relational capacity to link up with other actors and tasks within and between network enterprises implies the distinction between three basic types of positions: (1) the networkers who set up connections on their own initiative and navigate the routes and channels of the network enterprise; (2) the networked, workers who are on-line but without deciding when, how, why, or with whom; and (3) the switched-off workers, tied to their own specific tasks defined by non-interactive, one-way instructions (Castells, 1996:244).

Apart from the benefits and functions of networks for employers, the dysfunctions of informal social networks for competitive markets, legitimate institutions, public accountability and legal regulation remain to be considered in terms of a separate analysis. While such an analysis transcends the scope of this paper, one aspect of the "dark side of flexible production" (Harrison, 1994) should be mentioned here, namely the effect of networks on unionization as well as the reaction of labor and service unions to these developments.

In the absence of empirical data directly linking the new work and employment structures to the interests of workers and the efforts of unions to represent these interests, it is unavoidable to make some inferences from existing trends. There is little disagreement about the fact that the international labor movement grew in numbers and strength during the three decades following World War II. This growth reflected the continued vitality and centrality of industrial manufacturing that had begun in the 1920s and was a hallmark of the "Fordist" model of mass production. From the late 1970s on, however, union density and membership began to decline, thus eroding the organizational and institutional power of unions. While there continue to be differences in these trends among the industrial democracies, the overall tendency toward union decline has been unmistakable.

The debate on the decline of unions has been dominated by two opposed theoretical positions. From the perspective of the **structural changes** discussed above, i.e. the loss of manufacturing jobs and the rise of services, the decline of unions appears as a logical result of the structural shifts in work and technology that began in the late 1970s and accelerated after 1989/91. In the United States, the wave of plant closings in the 1970s and the de-industrializing shift from the "rust belt" to the "sun belt" began to undermine the traditional class base of labor unions (Bluestone and Harrison, 1982). The rise of services and the growing use of information technology in both production and services created a whole new sector of small, geographically dispersed, entrepreneurial business firms based on contingent labor. The network enterprises, lateral mobility of workers, and new employment practices emerging in the wake of networked production and services are part of this structural trend (Troy 1986; 1990; Bluestone and Bluestone, 1992). In contrast to the U.S., unions remained stronger in those Western European countries where the shift to services was less pronounced, as in France, Germany, and Italy. There is no clear-cut evidence that unions are opposed to certain aspects of flexible production and networking as such. But it is evident that all the factors described above conspire to undermine existing union strength and represent obstacles to organizing efforts.

From an **institutionalist perspective**, however, the structural changes described are not sufficiently compelling for explaining the decline of unions as well variations among countries. In a comparative study of postwar unionization in 18 OECD countries, Bruce Western (1997) argues that unions grow and persist where they are institutionally insulated from the market forces that drive up competition among workers. Working class and left parties enlisted the interventionist and regulatory power of government to promote and legitimate union organizing. In addition, a centralized system of industrial relations reduced employer resistance to unions and made a nationally coordinated approach to unionization possible. Finally, unions that managed unemployment insurance on their own (originally the Belgian "Ghent" system) were successful in recruiting workers at the margins of the labor market such as unemployed and retired persons. These three "institutional" factors, Western argues, constitute a more adequate account of union organization and explain variations within national labor markets, across the industrialized countries, and over time for the three decades since 1950. From the late 1970s on, the institutional frameworks of Western liberal democracies came increasingly under pressure from the globalizing economy. As a result, the institutional and organizational power of unions began to decline. Economic globalization is thus ultimately acknowledged as engendering de-institutionalization.

As in many theoretical accounts, the differences between positions depend often on the relative weight accorded to one or the other factor, as well as on the level of analysis itself. For example, it can be argued that the de-institutionalization of Western liberal democracies under the pressure of globalization occurred precisely because the shift to services, information technology and flexible social networking, economic deregulation, and global competition constituted an unprecedented structural change that the existing institutions were not prepared to handle. The resulting decline of efficacy at the institutional level was, therefore, reflected at the organizational level as well, and vice versa: structural changes at the economic and organizational level had repercussions at the institutional level. Since in institutional analysis, the boundary line between organizational and institutional phenomena is blurred or even eliminated, it is correspondingly difficult to assign unambiguous causal priorities and connections and to achieve unequivocal testability and falsifiability of empirical hypotheses.

One may conclude that both structural and institutional dynamics account for the interests of employers to pursue policies of restructuring, downsizing, and outsourcing, and of the members of the new segments of the service labor markets to ignore the appeal of unions or welfare regimes because of their own interest in, and expectation of, upward social mobility, self-organization, self-employment and the lure of flexible work and life styles. By contracting out responsibility for work and externalizing employment

benefits, employers save transaction costs but also participate in the restructuring of ownership relations. Conversely, previously employed workers become self-employed network entrepreneurs and provide needed services on a flexible, even "voluntary" basis. Networked self-employment and the absence of a visible hierarchy nurture the dream of self-empowerment and independence in the context of an imagined "community". These legal and institutional fictions may, however, embody or conceal certain consequences: 1. workers do the same job as before, only now as sub-contractors and freelancers; 2. they do not receive fixed employment and welfare benefits, but must provide them on their own on the basis of self-imposed planning and saving; 3. worker-owners can combine their networked existence and their temporal and spatial mobility with more flexible and open- ended life styles, but may find their age-specific, ethnicity-specific, and gender-specific dependencies aggravated. Unionization, however, may also assume new forms and emerge from new constituencies. Public and private service sector industries with high proportions of female workers may generate new forms and bases of organizing, and unions may pay more attention to part-time and contingent workers as their recruitment basis in the segment of core workers is shrinking (Kalleberg and Schmidt, 1996:268-69). Since the dynamics of union organization are partly political and ideological (and therefore neither purely institutional nor structural), there is a certain degree of indeterminacy that renders predictions about future developments in this area difficult, if not hazardous.

7. Summary and Conclusion

This concept paper has attempted to address a complex set of issues on which there is now a sizeable literature and a considerable number of empirical studies. Even though the network concept is generally perceived as important and as signaling new theoretical and empirical departures in the social sciences, however, there are differences in the way networks are defined and technically analyzed. For this reason, an attempt has been made to distinguish at least among structuralist and institutionalist approaches to the definition of social networks and to sort out the most important dimensions of the network concept. Thus, social networks were distinguished from technical and socio-technical networks. As to the question of how networks originate, emergent networks based on homophily and elective affinity were distinguished from established, instrumental and strategic networks.

Considering the relation between structure and content of network ties, special emphasis was placed on the informal, private, non-contractual, extra-legal, non-regulated and non-accountable nature of networks as well as their generally temporal and transient character.

The roles and effects of networks were also explored with respect to technical and economic benefits, the widely discussed role of trust, and the importance of informality and flexibility. Since there appears to be a considerable degree of variation in the cultural context as well as in the structural features of social networks, a comparative analysis of network phenomena would, as a minimum, have to separate cultural from structural effects by analyzing one while holding constant the other. There are beginnings with respect to the size and relative informality of networks, and there is, of course a great deal of technical structural network analysis within given cultural contexts, but we still know little about the relative effects of culture as compared to structure.

By way of summarizing the issues surrounding the definition and conceptualization of social networks, their epistemological status was shown to be rooted in a holistic (rather than reductionist or individualistic) as well as in an interactive (rather than dualistic) conception of social structure. This approach permits placing networks squarely within the methodological tradition of sociology and makes it possible to distinguish between networks and other structural phenomena such as organizations and institutions. The "social capital" approach in network analysis is shown to be an exception insofar as it is methodologically reductionist and constructs a conception of networks as relational aggregates of actors. This approach is shown to be akin to an economic conception

which treats networks as externalities, i.e. as potentially productive deviations from the perfect competition of classical markets. Finally, network failure through institutionalization or disintegration can, in turn, be seen as providing the negative evidence necessary for the falsifiability of network-related hypotheses and, therefore, for the testability of a theory of social networks.

The bulk of this paper addresses the dimensions, forms, and effects of social networks in complex production and service relations. Throughout the middle part of this century, cooperative production relations in manufacturing tended to be somewhat more formal and contractual. This changed with the emergence of innovative R&D networks in high tech industries and in knowledge-intensive production. In particular, innovation in information technology depends heavily on informal networking and biotechnology networks appear to be models of combining innovation and learning.

The discussion of marketing networks follows logically and empirically from the increasing emphasis placed on the continuity between R&D, production, and distribution as a series of relatively integrated business activities. A more conventional approach might have treated marketing networks strictly as a service phenomenon. As it stands, the discussion of marketing networks at this point emphasizes not only the transitional nature of marketing between production and services, but the fact that the boundary lines between these two major aspects of industrial classification have become blurred and permeable. It is, therefore, precisely the novel nature of marketing networks that embodies the integration between R&D, production and distribution as mediated by advanced producer services and information technology.

The analysis of social networks in complex service relations demonstrates this integration insofar as business service networks are the most important and fastest growing aspect of the production-service continuum. For obvious historical reasons, it is necessary to spell out the original analytical distinctions between production and services, to recognize the unprecedented growth of services in the last quarter century, and to acknowledge the problem of lower productivity and higher labor costs in services as well as the resulting imbalances in many national economies. But as soon as one grapples with the nature of service networks, in general, and the network enterprise, in particular, it becomes clear that one is dealing with a new productive and innovative force and that service networks constitute a new level of organizational development beyond flexible production, specialization, and accumulation.

Competitive-cooperative-integrative network relations are further extended and complicated by their internationalization. Trade in services and the international transfer of knowledge and technology accelerated as soon as the rise of services began to restructure production relations everywhere. Obviously, those societies like the U.S. and

the U.K. that showed particular strong increments in service employment were also those that began to assume a leading role in international trade and technology transfer and that joined with Germany and Japan in building up triadic networks involving inter-firm strategic technology alliances. Yet the really novel forms of networking occurred in business services since, here, the originally networked internal structure of project teams and task forces lent itself to easy externalization and transnational expansion. This is particularly true of financial services which took off in combination with the rapid advances of information and communications technology. But this take-off also spread to business services such as accounting, advertising, management consulting, and legal services where networking is becoming an integral part of the production-service continuum that fuels the expansion of advanced producer services.

An obvious question emerging from the analysis of service networks is the effect on qualifications and the demand for qualified labor, the contingent employment relations of networkers, and the newly segmented structure of labor markets. While there is as yet little hard empirical evidence because of the rapidly changing nature of globalization and intermittent de-globalization, there are strong indications that there is (1) continuing demand for highly qualified labor, (2) that many new jobs are not full-time, core positions in firms, but contingent, temporary, and part-time, (3) that there is a growing bifurcation and fragmentation of the labor markets in services, and (4) that the network phenomenon has both highly positive consequences for firms and core employees as well as problematic outcomes for job security and benefits. Deregulation and the dismantling of aspects of the welfare state during the 1990's have added to the mixed results of the new patterns of work organization and employment. The reactions of employers and unions are, therefore, also somewhat ambiguous since both positive and negative effects are visible on both sides and thus complicate policy making as well as the accustomed patterns of bargaining and negotiation.

As far as **substantive conclusions** are concerned, it is acknowledged that not all of the specific questions addressed in this concept paper can be answered unambiguously. It is, however, possible to draw the following basic conclusions from what has been reviewed, analyzed, and summarized above.

(1) The network concept is central to the description of complex production and service relations in a globalized economy and society. First of all, it contributes not only a rich and concrete imagery at the descriptive level, but also a measure of analytical clarification at the conceptual level. Social networks are unique and generic social structures that capture the power and appeal of spontaneous symbolic interaction and social cooperation among free, equal, and autonomous actors. As such, networks represent the human capacity for individual and collective social action, creativity,

productivity, and innovation in the face of ambiguity, uncertainty, unpredictability and indeterminacy.

These emergent qualities of interactive and relational networks can be highlighted by means of the conceptual distinctions between networks and individual actors, on the one hand, and networks and social institutions, on the other. Networks are the social webs within which the actions of rational and non-rational actors are embedded. Models of human creativity that emphasize individual rational choice, deviance, or non-rational impulse must therefore always be evaluated in reference to the social, cognitive, and symbolic context within which such creativity is situated and from which it emerges.

Networks are also analytically distinct from institutions. In organizational analysis, the difference between networks and hierarchies is well established. Exchange relations among network nodes may generate power and influence, but they are not equivalent to authority and hierarchy, nor to the formal rules, procedures, and routines of institutionalized structures such as organizations and associations.

Finally, network relations are distinct from legal contracts and classical market exchanges. There may be transitional forms of network relations that shade over into social contract and relational contract. But the classical market is based on either individualized transactional episodes or corporate contract relations. The conception of networks as "social capital" is relevant to the distinction between markets and networks. Social interaction and close ties among the units of a perfectly competitive market may lead to inefficiencies even though network externalities may have temporarily positive consequences for the members of the network. Networks-within-markets are semi-autonomous structures that either transcend the constraints of market rationality in the direction of collective creativity and innovation, or else subvert or destroy market relations by virtue of collusion or domination. The latter are usually called cartels, trusts, oligopolies or oligarchies, at best shading over into neo-corporatist and clientelist social arrangements, at worst into organized corruption and crime. Where networks transcend market relations in a constructive rather than destructive direction, one can see in them a new force of production which can liberate work relations in organizations from both rationalist and institutionalist constraints. The actual meaning of "construction" and "deconstruction" is, of course, always relative to the context and content of what is being destroyed or created, as the dialectical term "creative destruction" suggests.

Just as strategic social networks may transcend or undercut markets and institutionalized exchange relationships, they may also undermine or bypass democratic procedures, or else help to transform or at least reform entrenched and unresponsive institutions. Therefore, the purposes, directions, and outcomes of network trajectories tend to remain unavoidably ambiguous and indeterminate. This state of affairs, however, does not

signify hopeless relativism or nihilism, but rather underlines the autonomous, mutually constitutive, and self-reflexive nature of social interaction and relational ties in open-ended networks.

Networks, then, are also distinct from democratic institutions and communitarian or voluntary associations in which the central mechanisms of cohesion and coordination are either political (voting, elections) or normative (moral consensus). Loosely coupled inter-organizational networks in the form of temporary coalitions, alliances, and federations, may, of course, develop into more formalized and centralized political or economic conglomerations. In other words, network forms may become institutionalized over time, but this is not a necessary, only a potential empirical trajectory. Conceptually and analytically, therefore, it is useful to clearly distinguish networks from both institutions and individual social action.

At the theoretical level, the main task is to explain the formation (incidence and etiology) as well as the transformation of networks, and to account for the variations in the structure and content of network relations comparatively and historically. What is needed now, moreover, are theories that can explicate the relative propensity of historical and institutional or non-institutional contexts to generate network-like structures, their spatial and temporal characteristics, their interaction with information and communications technologies, their effects on existing or emerging institutions, and their likely trajectories. A number of different theoretical approaches might lend themselves to such a comparative and historical project (for example, Castells, 1996 and Messner, 1995), but there is as yet no well-developed framework beyond the field of technical network analysis that is taking up the challenge.

Insofar as the contemporary phase of globalization has been accompanied by processes such as flexible specialization and accumulation, deregulation, international trade in services, transnational expansion of financial capital as well as of financial and other business services, and the development of transnational and global networks of production, services, research and development, distribution and marketing, we witness a specific historical process that appears to be particularly germane and receptive to networking.

This process implies the dedifferentiation of existing social systems and structures, and the gradual if selective de-institutionalization of heretofore taken for granted institutional and regulatory regimes, such as corporations and unions, nation states and national economies, the rule of law mediated and enforced by national sovereignty, and democratic institutions. But acknowledging the changing features of an apparently unique historical causal context does not constitute a theory. It remains to be seen whether these processes continue to emerge and what ultimate effects they have on the

existing institutional structure of modern societies built up during the 20th century. A theory of social networks in the context of globalization, however, is likely to play a prominent role in this intellectual venture by changing both the terms of discourse and the analytical framework of the social sciences.

(2) The conventional distinction between production and services is no longer adequate or relevant. In almost all industrial spheres, production occurs mainly on the basis of the intimate participation of services or is constituted through a process of service delivery. The medium of this combined process is increasingly advanced information and telecommunications technology, i.e. computers and the Internet or other cybernetic control systems. Nevertheless, strategic social networks of advanced producer services penetrate virtually all aspects of the conventional production chain extending from strategic planning and management to design, production, research and development, distribution, advertising, and marketing. At the same time, such networks overlap with inter-firm networks of suppliers, subcontractors, co-producers, and distributors. Many corporate entities (for example, Microsoft or IBM) or cultural-products industries such as the new media connected to the INTERNET project an image of offering a product and delivering a service not in sequence, but simultaneously. They do not see themselves as operating in diversified markets, but serving one integrated market even though that market may be geographically diverse and segmented. Dominant corporations in such integrated markets (e.g., Microsoft) do not see their product-services as competing with those of other firms or as inhibiting competition, but as facilitating worldwide cooperation and innovation, i.e. as a universal service (see, e.g., Bill Gates, 1999:616: "The Internet is going to break down boundaries and may promote a world culture"). In such a case, however, inter-corporate network formation as such has probably ceased to be the decisive factor in flexibility, productivity, reduction of transaction costs, and innovativeness. Market and exchange relations with partners, suppliers, subcontractors, and distributors will have been effectively co-opted, if not economically internalized. To be sure, there may still be a modicum of interdependent "networking" with a host of other firms as well as newly emerging creative players, but the ties that bind the dependent partners, co-producers, and integrated former competitors to the network's core may no longer be reciprocal, but one-sided and asymmetrical as in economic and semi-coercive dependence. Interdependence, mutuality and reciprocity may still be on the agenda of public relations, but they can no longer be the central cause of cohesion. The reason is simply that economic, contractual, even military dependence, while sometimes eagerly sought out and often tolerated or complied with in antagonistic cooperation, supersedes the putative equality of autonomous network partners. It is, therefore, crucial to investigate and understand the temporal trajectories of networks, the

rate at which new ones are emerging or being established, their duration and stability, and their structural transformation in the direction of either dissolution, integration, or institutionalization.

(3) Transnational and global inter-firm networking has a profound effect on the structure of occupational skills, qualifications, and labor markets. The central impact, especially in knowledge-intensive service network, is that contingent employment is rising. A related effect is the segmentation and bifurcation of service labor markets in terms of educational qualifications, skill level, income, job benefits, and job security. There is a definite high end in the bi-modal distributions of education and income in which professional, managerial, and technical workers in both core and contingent labor markets participate. This pole of the distribution is also increasingly internationalized, attracting educated and qualified workers from different countries (usually Europe, Japan, and the newly industrializing countries).

On the other side, there is a low end of the service labor market in which less educated, semi-skilled and unskilled workers from indigenous minorities predominate and where part-time and temporary work is the norm. Employers have generally welcomed the effects of deregulation and the relaxation of job-related obligations and rules. Blue-collar unions have declined to below 15% of the labor force, whereas white- collar and public sector unions have maintained and in some cases increased their strength. There is little information as yet as to the specific reactions of unions to the proliferation of inter-firm networks. There is some evidence, however, that the trans-national and global expansion of inter-firm networks has allowed employers to ignore or bypass unionization drives, to ignore or violate existing union contracts, and to structure work in such a way as to minimize the possible effects and interventions of organized labor. It can be assumed that these tendencies will continue or even increase in importance as economic globalization undermines the regulatory power of governments and the sovereignty of those nation-states who find themselves outside the triadic alliances between Europe, the United States, and other developing regions.

(4) The increasingly networked structure of production and service relations is highly relevant to the innovative capacity and actual innovativeness of local service production clusters and regional economies. The delivery of services in complex, knowledge-intensive producer services and cultural-products industries generally occurs in the context of the “cultural economy”(Scott, 1997) of cities, regions, and specific transnational pathways. The technological and organizational dimensions of this cultural-economic context are defined and constituted by increasingly complex network structures.

First, a growing proportion of intellectual and symbolic labor is used by knowledge-intensive service industries in conjunction with advanced information and telecommunications technologies, including infra-structural technical and emergent socio-technical networks. Second, the service-production process is initially organized in the form of dense social networks of relatively small- and medium-sized firms that are interlinked through both cooperative and competitive co-production, R&D, supplier, subcontracting, and marketing relationships. In subsequent phases of development, however, vertical integration tends to reappear within these industrial/service clusters and may lead to a rise of economic concentration, even though continuing decentralization through networking (Harrison, 1994; Pavlik, 1997; Heydebrand, 1998).
Third, expanding links among network enterprises and clusters create highly diverse local labor markets. Employment relations are typically contingent, flexible, and intermittent, generating a high degree of labor mobility and a continuous flow of job-search and recruitment activities. Fourth, the mutual effects of the development of external economies and local agglomeration create rapid increases and unusual organizational dynamics (high entry and turnover rates). As Scott (1997:333) suggests, this network-based economic generativity and cultural creativity engenders a high level of learning and innovation that expands with the "size of the relevant reference group".
Finally, most observers believe that agglomeration along these lines facilitates the emergence of local institutional and governmental support structures "providing critical overhead services, facilitating flows of information, promoting trust and cooperation among interlinked producers. insuring that effective strategic planning is accomplished, etc." (Scott, 1997:333; Pavlik, 1997; Powell 1996). It is as yet a matter of speculation, however, how long these clusters of network enterprises last, how skewed and stratified their economic structure becomes over time, and how vulnerable they are to sudden shifts in global competition or global economic crises.
(5) From the perspective of the social sciences, the institutional and cultural role of the new networked service providers is ambiguous and indeterminate, if not contradictory in the sense of having both positive and negative consequences. Moreover, there are cultural variations in the institutional capacity and political willingness to use informal networks for purposes of capital formation, policy making, and problem-solving. Cultural traditions, state regulation, and national legal systems may resist developments in economic policy making that favor informal bargaining and negotiation across institutional boundaries and the formation of unaccountable and unregulated network relations within specific institutional spheres themselves. From the point of view of highly institutionalized, regulatory systems of industrial relations, the idea of conducting production, service delivery and governance through informal, flexible networks

borders at best on neo-libertarian self-organization and excessive privatization, at worst on organized anarchy and institutional dissolution.

Generally speaking, networks appear to be "functional" for the adaptability and flexibility of financial transactions, transnational corporate practices such as restructuring and downsizing, the expansion of markets and trade in the current phase of economic globalization, and the corresponding resurgence of local and regional demands for autonomy, recognition, and local control over the terms and conditions of productivity and creativity. They are also "functional" for the deconstruction of legal and regulatory obstacles to transnational expansion, and they facilitate the transformation of established economic, social, and political institutions that may lag behind in their capacity to respond in entirely new ways to complex and uncertain conditions.

By the same token however, networks may be "dysfunctional" from the perspective of governmental regulation, the administration of social provisions, the rule of law, the control of corruption and criminality, and the protection of civil rights and democratic procedures.

In functionalist and systems-theoretical terms, then, simplification, flexibility and adaptability through networking spells the de-differentiation of existing complex and differentiated systems and the dissolution and de-institutionalization of existing institutional regimes and their structural manifestations. Processes of de-differentiation within the economy, e.g. between production and services, competition and cooperation, public and private ownership, control and regulation, formal and informal coordination and governance, as well as de-differentiation among the spheres of economy, polity, and law themselves are indicated and constituted in large part by the emergence of undifferentiated, even though frequently segmented and internally clustered social networks.

Indeed, it may be necessary to critically re-examine or even abandon the long-standing assumption in systems theory that modern societies survive by processes of adaptive upgrading, structural differentiation, the inclusion of new units (globalization through incorporation and integration), and the progressive generalization of existing values through expanded institutionalization. Economic and political shocks could conceivably be buffered by the de-differentiation of systems and their reconstitution on lower levels of complexity and integration, for example, social networks. But theoretically, the functionalist language of differentiation and de-differentiation remains unsatisfactory and inadequate since it embodies too many unwarranted evolutionary assumptions, normative premises, and a-historical pre-suppositions. These limitations of the analytical horizon of neo-functionalism, systems theory, and neo-institutionalism render them

unable to account for non-evolutionary, historical change and to admit the notion of integrative social networks as logical alternatives and counter-types to social institutions. Other more historical or critical approaches might explore processes of non-evolutionary or strategic institutional change and the historical rise of new criteria of rationality, for example, the consequences of the currently popular neo-liberal economic paradigm for a theory of socio-economic change and institutional dissolution. Theories of legal de-formalization (e.g. the growing use of general clauses, indeterminate legal concepts, ad hoc substantive case law, and informal procedures of dispute resolution like bargaining, negotiation, mediation, and arbitration) or political theories of the decline of the nation state and national sovereignty might conceptualize the hypothesis of de-institutionalization and the rise of networks at the level of legal and political culture (Heydebrand, 1997). Needless to say, there is as yet little if any articulation between these theories of institutional dedifferentiation and the theory of social networks, notwithstanding the suggestive work of such authors as Messner (1995) and Castells (1996). Such an articulation would, as a minimum, have to theorize the role and relative usefulness of informal social and socio-technical networks as non-accountable, non-legal, non-contractual but nonetheless effective social structures. Networks can be seen as providing extra-institutional channels of communication and decision making as well as representing instruments of coordination and governance precisely at the point when national economies and the nation state are in disarray. The current strategic importance of networks, then, seems to lie in the fact that they emerge and flourish outside or alongside the institutional hierarchies of law and the state, indeed, internal and external to all social institutions that might exercise some kind of legitimate authority, whether traditional or rational, but that are for specific historical and structural reasons increasingly unable to do so at the present time.

8. References

Abel, R.L. **(**1989): American Lawyers. New York, Oxford University Press.

Adams, G. (1982): The Politics of Defense Contracting: The Iron Triangle. New Brunswick, Transaction Press.

Adams, J.R. (1990): The Big Fix: Inside the Savings and Loan Scandal. New York, Wiley.

Aderhold, J. et al. (1994): Von der Betriebs- zur Zweckgemeinschaft: Ostdeutsche Arbeits- und Managementkulturen im Transformationsprozess (From the organizational to the strategic community: East German worker and management cultures in the process of transformation). Berlin, Edition Sigma.

Akers, R. (1985): Deviant Behavior: A Social Learning Approach. Belmont, CA, Wadsworth.

Alberts, W.W.; Segall, J.E. (eds.) (1966): The Corporate Merger. Chicago, University of Chicago Press.

Alchian, A.; Demsetz, H. (1972): Production, Information Costs, and Economic Organization. In: American Economic Review (62), 777-795.

Alcorn, P.A. (1997): Social Issues in Technology. 2nd ed. Upper Saddle River, N.J., Prentice Hall.

Aldrich, H.E.; Sasaki, T. (1995): R&D Consortia in the United States and Japan. In: Research Policy (24), 301-316.

Amin, A. (ed.). (1994): Post-Fordism: A Reader. Oxford, Blackwell.

Amin, A.; Robins, K. (1990): The Re-Emergence of Regional Economies? The Mythical Geography of Flexible Accumulation. In: Environment and Planning: D 8, Society and Space (March), 7-34.

Amin, A.; Thrift, N. (eds.) (1995): Globalization, Institutions, and Regional Development in Europe. Oxford, Oxford University Press.

Andersson, U.; Johanson, J. (1997): International Business Enterprise. In: Bjoerkman, I.; Forsgren, M. (eds.): The Nature of the International Firm: Nordic Contributions to International Business Research. Copenhagen, Munksgaard Internat'l. Publishers, 33-50.

Appelbaum, E. (1985): Technology and Work Organization in the Insurance Industry. In: Institute for Industrial and Labor Relations Report (Fall), 21-27. Ithaca, N.Y., Cornell University.

Appelbaum, E. (1992): Structural change and the growth of part-time and temporary employment. In: DuRivage, V. (ed.): New Policies for the Part-time and Contingent Workforce. Armonk, N.Y.

Appelbaum, E.; Albin, P. (1990): Shifts in Employment, Occupational structure and Educational Attainment. In: Noyelle, T. (ed.): Skills, Wages and Productivity in the Service Sector. Boulder, Westview Press.

Arabie, P.; Wind, Y. (1994): Marketing and Social Networks. In: Wasserman, S.; Galaskiewicz, J. (eds.): Advances in Social Network Analysis. Thousand Oaks, Sage, 254-73.

Arkell, J. (1994): Lobbying for market access for professional services: accountancy, architecture, engineering and legal services. In: Kostecki, M. (ed.): Market Strategies for Services: Globalization, Client-Orientation, Deregulation. Oxford, Pergamon, 173-92.

Attewell, P.; Rule, J. (1984): Computing and organizations: what we know and what we don't know. Communications of the ACM 27 (12), 1184-91.

Averitt, R.T. (1968): The Dual Economy: The Dynamics of American Industry Structure. New York, Norton.

Axelsson, B.; Easton G. (1992): Industrial Networks: A New View of Reality. London, Routledge.

Bairoch, P. (1996): Globalization Myths and Realities: One Century of External Trade and Foreign Investment. In: Boyer, R.; Drache, D. (eds.): States against Markets: The limits of globalization. London and New York: Routledge, 173- 192.

Baker, W.E. (1990): Market networks and corporate behavior. In: American Journal of Sociology (96), 589-625.

Baker, W.E.; Faulkner, R.R. (1993): The Social Organization of Conspiracy: Illegal networks in the heavy electrical equipment industry. In: American Sociological Review (58), 837-60.

Bankman, J. (1994): The Structure of Silicon Valley Start-ups. In: UCLA Law Review (41), No.7, 1737-1768.

Bankman, J.; Gilson, R. (1999): Why Start-ups? In: Stanford Law Review (51), No.2, 289-308.

Eichengreen, B. (1996): Globalizing Capital: A History of the International Monetary System. Princeton, Princeton University Press.

Barfield, C.E. (1996): International Financial Markets: Harmonization versus Competition. Washington, D.C., American Enterprise Institute (AEI).

Barras, R. (1985): Information Technology and the Service Revolution. In: Policy Studies (5, No.4), 14-24

Barras, R.. (1990): Interactive innovation in financial and business services: The vanguard of the service revolution. In: Research Policy (19), 215-237.

Bartholomew, S. (1997): The globalization of technology: a socio-cultural perspective. In: Howells, J.; Michie, J. (eds.): Technology, Innovation, and Competitiveness. Cheltenham, UK, Elgar, 37-64.

Bates, F.L.; Peacock, W.G. (1989): Conceptualizing Social Structure: The Misuse of Classification in Structural Modeling. In: American Sociological Review (54), No.4, 565-577.

Baum, J.; Oliver, Ch. (1992): Institutional embeddedness and the dynamics of organizational populations. In: American Sociological Review (57), 540-59.

Baumol, W. (1967): Macroeconomics of Unbalanced Growth: The Anatomy of Urban Crisis. In: American Economic Review (57), 415-26.

Becker, H.S. (1963): Outsiders: Studies in the sociology of deviance. New York, Free Press.

Bell, D. (1973): The Coming of Post-industrial Society: A Venture in Social Forecasting. New York, Basic Books.

Belussi, F. (1989a): Benetton - A case study of corporate strategy for innovation in traditional sectors. In: Dodgson, M. (ed.): Technology, Management and the Firm: Management and Public Policy. Harlow, Longman.

Belussi, F. (1989b): Benetton Italy: Beyond Fordism and Flexible Specialization to the Evolution of the Network Firm Model. In: Mitter, S. (ed.): Information Technology and Women's Employment: The Case of the European Clothing Industry. Berlin, Springer.

Benson, J.K. (1975): The interorganizational network as a political economy. In: Administrative Science Quarterly (20), 229-49.

Benson, J.K. (1981): Networks and Policy Sectors: A Framework for Policy Analysis. In: Rogers, D.L.; Whetten, D.A. (eds.): Interorganizational Coordination. Ames, Iowa State University Press, 137-76.

Bergquist, W. (1993): The Postmodern Organization: Mastering the Art of Irreversible Change. San Francisco, Jossey Bass.

Berkowitz, S.D. (1988): Markets and Market Areas. In: Wellman, B.; Berkowitz, S.D. (eds.): Social Structures: A Network Approach. New York, Cambridge University Press, 261-303.

Best, M.H. (1990): The new competition: institutions of industrial restructuring. Cambridge, MA, Harvard University Press.

Bian, Y. (1997): Bringing Strong Ties back in: Indirect Ties, Network Bridges, and Job Searches in China. In: American Sociological Review (62), 366-85.

Bianchi, P.; Bellini, N. (1991): Public policies for local networks of innovators. In: Research Policy (20), 487-497.

Bjoerkman, I.; Forsgren, M. (eds.) (1997): The Nature of the International Firm: Nordic Contributions to International Business Research. Copenhagen, Munksgaard International Publishers.

Blau, P.M. (1964): Exchange and Power in Social Life. New York, Wiley.

Blau, P.M. (1977): Inequality and Heterogeneity. New York, Free Press.

Blossfeld, H.-P.; Gianelli, G.; Mayer, K.U. (1991): Expansion of the Tertiary Sector and Social Inequality: Is there a new service proletariat emerging in the Federal Republic of Germany? Florence: European University Institute Working Paper SPS No. 91/8.

Bluestone, B.; Harrison, B. (1982): The Deindustrialization of America: Plant Closings, Community Abandonment, and the Dismantling of Basic Industry. New York, Basic Books.

Bluestone, B.; Bluestone, I. (1992): Negotiating the Future: A Labor Perspective on American Business. New York, Basic Books.

Bourdieu, P. (1986): The Forms of Capital. In: Richardson, J.G. (ed.): Handbook of Theory and Research in the Sociology of Education. New York, Greenwood Press.

Boyer, R. (1991): New Directions in Management Practices and Work Organization: General Principles and National Trajectories. Paris, CERPEMAP, CNRS, EHSS.

Braczyk, H.-J.; Schienstock, G. (eds.) (1996): Kurswechsel in der Industrie: Lean production in Baden-Württemberg. Stuttgart, Kohlhammer.

Bradach, J.L.; Eccles, R. (1989): Price, authority, and trust: from ideal types to plural forms. In: Annual Review of Sociology (15), 97-118.

Braham, P. (1996): Divisions of Labor. In: Hall, S. et al. (eds.): Modernity: An Introduction to Modern Societies. Cambridge and Oxford, Blackwell, 308-342.

Brandenburger, A.M.; Nalebuff, B.J. (1996): Co-opetition. New York, Doubleday.

Bressand, A. (1992): On the networked economy. In: Biemans, W.G.: Managing Information within Networks. London, Routledge, 85.

Bressand, A. (1989): Computer Reservation Systems: Networks Shaping Markets. In: Bressand, A.; Nicolaidis, K. (eds.): Strategic Trends in Services: An Inquiry into the Global Service Economy. New York, Harper and Row, Ballinger, 51-64.

Bressand, A.; Distler, C.; Nicolaidis, K. (1989): Networks at the Heart of the Service Economy. In: Bressand, A.; Nicolaidis, N. (eds.): Strategic Trends in Services. New York, Harper, Row, Ballinger, 17-32.

Breyer, S.; Stewart, R. (1985): Administrative Law and Regulatory Policy. 2nd ed. Boston, Little, Brown.

Breyer, S. (1994): Breaking the Vicious Circle: Toward Effective Risk Regulation. Cambridge, Harvard University Press.

Burt, R. (1979): A structural theory of interlocking corporate directorates. In: Social Networks (1), 415-35.

Burt, R. (1982): Toward a Structural Theory of Action. New York, Academic Press.

Burt, R..(1983): Corporate Profits and Cooptation. New York, Academic Press.

Burt, R. (1992): Structural Holes: The social structure of competition. Cambridge, Harvard University Press.

Calavita, K.; Pontell,H.N.; Tillman, R. (1997): Big Money Crime. Berkeley: University of California Press.

Callaghan, P.; Hartmann, H. (1991): Contingent Work: A chart book on part-time and temporary employment. Washington, D.C., Economic Policy Institute.

Camagni, R.P. (1991): Innovation Networks: Spatial Perspectives. London, Belhaven Press.

Camagni, R.; Salone, C. (1993): Network urban structures in Northern Italy: Elements for a theoretical framework. In: Urban Studies (30), No.16, 1053-64.

Carter, C.F.; Williams, B.R. (1959): The Characteristics of Technically Progressive Firms. In: Journal of Industrial Economics (7), 87-104.

Castells, M. (1996): The Information Age, Vol.1. The Rise of the Network Society. Oxford, Blackwell.

Castells, M. (1998): The Information Age, Vol.3. End of Millennium. Oxford, Blackwell.

Chandler, A.D. (1977): The Visible Hand: The Managerial Revolution in American Business. Cambridge, Harvard University Press.

Chandler, A.D. (1990): Scale and Scope: The Dynamics of Industrial Capitalism. Cambridge, Harvard University Press.

Charles, D.; Howells, J. (1992): Technology Transfer in Europe: Public and Private Networks. London and New York, Belhaven Press.

Christensen, K. (1991): The two-tiered workforce in U.S.corporations. In: Doeringer, P.D. et al. (eds.): Turbulence in the American Workplace. New York, Oxford University Press.

Christopherson, S. (1990): Emerging Patterns of Work. In: Noyelle, T. (ed.): Skills, Wages, and Productivity in the Service Sector. Boulder, Westview, 11-30.

Clegg, S.R. (1990): Modern Organizations: Organization Studies in the Postmodern World. London, Sage.

Clegg, S.R.; Palmer, G. (eds.) (1996): The Politics of Management Knowledge. London, Sage.

Clegg, S.R. et al. (1996): Management Knowledge for the Future: Innovation, Embryos, and New Paradigms. In: Clegg, S.R.; Palmer, G. (eds.): The Politics of Management Knowledge. London, Sage, 190-236.

Codagnone, C. (1994): Big Businessmen: Continuity and Change in Russian Economy and Society. New York, New York University, Department of Sociology, unpublished Ph.D.dissertation.

Cohen, W.M.; Levin, R.C. (1989): Empirical Studies of Innovation and Market Structure. In: Schmalense, R.; Willie, R. (eds.): Handbook of Industrial Organization, Vol.2. New York, North-Holland.

Coleman, J.S. (1988): Social Capital in the Creation of Human Capital. In: Winship, C.; Rosen, S. (eds.): Organizations and Institutions: Sociological and Economic Approaches to the Analysis of Social Structure. Special supplement to the American Journal of Sociology (94), 95-120.

Coleman, J.S. (1990): Rational Action, Social Networks, and the Emergence of Norms. In: Calhoun, C. et al. (eds.). Structures of Power and Constraint: Papers in Honor of Peter Blau. Cambridge, Cambridge University Press, 91-112.

Comerford, J. (1998): Learning to Team with the Competition. In: Outlook Magazine (1), 71-76. (New York: Andersen Consulting).

Cone III, S.M. (1986): Government Trade Policy and the Professional Regulation of Foreign Lawyers. In: Barriers to International Trade in Professional Services (1), University of Chicago Legal Forum, 1 (November).

Cook, K.S. (1977): Exchange and Power in Networks of Interorganizational Relations. In: Sociological Quarterly (18), 62-82.

Cooke, P. (1988): Integration, Scope Economies, and Strategic Alliances: Social and Spatial Meditations. In: Environment and Planning. Society and Space (6), 281-300.

Cornelsen, C. (1994): Entwicklung der Erwerbstätigkeit nach Wirtschaftsbereichen und Berufen. In: Wirtschaft und Statistik (12), 995.

Cox, H.; Clegg, J.; Ietto-Gillies, G. (eds.) (1993): The Growth of Global Business. London and New York, Routledge.

Cyert, R.M.; March, J.G. (1963): A behavioral theory of the firm. Englewood Cliffs, N.J., Prentice Hall.

Daniels, P. (1985): Service Industries: A geographical appraisal. London and New York, Methuen.

Daniels, P. (1993): Service Industries in the World Economy. Oxford, Blackwell.

Daniels, P.; Moulaert, F. (eds.) (1991): The Changing Geography of Advanced Producer Services. London and New York, Belhaven Press.

Davis, E.; Hanlon, G.; Kay, J. (1993): What internationalization in services means: the case of accountancy in the UK and Ireland. In: Cox, H.; Clegg, J.; Ietto-Gillies, G. (eds.): The growth of global business. London and New York, Routledge, 105-118.

Davis, G.F.; Greve, H.R. (1997): Corporate Elite Networks and Governance Changes in the 1980s. In: American Journal of Sociology (103), 1-37.

Davis, G.F.; Robbins, G.E. (1998): The Fate of the Conglomerate Firm in the United States. In: Powell, W. (ed.): Remaking the Iron Cage: Institutional Dynamics and Processes (forthcoming).

Davidow, W.H.; Malone, M.S. (1993): Das Virtuelle Unternehmen: Der Kunde als Co-Produzent. Frankfurt and New York, Campus.

Davidow, W.H.; Uttal, B. (1989): Total Customer Service: The Ultimate Weapon. New York, Harper and Row.

De Bresson, C. (1989): Breeding Innovation Clusters: A Source of Dynamic Development. In: World Development (17), 1-16.

DeBresson, C.; Amesse, A. (1991): Networks of Innovators: A review and introduction to the issue. In: Research Policy (20), 363-379.

Della Porta, D.; Meny, Y. (eds.) (1996): Democracy and Corruption in Europe. London, Washington, Pinter.

Della Porta, D.; Vannucci, A. (1999): Corrupt Exchanges: Actors, Resources and Mechanisms of Political Corruption. New York, Aldine deGruyter.

Deppe, R.; Hosz, D. (1989): Arbeitspolitik im Staatssozialismus: Zwei Varianten: DDR und Ungarn. Frankfurt/M., Campus Verlag.

Dermine, J. (1996): International Trade in Banking. In: Barfield, C. (ed.): International Financial Markets. Washington D.C., American Enterprise Institute, 49-83.

Dezalay, Yves. 1990. “The Big Bang and the Law: the internationalization and restructuring of the legal field”, in M. Featherstone, ed. Global Culture: Nationalism, Globalization, and Modernity. London: Sage, 279-296.

Dezalay, Y.; Garth,B. (1996): Dealing in Virtue: International Commercial Arbitration and the Construction of a Transnational Legal Order. Chicago, University of Chicago Press.

Dickinson, G.M. (1989): Corporate Risk Management in the Age of Global Networks. In: Bressand, A.; Nicolaidis, K. (eds.): Strategic Trends in Services. Grand Rapids, Harper and Row, Ballinger, 237-252.

DiMaggio, P.; Powell, W. (1983): The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields. In: American Sociological Review (48, April), 147-160.

Doeringer, P.; Piore, M.J. (1971): Internal Labor Markets and Manpower Analysis. Lexington, MA, Heath.

Domhoff, G.W. (1996): State Autonomy or Class Dominance: Case Studies on Policy Making in America. New York, Aldine De Gruyter.

Dreyfuss, R.C.; Zimmerman, D.L. (1997): The Culture and Economics of Participation in an International Intellectual Property Regime. In: New York University Journal of International Law and Politics (29), 1-9.

Dunning, J.H. (1994): Multinational enterprises and the globalization of innovatory capacity. In: Research Policy (23), 67-88.

Duysters, G.; Hagedoorn, J. (1996): Internationalization of corporate technology through strategic partnering: an empirical investigation. In: Research Policy (25), 1-12.

Dyson, K. (1996): Cultural Issues and the Single European Market. In: Gessner, V. et al. (eds.): European Legal Cultures. Aldershot, Dartmouth, 387-98.

Eccles, R.G. (1981): The Quasifirm in the Construction Industry. In: Journal of the Economic Behavior of Organizations (2), 335.

Eccles, R.G. (1985): The Transfer Pricing Problem: A Theory for Practice. Lexington, MA, Lexington.

Eccles, R.G.; White, H.C. (1986): Firms and market interfaces of profit center control. In: Lindberg, S. et. al. (eds.): Approaches to Social Theory. New York, Russell Sage, 203-220.

Eccles, R.G.; White, H.C. (1988): Price and authority in inter-profit center transactions. In: American Journal of Sociology (94, Supplement), 17-51.

Economides, N. (1996): The Economics of Networks. In: International Journal of Industrial Organization (14, October), No.6, 673-699.

Economides, N. (1999) (periodically updated): Bibliography on the economics of networks. New York, NYU Stern School of Business, http://www.stern.nyu.edu/networks/site/html.

Edelman, L.B.; Suchman, M.C. (1997): The Legal Environments of Organizations. In: Annual Review of Sociology (23), 479-515.

Emirbayer, M.; Goodwin, J. (1994): Network Analysis, Culture, and the Problem of Agency. In: American Journal of Sociology (99), 1411-1454.

Erikson, A.; Hakansson, H. (1990): Getting Innovations out of Supplier Networks. Montreal, Conference on Network Innovators (May).

Erman, M.D.; Lundman, R.J. (eds.) (1992): Corporate and governmental deviance: Problems of organizational behavior in contemporary society. New York, Oxford, 4th ed.

Esping-Andersen, G. (1991): Post-Industrial class structures: an analytical framework. Florence, European University Institute Working Paper SPS 91.

Esser, J.; Noppe, R. (1996): Private Muddling Through as a Political Programme? The Role of the European Commission in the Telecommunications Sector in the 1980s. In: West European Politics (19), 547-62.

Fairtlough, G. (1994): Creative Compartments: a Design for Future Organizations. London, Adamantine Press.

Farr, M.C.; Fischer, W.A. (1992): Managing International High Technology Cooperative Projects. In: R&D Management (22), 60-67.

Farrell, J.; Saloner, G. (1985): Standardization, compatibility, and innovation. Rand Journal of Economics (16), No.1, 70-83.

Feketekuty, G. (1988): International Trade in Services: An overview and Blueprint for Negotiations. Cambridge, MA, Ballinger

Fennema, M. (1982): International Networks of Banks and Industry. Den Hague, Boston, London, Martinus Nijhoff.

Fennema, M.; Kees van der Pijl (1987): International bank capital and the new liberalism. In: Mizruchi, M.; Schwartz, M. (eds.): Inter-Corporate Relations: the structural analysis of business. New York, Cambridge University Press, 298-321.

Ferguson, C. (1990): The Coming of the U.S.Keiretsu. Harvard Business Review (July-August), 55-70.

Fisher, R.; Ury,W. (1991): Getting to Yes: Negotiating agreement without giving in. 2nd ed. with Bruce Patton. New York, Penguin.

Fligstein, N. (1990): The Transformation of Corporate Control. Cambridge, Harvard University Press.

Fligstein, N. (1991): The Structural Transformation of American Industry: An institutional account of the causes of diversification in the largest firms, 1919-1979. In: Powell, W.; DiMaggio, P. (eds.): The New Institutionalism in Organizational Analysis. Chicago, University of Chicago Press, 311-336.

Fligstein, N. (1995): Networks of Power or the Finance Conception of Control? Comment on Palmer, Barber, Zhou, and Soysal. In: American Sociological Review (60), 500-503.

Fligstein, N.; Brantley, P. (1992): Bank control, owner control, or organizational dynamics: who controls the modern corporation? In: American Journal of Sociology (98), 280-307.

Foray, D. (1991): The Secrets of Industry are in the Air: Industrial Cooperation and the Organizational Dynamics of the Innovative Firm. In: Research Policy (20), 393-405.

Forsgren, M.; Johanson, J, (eds.) (1992): Managing Networks in International Business. Philadelphia, Gordon and Breach.

Freeman, C. (1987): Technology Policy and Economic Performance: Lessons from Japan. London, Pinter.

Freeman, C. (1990): Formal scientific and technical institutions in the national system of innovation. In: Lundvall, B.A. (ed.): National Systems of Innovation: Towards a theory of innovation and interactive learning. London, Pinter.

Freeman, C. (1991): Networks of Innovators: A synthesis of research issues. In: Research Policy (20), 499-514.

Freeman, C.; Soete, L. (eds.) (1990): New Explorations in the Economics of Technical Change. London, Pinter.

Freeman, C.; Hagedoorn, J. (1992): Globalization of Technology: Report for the FAST Programme, Commission of the European Community (June).

Fuchs, V.R. (1968): The Service Economy. New York, Columbia Universiy Press.

Galanter, M.; Palay, T. (1992): The Transformation of the Big Law Firm. In: Nelson, R.; Trubek, D.; Solomon, R. (eds.): Lawyers' Ideals, Lawyers' Practices: Transformations in the American Legal Profession. Ithaca, Cornell University Press, 31-62.

Galaskiewicz, J.; Wasserman, S. (1981): A Dynamic Study of Change in a Regional Corporate Network. In: American Sociological Review (46), 475-84.

Galbraith, J.R. et al. (1993): Organizing for the Future: The New Logic for Managing Complex Organizations. San Francisco, Jossey Bass.

Gambetta, D. (ed.) (1990): Trust: making and breaking cooperative relations. Oxford, Blackwell.

Gartrell, C.D. (1987): Network Approaches to Social Evaluation. In: Annual Review of Sociology (13), 49-66.

Garud, R. (1994): Cooperative and competitive behaviors during the process of creative destruction. In: Research Policy (23), 385-94.

Gates, B. (1999): The Information Age. In: Lemert, C. (ed.): Social Theory: The Multicultural and Classical Readings. Boulder, CO: Westview Press, 615-17.

Gemuenden, H.G.; Heydebreck, P. (1995): The influence of business strategies on technological network activities. In: Research Policy (24), 831-49.

Gerlach, M. (1992): Alliance Capitalism: The Social Organization of Japanese Business. Berkeley, University of California Press.

Gershuny, J. (1978): After Industrial Society? The Emerging Self-Service Economy. London, Macmillan.

Gershuny, J.; Miles, I. (1983): The New Service Economy: The transformation of employment in industrial societies. New York, Praeger.

Giarini, O. (ed.) (1987): The Emerging Service Economy. Oxford Pergamon Press.

Giarini, O. (1989) The Service Economy and the Management of Risk. In: Bressand, A.; Nicolaidis, K. (eds.): Strategic Trends in Services. Grand Rapids: Harper and Row, Ballinger, 225-36.

Giarini, O.; Stahel, W.R. (1989): The Limits to Certainty: Facing Risks in the New Service Economy. Dordrecht, Boston, London, Kluwer Academic Publishers.

Glasmeier, A. (1991): Technological discontinuities and flexible production networks: The case of Switzerland and the world watch industry. In: Research Policy (20), 469-485.

Glasmeier, A. (1995): Flexible Districts. Flexible Regions? The institutional and cultural limits to districts in an era of globalization and technological paradigm shift. In: Amin, A.; Thrift, N. (eds.): Globalization, Institutions, and Regioanl Development in Europe. Oxford, Oxford University Press, 118-146.

Gordon, D.M.; Edwards, R.C.; Reich, M. (1982): Segmented Work, Divided Workers. New York, Oxford University Press.

Goto, A. (1982): Business groups in a market economy. In: European Economic Review (19), 53-70.

Grabher, G. (1989): Firm Networks and Innovation: Changes in the division of labor between large and small firms in the course of the restructuring of the steel industry (Ruhr District) and the chemical industry (Rhein/Main). Paper presented at the 9th EGOS- Colloquium, Berlin, Wissenschaftszentrum, July, 11-14.

Grabher, G. (ed.) (1993): The Embedded Firm: On the Socioeconomics of Industrial Networks. London/New York, Routledge.

Grabher, G. (1995): The Disembedded Regional Economy: The Transformation of East German Industrial Complexes into Western Enclaves. In: Amin, A.; Thrift, N. (eds.): Globalization, Institutions, and Regional Development in Europe. Oxford, Oxford University Press, 177-195.

Granovetter, M.S. (1973): The Strength of Weak Ties. In: American Journal of Sociology (78), 1360-80.

Granovetter, M.S. (1974): Getting a Job: A study of contacts and careers. Cambridge, Harvard University Press.

Granovetter, M.S. (1985): Economic Action and Social Structure: The Problem of Embeddedness. In: American Journal of Sociology (91), 481-510.

Granovetter, M.S. (1994): Business groups. In: Smelser, N.; Swedberg, R. (eds.): Handbook of Economic Sociology. New York and Princeton, N.J., Russell Sage Foundation and Princeton University Press, 453-475.

Grenier, R.; Metes, G. (1992): Enterprise Networking: Working together Apart. Digital Press.

Griliches, Z. (1992): Output Measurement in the Service Sectors. Chicago, University of Chicago Press.

Groenroos, C. (1990): Service Management and Marketing: Managing the moments of truth in service competition. Lexington,MA, Lexington/Heath.

Guthrie, D. (1998): The Declining Significance of Guanxi in China's Economic Transition. In: The China Quarterly (154), 254-82.

Hagedoorn, J.(1990): Organizational modes of inter-firm cooperation and technology transfer. 1 Technovation.

Hagedoorn, J. (1995a): Strategic technology partnering during the 1980s: Trends, networks and corporate patterns in non-core technologies. In: Research Policy (24), 207-231.

Hagedoorn, J. (1995b): The Economics of Cooperation among high-tech firms - trends and patterns in strategic partnering since the early 1970a. Paper presented at the Conference on the Economics of High Technology Compeition and Cooperation in Global Markets. Hamburg (February), 2-3.

Hagedoorn, J.; Schakenraad. J. (1990): Inter-firm Partnerships and Cooperative Strategies in Core Production. In: Freeman, C.; Soete, L. (eds.): New Explorations in the Economics of Technical Change. London, Pinter, 3-37.

Hagedoorn, J.; Schakenraad, J. (1992): Leading companies and networks of strategic alliances in information technologies. In: Research Policy (21), 163-190.

Haisken-DeNew, J.G. et al. (1996): Keine Dienstleistungsluecke in Deutschland: Ein Vergleich mit den USA anhand von Haushaltsbefragungen. (No services gap in Germany: A comparison with the U.S. based on household surveys). Berlin, DIW - Wochenbericht 14/96. (Electronic document).

Hakansson, H. (1989): Corporate Technological Behavior: Cooperation and Networks. London, Routledge.

Hamilton, G.G.; Biggart, N. (1988): Market, Culture, and Authority: A Comparative Analysis of Management and Organization in the Far East. In: American Journal of Sociology (94), 52-94.

Handelman, S. (1995): Comrade Criminal. New Haven, Yale University Press.

Harrison, B. (1994): Lean and Mean: The Changing Landscape of Corporate Power in the Age of Flexibility. New York, Basic Books/Harper Collins.

Harrison, B.; Kelley, M.; Grant,J. (1996): Innovative firm behavior and local milieu: Exploring the intersection of agglomeration, firm effects, and technological change. In: Economic Geography (72), 233.

Heidenreich, M. (ed.) (1992): Krisen, Kader, Kombinate: Kontinuität und Wandel in ost-deutschen Betrieben. Berlin, Edition Sigma.

Heinz, J.P.; Laumann, E.O. (1982): Chicago Lawyers: The Social Structure of the Bar. New York and Chicago: Russell Sage Foundation and American Bar Foundation.

Held, D. (1996): The 1989 Revolutions and the Triumph of Liberalism. In: Hall, S. et al. (eds.): Modernity: An Introduction to Modern Societies. Cambridge, Blackwell, 436-465.

Heydebrand, W. (1989) New Organizational Forms. In: Work and Occupations (16), 323-357.

Heydebrand, W. (1990a): The Technocratic Organization of Academic Work. In: Calhoun, C.; Meyer, M.W.; Scott, W.R. (eds.): Structures of Power and Constraint: Papers in Honor of Peter M. Blau. Cambridge, Cambridge University Press, 271-320.

Heydebrand, W. (1990b): Government Litigation and National Policymaking from Roosevelt to Reagan. In: Law & Society Review (24), 477-95.

Heydebrand, W. (1997): Globalization and the Rule of Law at the End of the 20th Century. European Yearbook in the Sociology of Law, 1997. Milan Giuffre.

Heydebrand, W. (1998): Multimedia Networks, Globalization, and Strategies of Innovation: The Case of Silicon Alley. In: Fuchs, G.; Wolf, H.G. (eds.): Regional Economic Restructuring and Multimedia. New York and London, Routledge, 49-80.

Heydebrand, W.; Codagnone, C. (1998): The Legal Consequences of National Policy-making: Explaining Changes in Government Litigation from the New Deal to the End of the Reagan Era. In: Nagel, S. (ed.): Global Legal Policy Among and Within Nations. New York, Macmillan and St. Martin's Press (forthcoming).

Hicks, D.M.; Isard, P.A.; Martin, B.R. (1996): A morphology of Japanese and European corporate research networks. In: Research Policy (25), 359-378.

Hirsch, J. (1995): Der Nationale Wettbewerbsstaat (The competitive nation state). Berlin and Amsterdam, ID Archiv.

Hirschhorn, L. (1984): Beyond Mechanization: Work and Technology in a Post-Industrial Age. Cambridge, M.I.T.Press

Hirschhorn, L. (1985): Information technology and the New Services Game. In: Castells, M. (ed.): High Technology, Space, and Society. Beverly Hills,CA, Sage, 172-190.

Hoekman, B. (1994): Deregulation, Harmonization, and Liberalization: Implications for the International Marketing of Services. In: Kostecki, M. (ed.): Marketing Strategies for Services. Oxford, Pergamon, 65-94.

Hoekman, B. (1995): The political economy of the world trading system: from GATT to WTO. Oxford, Oxford University Press.

Hoekman, B.; Sauve, P. (1991): Information Technology and Trade in Financial Services: Evolving Regulatory Priorities. In: O'Brien, R. (ed.): Finance and the International Economy. Oxford, Oxford University Press, 5-24.

Holmes, J. (1986): The Organization and Locational Structure of Production Subcontracting. In: Scott, A.; Storper, M. (eds.): Production, Work, and Territory. Boston, Allen, Unwin.

Holmstrom, B. (1985): The Provision of Services in a Market Economy. In: Inman, R. (ed.): Managing the Service Economy. Cambridge, Cambridge University Press, 183-213.

Homans, G. (1950): The Human Group. New York, Harcourt, Brace, Jovanovich.

Homans, G. (1961): Social Behavior: Its Elementary Forms. New York, Harcourt, Brace, Jovanovich.

Horning, R.A. (1997): The Enforceability of Contracts Negotiated in Cyberspace. In: International Journal of Law and Information Technology (5), 109.

Horning, R.A. (1998): Encryption Control and Global Security Policy. RSA Data Security Conference. San Francisco, CA, Jan 16.

Howells, J. (1995.): Going global: the use of ICT networks in research and development. In: Research Policy (24), 169-84.

Howells, J.; Wood, M. (1993): The Globalization of Production and Technology. London and New York, Belhaven Press.

Howells, J.; Michie, J. (eds.) (1997): Technology, Innovation, and Competitiveness. Cheltenham, Edward Elgar.

Huther, J. (1997): Evidence of Baumol's 'Cost Disease' in OECD Countries. Washington, D.C., Georgetown University, Department of Economics. Unpublished manuscript.

Iacobuzzi, D.; Hopkins, N. (1992): Modeling dyadic interactions and networks in marketing. In: Journal of Marketing Research (29), 5-17.

Ianni, F.A.J. (1974): Black Mafia: Ethnic succession in organized crime. New York, Simon and Schuster.

Imai, K.; Baba, Y. (1989): Systemic innovation and cross-border networks: Transcending markets and hierarchies to create a new techno-economic system. Paris, OECD Conference on Science, Technology, and Economic Growth (June).

Inman, R.P. (ed.) (1985): Managing the Service Economy: Prospects and Problems. Cambridge, Cambridge University Press.

Iwabuchi, A. (992): Andersen Consulting: The 21st century strategy of a worldwide organization. Tokyo, Diamond Inc.

Jacobs, J.A. (1992): Consumer, Social, and Business Service Industries in the United States: Trends between 1969 and 1987. Florence, European University Institute Working Paper SPS No. 92/15.

Jasso, G.; Rosenzweig, M.; Smith, J. (1998): The Changing Skill of New Immigrants to the United States: Recent Trends and their Determinants. Montreal: International Sociological Association, 14th World Congress, Research Committee 41, Session 02 (July 27).

Jensen, M.C.; Meckling, W.H. (1976): Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure. Journal of Financial Economics (3), 305-360.

Jepperson, R.L. (1991): Institutions, Institutional Effects, and Institutionalism. In: Powell, W.; DiMaggio, P. (eds.): The New Institutionalism in Organizational Analysis. Chicago, University of Cgicago Press.

Johannisson, B. (1990): Organizing for local economic development: on firm and context dynamics. Paper presented at the 30th European Conference of the Regional Science Association. Istanbul (Aug.), 28-31.

Johanson, J.; Mattson, L.G. (1987): Interorganizational relations in industrial systems: a network approach compared with the transaction-cost approach. International Studies of Management and Organization (17), 34- 51.

Johanson, J.; Vahlne, J.E. (1992): Management of Foreign Market Entry. Scandinavian International Business Review (1, No.3), 9-27.

Johnsen, E.; Mintz, B. (1989): Organizational vs. Class Components of Director Networks. In Perrucci, R.; Potter, H.R. (eds.): Networks of Power: Organizational Actors at the National, Corporate and Community Levels. New York, Aldine de Gruyter, 57-80.

Johnson, H.T.; Kaplan, R. (1991): Relevance Lost: The Rise and Fall of Management Accounting. Boston, Harvard Business School Press.

Jones, G. (1993): British multinational banking strategies over time. In: Cox, H.; Clegg, J.; Ietto-Gillies, G. (eds.): The growth of global business. London and New York, Routledge, 38-61.

Kalleberg, A.L.; Schmidt, K. (1996): Contingent Employment in Organizations. In: Kalleberg, A. et al.: Organizations in America: Analyzing their structures and human resource practices. Thousand Oaks, CA. Sage, 253-275.

Katz, M.L.; Shapiro, C. (1985): Network Externalities, Competition, and Compatibility. American Economic Review (75, No.3, June), 424-440.

Kaufman W.J. (1994): Relational Practices and the Marginalization of Law: Informal Financial Practices of Small Businesses in Taiwan. Law&Society Review (28), 193-232.

Kelly, K. (1995): Out of Control: The rise of neo-biological civilization. Menlo Park, CA, Addison-Wesley.

Kingsbury, B. (1998): The Concept of Compliance as a Function of Competing Conceptions of International Law. Michigan Journal of International Law (19), 345.

Knoke, D.; Ishio, Y. (1996): Training, Unions, and Internal Labor Markets. In: Kalleberg, A. et al.: Organizations in America. Thousand Oaks, Sage, 180-199.

Kono, C. et al. (1998): Lost in Space: The Geography of Corporate Interlocking Directorates. American Journal of Sociology (103), 863-911.

Koppel, R.; Appelbaum, E.; Albin, P. (1988): Implications of workplace information technology: control, organization of work, and the occupational structure. Research in the Sociology of Work (4), 125-52.

Kostecki, M.M. (ed.) (1994): Marketing Strategies for Services: Globalization, Client-Orientation, Deregulation. Oxford, Pergamon Press.

Kotz, D. (1978): Bank Control of Large Corporations in the United States. Berkeley, University of California Press.

Kraus, J. (1994): The GATT Negotiations: a business guide to the results of the Uruguay Round. Paris, ICCI (International Chamber of Commerce) Publishing, S.A.

Krueger, A.O.; Aturupane, C. (eds.) (1998): The WTO as an international organization. (1996 Singapore conference). Chicago, University of Chicago Press.

Landau R.; Rosenberg, N. (eds.) (1986): The Positive-Sum Game. Washington, D.C., National Academy Press.

Langhoff, T. (1997): The Influence of cultural differences on internationalization processes of firms - An introduction to a semiotic and inter-cultural perspective. In: Bjoerkman, I.; Forsgren, M. (eds.): The Nature of the International Firm:

Nordic contributions to international business research. Copenhagen, Munksgaard Internat'l Publishers, 135-64.

Langlois, R.N.; Robertson, P.L. (1992): Networks and Innovation in a Modular System: Lessons from the Microcomputer and Stereo Component Industries. Research Policy (21), 297-313.

Lauman, E.; Knoke, D. (1987): The Organizational State: Social Choice in Public Policy Domains. Madison, University of Wisconsin Press.

Lauman, E.; Pappi, F.U. (1976): Networks of Collective Action: A Perspective on Community Influence Systems. New York, Academic Press.

Lazerson, M. (1988): Organizational growth of small firms: An outcome of markets and hierarchies? American Sociological Review (53), 330-342.

Lehmann, A.P. (1994): Deregulation of Insurance and Market Organization: A Case Study of urich Insurance Group. In: Kostecki, M. (ed.): Marketing Strategies.Oxford, Pergamon, 137-154.

Leoncini, R.; Maggioni, M.A.; Montresor, S. (1996): Intersectoral innovation flows and national technological systems: network analysis for comparing Italy and Germany. Research Policy (25), 415-30.

Levine, R. (1996): Foreign Banks, Financial Development, and Economic Growth. In: Barfield, C. (ed.): International Financial Markets. Washington, D.C., AEI.

Levitt, T. (1972): Production-Line Approach to Service. Harvard Business Review (50, No. 5), 41-52.

Levitt, T. (1976): The Industrialization of Service. Harvard Business Review (54, No. 5), 63-74.

Lin, N. (1982): Social Resources and Instrumental Action. In: Marsden, P.; Lin, N. (eds.): Social Structure and Network Analysis. Beverly Hills, Sage, 131-146.

Lin, N. (1999): Building a Network Theory of Social Capital. Connections (forthcoming).

Lincoln, J.R.; Gerlach, M.L.; Takahashi, P. (1992.): Keiretsu Networks in the Japanese Economy: A Dyad Analysis of Intercorporate Ties. American Sociological Review (57), 561-85.

Lorenz, E. (1989): The Search for Flexibility: Subcontracting networks in French and British engineering. In: Hirst, P.; Zeitlin, J. (eds.): Reversing Industrial Decline? Oxford, Berg, 122-132.

Lorenz, E. (1990): Neither Friends nor Strangers: Informal networks of subcontracting in French Industry. In: Gambetta, D. (ed.): Trust: Making and Breaking Cooperative Relations. Oxford, Blackwell, 194-210.

Lundvall, B.-A. (1988): Innovation as an Inter-Active Process: From User-Producer Interaction to National Systems of Innovation. In: Dosi, G. et al. (eds.): Technical Change and Economic Theory. London, Frances Pinter.

Lundvall, B.-A. (1990): From Technology as a Factor to Innovation as an Interactive Process. Networks of Innovators - International Workshop, Montreal.

Lundvall, B.-A.; Johnson, B. (1994): The learning economy. Journal of Industry Studies, (1, No. 2), 23-42.

Macneil, I.R. (1978): Contracts: Adjustment of long-term economic relations under classical, neo-classical, and relational contract law. Northwestern University Law Review (72), 854

Maillat, D. (1993): Reseau d'innovation et milieux innovateurs: un pari pour le developpement regional. Neuchatel: GREMI, Groupe de recherche europeen sur les milieux innovateurs; EDES, Division economique et sociale. Universite de Neuchatel.

Maillat, D. (1995): Territorial dynamic, innovative milieu and regional policy. Entrepreneurship and Regional Development, 157-165.

Malmude, J. (1998): Personal communication, (15, Nov.).

Marbacher, J. (1994): Combining Banking and Insurance Services: Some Implications for Marketing Strategies. In: Kostecki, M. (ed.): Marketing Strategies.Oxford, Pergamon, 125-136.

Markusen, A. et al. (1991): The Rise of the Gunbelt. New York, Oxford University Press.

Markusen, A.; Yudkin, J. (1992): Beyond the Cold War Economy. New York, Basic Books.

Marsden, P.V. (1987): Core Discussion Networks of Americans. American Sociological Review (52), 122-31.

Martinelli, F. (1991): Producer services' location and regional development. In: Daniels, P.; Moulaert, F. (eds.): The changing geography of advanced producer services. London and New York, Belhaven, 70-90.

Martinelli, F.; Schoenberger, E. (1991): Oligopoly is Alive and Well: Notes for a broader discussion of flexible accumulation. In: Benko, G.; Dunford, M. (eds.): Industrial Change and Regional Development: The Transformation of New Industrial Spaces. London, Belhaven.

McGrew, A. (1996): A Global Society? In: Hall, S. et al. (eds.): Modernity. Cambridge, Blackwell, 466-503.

McGrew, A.; Lewis, P. (1992): Globalization and the Nation States. Cambridge: Polity Press.

McPherson, J.M.; Smith-Lovin, L. (1987): Homophily in Voluntary Organizations: Status Distance and the Composition of Face-to-Face Groups. American Sociological Review (52), 370-79.

Messner, D. (1995): Die Netzwerkgesellschaft: Wirtschaftliche Entwicklung und internationale Wettbewerbsfaehigkeit als Probleme gesellschaftlicher Steuerung (The network society: Economic development and international competitive advantage as problems of societal guidance). Deutsches Institut für Entwicklungspolitik (108). Koeln, Weltforum Verlag.

Meyer, J.; Rowan, B. (1977): Institutionalized Organizations: Formal Structure as Myth and Ceremony. American Journal of Sociology (83, No.2):340-363.

Michie, J.; Smith, J.G. (eds.): Managing the Global Economy. Oxford, Oxford University Press.

Midgley, D.F.; Morrison, P.D.; Roberts, J.H. (1992): The effect of network structure in industrial diffusion processes. Research Policy (21), 533-52.

Miles, I. (1990): Services and information technology: emerging patterns. In: Teare, R. et al. (eds.): Managing and Marketing Services in the 1990s. London and New York, Cassell, 74-91.

Miles, R.; Snow, C. (1986): Organizations: new concepts for new forms. California Management Review (28), 62-73.

Milgrom, P.; Roberts, J. (1992): Economics, Organization, and Management. Englewood Cliffs, N.J., Prentice Hall.

Miller, R. (1994): Global R&D networks and large-scale innovations: The case of the automobile industry. Research Policy (23), 27-46.

Mills, P.K. (1986): Managing Service Industries: Organizational Practices in a Postindustrial Economy. Cambridge, MA, Ballinger.

Mintz, B.; Schwartz, M. (1985): The Power Structure of American Business. Chicago, University of Chicago Press.

Mintzberg, H.; McHugh, A. (1985): Strategy Formation in an Adhocracy. Administrative Science Quarterly (30, June), 160-97.

Mitchell, J. C. (1969): The Concept and Use of Social Networks. In: Mitchell, J.C. (ed.): Social networks in urban situations. Manchester, Manchester University Press, 1-50.

Mizruchi, M. (1982): The American Corporate Network: 1904-1974. Beverly Hills, Sage.

Mizruchi, M.; Galaskiewicz, J. (1993): Networks of interorganizational relations. Sociological Methods and Research (22), 46-70.

Mizruchi, M.; Schwartz, M. (eds.) (1987): Inter-Corporate Relations: the structural analysis of business. New York, Cambridge University Press.

Mok, A.C. (1973): Professional Innovation in Post-Industrial Society. In: Freidson, E. (ed.): The Professions and their Prospects. Beverly Hills, Sage

Morgan, N.; Piercy, N. (1990): Marketing in financial services organization: policy and practice. In: Teare, R. et al (eds.): Managing and Marketing Services in the 1990s. London, Cassel, 121-136.

Moulaert, F. (1996): Arthur Andersen: from national accountancy to international management consultancy firm. In: Nilsson, J.E.; Dicken, P.; Peck, J. (eds.): The Internationalization Process: European firms in global competition. London, Chapman, 74-89.

Moulaert, F.; Scott, A.J. (eds.) (1997): Cities, Enterprises and Society on the Eve of the 21st century. London and Washington, Pinter.

Moulaert, F.; Scott, A.; Farcy, H. (1997): Producer services and the formation of urban space. In: Moulaert, F.; Scott, A. (eds.): Cities, Enterprises and Society on the Eve of the 21st Century. London and Washington, Pinter.

Moulaert, F.; Toedtling, F.; Schamp, E.W. (1995): The geography of advanced producer services in Europe: The role of transnational corporations. Progress in Planning (43, No.2-3), 107-121.

Mowery, D. (1983): The Relationship between Intrafirm and Contractual Forms of Industrial Research in American Manufacturing, 1900-1940. Explorations in Economic History (20), 351-74.

Mowery, D. (ed.) (1988): International Collaborative Ventures in U.S.Manufacturing. Cambridge, Ballinger.

Mushaben, J.M. (1997): Auferstanden aus Ruinen: Social Capital and Democratic Identity in the New Laender. German Politics and Society (4, Winter), 71-101.

Nelken, D. (1997): The Globalization of Crime and Criminal Justice. In: Freeman, M.D.A.; Lewis, A.D.E. (eds.): Law and Opinion at the end of the 20th Century. Current Legal Problems (50). Oxford, Oxford University Press, 251-277.

Nelson, R.R. (ed.) (1993): National Innovation Systems: A Comparative Analysis. New York, Oxford.

Nelson, R.R.; Winter, S.G. (1977): In search of useful theory of innovation. Research Policy (6), 36-76.

Nicolaidis, P. (1989): Liberalizing Trade in Services. New York, Council on Foreign Relations Press.

Noble, D.F. (1977): America by Design: Science, Technology, and the Rise of Corporate Capitalism. New York, Knopf.

Noyelle, T.J. (1987): Beyond Industrial Dualism: Market and Job Segmentation in the New Economy. Boulder, Westview Press.

Noyelle, T.J. (1990): Toward a new labor market segmentation. In: Noyelle, T. (ed.): Skills, Wages, and Productivity in the Service Sector. Boulder, Westview Press, 212-224.

Noyelle, T.J. (1991): Transnational business service firms and developing countries. In: Daniels, P.; Moulaert, F.(eds.): The changing geography of advanced producer services. London and New York, Belhaven Press, 177-196.

Noyelle, T.J.; Dutka, A.B. (1988): International Trade in Business Services: Accounting, Advertising, Law, and Management Consulting. Cambridge, MA, Ballinger.

Nusbaumer, J. (1987a): The Services Economy: Lever to Growth. Boston: Kluwer Academic.

Nusbaumer, J. (ed.) (1987b): Services in the Global Market. Boston, Kluwer Academic.

Odier, P.; Lenhard, D. (1994): The Marketing of Portfolio Management Services: A Private Banker's View. In: Kostecki, M. (ed.): Marketing Strategies. Oxford, Pergamon, 105-124.

OECD (1996): Intersectoral Database. Paris, OECD.

Ohmae, K. (1990): The Borderless World: Power and strategy in the interlinked world economy. New York, Harper Business.

Ohmae, K. (1993): The rise of the region state. Foreign Affairs (71), 78-87.

Olmsted, B.; Smith, S. (1989): Creating a Flexible Workplace: How to select and manage alternative work options. New York, American Management Association.

Orlikowski, W.J. (1988): Information Technology in Post-Industrial Organizations: An Exploration of the Computer-Mediation of Production Work. New York University, Stern School of Business, unpubl. Ph.D. dissertation.

Ouchi, W. (1980): Markets, hierarchies, and clans. Administrative Science Quarterly (25), 129-142.

Paemen, H. (1995): From GATT to the WTO: The European Community in the Uruguay Round. Leuven, Leuven University Press.

Palmer, D. (1983): On the significance of interlocking directorates. Social Science History (7), 217-231.

Palmer, D. et al. (1995): The Friendly and Predatory Acquisition of large U.S. Corporations in the 1960s: The other contested terrain. American Sociological Review (60), 469-99.

Palmer, D.; Barber, B.M.; Zhou, X. (1995): The Finance Conception of Control - 'The Theory that ate New York?'. Reply to Fligstein. American Sociological Review (60), 504-508.

Parker, R.E. (1994): Flesh Peddlers and Warm Bodies: The Temporary Help Industry and its Workers. New Brunswick, N.J., Rutgers University Press.

Pavitt, K. (1986): International Patterns of Technological Accumulation. In: Hood, N. (ed.): Strategies in Global Competition. New York, Wiley, 126-157.

Pavitt, K.; Robson, M.; Townsend, J. (1987): The Size Distribution of Innovating Firms in the U.K.: 1945-1983. Journal of Industrial Economics (35), 297-316.

Pavlik, J.V. (1997): Content and Economics in the Multimedia Industry: The case of New York's Silicon Alley. International Workshop on Regional Economic Restructuring and Multimedia. Stuttgart, Center of Technology Assessment in Baden-Wuerttemberg (Oct.).

Peck, J.; Dicken, P. (1996): Manchester's Tootal. In: Nilsson, J.-E.; Dicken, P.; Peck, J. (eds.): The Internationalization Process: European Firms in Global Competition. London, Chapman, 109-129.

Perez, C. (1985): Micoelectronics, Long Waves, and World Structural Change: New Perspectives for Developing Countries. World Development (13), 441-63.

Perrow, C. (1992): Small network firms. In: Nohria, N.; Eccles, R. (eds.): Networks and Organizations: Structure, Form, and Action. Boston, Harvard Business School Press.

Petit, P. (1991): Institutional changes and provision of market services: lessons from the banking sector. In: Daniels, P.; Moulaert, F. (eds.): The Changing Geography of Advanced Producer Services. London and New York, Belhaven Press, 47-58.

Petrella, R. (1996): Globalization and Internationalization: The dynamics of the emerging world order. In: Boyer, R.; Drache, D. (eds.): States against Markets: The limits of globalization. London and New York, Routledge, 62-83.

Pfeffer, J. (1994): Competitive Advantage through People: Unleashing the Power of the Workforce. Boston, Harvard University Press.

Pfeffer, J.; Salancik, G. (1978): The External Control of Organizations: A Resource Dependence Perspective. New York, Harper and Row.

Picot, A.; Reichwald, R.; Wigand R. (1996): Die grenzenlose Unternehmung: Wiesbaden: Gabler.

Piore, M.; Sabel, C. (1984): The Second Industrial Divide. New York, Basic Books.

Pisano, G.P. (1991): The governance of innovation: Vertical integration and collaborative arrangements in the biotechnology industry. Research Policy (20), 237-249.

Pisano, G.P. (1996): Learning-before-doing in the development of new process technology. Research Policy (25), 1097-1119.

Pisano, G.; Shaw, W.; Teece, D.J. (1988): Joint ventures and collaboration in the biotechnology industry. In: Mowery, D.C. (ed.): International Collaborative Ventures in U.S. Manufacturing. Cambridge, MA, Ballinger, 183-222.

Podolny, J.M.; Page, K.L. (1998): Network Forms of Organization. Annual Review of Sociology (24), 57-76.

Podolny, J.M.; Baron, J.N. (1997): Resources and Relationships: Social Networks and Mobility in the Workplace. American Sociological Review (62), 673-93.

Porat, M. (1977): Information Economy: Definition and Measurement. Washington, D.C: U.S.Department of Commerce, Office of Telecommunications.

Powell, W.W. (1990): Neither market nor hierarchy: network forms of organizations. Research in Organizational Behavior (12), 295-336.

Powell, W.W. (1991): Expanding the Scope of Institutional Analysis. In: Powell, W.; DiMaggio, P. (eds.): The New Institutionalism in Organizational Analysis. Chicago, U.of Chicago Press, 183-203.

Powell, W.W.; Brantley, P. (1992): Competitive cooperation in biotechnology: Learning through Networks? In: Nohria, N.; Eccles, R. (eds.): Networks and Organizations. Boston, Harvard Business School Press.

Powell, W.W.; Smith-Doerr, L. (1994): Networks and Economic Life. In: Smelser, N.; Swedberg, R. (eds.): Handbook of Economic Sociology. Princeton, Princeton University Press, 368-402.

Powell, W.W.; Koput, K.W.; Smith-Doerr, L. (1996): Interorganizational Collaboration and the Locus of Innovation: Networks of Learning in Biotechnology. Administrative Science Quarterly (41), 116-145.

Prechel, H. (1994): Economic Crisis and the Centralization of Control over the Managerial Process: Corporate Transformation and Neo-Fordist Decisionmaking. American Sociological Review (59), 723-45.

Ratcliff, R. (1980): Banks and corporate lending: An analysis of the impact of the internal structure of the capitalist class. American Sociological Review (45), 553-70.

Ratti, R.; Bramanti, A.; Gordon, R. (eds.) (1997): The Dynamics of Innovative Regions: the GREMI approach. Aldershot, Ashgate.

Reich, R. (1991): The Work of Nations: Preparing ourselves for 21st century capitalism. New York, Knopf.

Reutlinger, P. (1994): Marketing Strategies in Air Transportation: The Case of Swissair. In: Kostecki, M. (ed.): Marketing Strategies. Oxford, Pergamon, 155-162.

Ritzer, G. (1993): The McDonaldization of Society. Newbury Park, CA, Pine Forge Press.

Robertson, P.L.; Langlois, R.N. (1995): Innovation, networks and vertical integration. Research Policy (24), 543-62.

Rosenfeld, S.A. (1996): Does cooperation enhance competitiveness? Assessing the impacts of inter-firm collaboration. Research Policy (25), 247-263.

Rosoff, S.M.; Pontell, N.; Tillman, R. (1998): Profit without Honor: White-Collar Crime and the Looting of America. Upper Saddle River, N.J., Prentice Hall.

Rossi, F. (1986): Government impediments and professional constraints on the operation of international accounting organizations. In: Barriers to International Trade in Professional Services. Chicago, 1 University of Chicago Legal Forum (1, November).

Rothwell, R. et al. (1974): SAPPHO Updated. Research Policy (3), 258-91.

Rothwell, R. (1991): External Networking and Innovation in small and medium-sized manufacturing firms in Europe. Technovation (11), 93-112.

Roy, W. (1983): The interlocking directorate structure of the United States. American Sociological Review (48), 243-57.

Ruggiero, V. (1996): Organised and Corporate Crime in Europe: Offers that can't be refused. Aldershot, Dartmouth.

Ruigrok, W.; Tulder, R.v. (1995): The Logic of International Restructuring. London and New York, Routledge.

Sabel, C.F. (1993 a): Studied Trust: Building New Forms of Cooperation in a Volatile Economy. In: Swedberg, R. (ed.): Explorations in Economic Sociology. New York, Russell Sage Foundation, 104-144.

Sabel, C.F. (1993b): Constitutional Ordering in Historical Context. In: Scharpf, F.W. (ed.): Games in Hierarchies and Networks: Analytical and Empirical Approaches to the Study of Governance Institutions. Frankfurt/M., Campus, 65-124.

Sabel, C.F. (1994): Learning by Monitoring: The institutions of economic development. In: Smelser, N.; Swedberg, R. (eds.): The Handbook of Economic Sociology. Princeton, Princeton University Press, 137-165.

Sabel, C.F. et al. (1989): Regional Prosperities Compared: Massachusetts and Baden-Wuerttemberg in the 1980s. Economy and Society (18), 374-404 (special issue on Local Industrial Strategies, edited by Jonathan Zeitlin).

Sako, M. (1989): Neither Markets nor Hierarchies: A comparative study of the Printed Circuit Board industry in Britain and Japan. London, London School of Economics, Industrial Relations Department (Mimeo).

Salacuse, J. (1991): Making Global Deals: Negotiating in the International Marketplace. Boston, Houghton Mifflin.

Sassen, S., 1994. Cities in a World Economy. Thousand Oaks: Pine Forge.

Sassen, S. (1995): Immigration and Local Labor Markets. In: Portes, A. (ed.): The Economic Sociology of Immigration. New York, Russell Sage Foundation, 87-127.

Sassen, S. (1998): Globalization and its Discontents. New York, New Press.

Saxenian, A.L. (1990): Regional Networks and the Resurgence of Silicon Valley. California Management Review (33), 89-112.

Saxenian, A.L. (1991): The origins and dynamics of production networks in Silicon Valley. Research Policy (20), 423-37.

Saxenian, A.L. (1994): Regional Advantage: Culture and Competition in Silicon Valley and Route 128. Cambridge, Harvard University Press.

Schauerman, J. (1990): A new basis for segmenting the corporate banking market. In: Teare, R. et al (eds.): Managing and Marketing Services in the 1990s. London, Cassell, 169-184.

Schumpeter, J.A. (1928): The Instability of Capitalism. Economic Journal, 361-86.

Schumpeter, J.A. (1939): Business Cycles. New York, McGraw Hill.

Scott, A.J. (1991): The aerospace-electronics industrial complex of Southern California: The formative years, 1940-1960. Research Policy (20), 439-456.

Scott, A.J. (1995): From Silicon Valley to Hollywood: Growth and Development of the Multimedia Industry in California. Los Angeles, CA: UCLA, Lewis Center for Regional Policy Studies, Working Paper 13.

Scott, A.J. (1997): The Cultural Economy of Cities. International Journal of Urban and Regional Research (21), 323-339.

Scott, A.J.; Angel, D. (1990): The U.S.Semiconductor Industry: A Locational Analysis. Environment and Planning (A19), 875-912.

Scott, A.J.; Drayse, M.H. (1991): The Electronics Industry in Southern California: Growth and Spatial Development, 1945- 1989. The Review of Regional Studies (20), 1-14.

Scott, A.J.; Mattingly, D.J. (1989): The Aircraft Industry in Southern California: Continuity and Change from the Inter-War Years to the 1990s. Economic Geography (65), 48-71.

Scott, J. (1991): Social Network Analysis: A Handbook. London, Sage.

Sedaitis, J.B. (1997): Network Dynamics of New Firm Formation: Developing Russian Commodity Markets. In: Grabher, G.; Stark, D. (eds.): Restructuring Networks in Post-Socialism: Legacies, Linkages, and Localities. Oxford, Oxford University Press.

Seidman, H.; Gilmour, R. (1986): Politics, Position, and Power: From the Positive to the Regulatory State. 4th ed., New York, Oxford University Press.

Seron, C. (1992): Managing Entrepreneurial Legal Services: The Transformation of Small- Firm Practice. In: Nelson, R. et al. (eds.): Lawyers' Ideals, Lawyers' Practices. Ithaca, Cornell University Press, 63-92.

Seron, C. (1996): The Business of Practicing Law: The work lives of solo and small-firm attorneys. Philadelphia, Temple University Press.

Shaiken, H. (1985): Work Transformed: Automation and Labor in the Computer Age. New York, Holt, Rinehart and Winston.

Silvestri, G.T. (1993): The American work force, 1992-2005: occupational employment, wide variations in growth. Monthly Labor Review, November: 58-86.

Simon, D.R.; Eitzen, S. (1990): Elite Deviance. 3rd. ed. Boston, Allyn and Bacon.

Singelmann, J. (1978): From Agriculture to Services: The transformation of industrial employment. Beverly Hills, Sage.

Skipper, H.D. (1996): International Trade in Insurance. In: Barfield, C. (ed.): International Financial Markets. Washington, D.C., American Enterprise Institute, 151-223.

Sklair, L. (1993): Competing Models of Globalization. London, London School of Economics, unpublished manuscript.

Skowronek, S. (1982): Building a New American State: The Expansion of National Administrative Capacities, 1877-1920. Cambridge, Cambridge University Press.

Smith, H.L.; Dickson, K.; Smith, S.L. (1991): 'There are two sides to every story': Innovation and collaboration within networks of large and small firms. Research Policy (20), 457-468.

Smitka, M. (1991): Competitive Ties: Subcontracting in the Japanese Automotive Industry. New York, Columbia University Press.

SOEP (Sozio-oekonomisches Panel, 1994): Vierteljahreshefte zur Wirtschaftsforschung, (Heft 1/1995), 5-15.

Solnick, S. (1998): Stealing the State. Boston, Harvard University Press.

Soref, M. (1979): Research on interlocking directorates: An introduction and a bibliography of North American sources. Connections (2), 84-86.

Soref, M.; Zeitlin, M. (1987): Finance Capital and the Internal Structure of the Capitalist Class in the United States. In: Mizruchi, M.; Schwartz, M (eds.): Intercorporate Relations: The structural analysis of business. New York, Cambridge University Press, 56-84.

Soros, G. (1998): The Crisis of Global Capitalism. New York, Public Affairs/Perseus Books.

Spriano, G. (1989): R&D Networks: The Emerging Market for Technological and Scientific Services. In: Bressand, A.; Nicolaidis, K. (eds.): Strategic Trends in Services. New York, Harper and Row, Ballinger, 65-80.

Stanback, T.M. et al. (1981): Services: The New Economy. Totowa, N.J., Allanheld.

Starbuck, W.H. (1983): Organizations as Action Generators. American Sociological Review (48, February), 91-102.

Starbuck, W.H. (1992): Learning by Knowledge-Intensive Firms. Journal of Management Studies (29), 713-40.

Stearns, L.B.; Allan, K.D. (1996): Economic Behavior in Institutional Environments: The Corporate Merger Wave of the 1980s. American Sociological Review (61), 699-718.

Stern, B.J. (1960): Historical Sociology: Collected Papers. New York, Citadel Press.

Storper, M.; Harrison, B. (1991): Flexibility, hierarchy, and regional development: The changing structure of industrial production systems and their forms of governance in the 1990s. Research Policy (20), 407-22.

Strambach, S. (1994): Knowledge-Intensive Business Services in the Rhine-Neckar Area. In: Journal of Economic and Social Geography (85), 354ff.

Strambach, S. (1997a): Die Rolle wissensintensiver unternehmensbezogener Dienstleistungen im Strukturwandel der Region Stuttgart. In: Gaebe, W. (ed.): Struktur und Dynamik in der Region Stuttgart. Stuttgart, Ulmer, 82-97.

Strambach, S. (1997b): Wissensintensive unternehmensorientierte Dienstleistungen - ihre Bedeutung für die Innovations- und Wettbewerbsfaehigkeit Deutschlands. Vierteljahreshefte zur Wirtschaftsforschung (66, Heft 2), 230-42.

Suchman, M.C.; Cahill, M.L. (1996): The Hired Gun as Facilitator: Lawyers and the Suppression of Business Disputes in Silicon Alley. Law and Social Inquiry (21), 679-712.

Sutherland, E.H.; Cressey, D.R. (1978): Criminology. 10th ed. New York, Harper, Row.

Swann, D. (1991): Creating the Single European Market. In: Thompson, G. et al. (eds.): Markets, Hierarchies, and Networks: The Coordination of Social Life. London, Sage, 82-95.

Swann, P.; Prevezer, M. (1996): A comparison of the dynamics of industrial clustering in computing and biotechnology. Research Policy (25), 1139-57.

Szarka, J. (1990): Networking and Small Firms. International Small Business Journal (8), 10-22.

Teare, R.; Montinho, L.; Morgan, N. (eds.) (1990): Managing and Marketing Services in the 1990s. London and New York, Cassell.

Teubal, M.; Yinnon, T.; Zuscovitch, E. (1991): Networks and Market Creation. Research Policy (20), 381-92.

Thomsen, S. (1997): Comparative Institutional Advantage: Assessing the impact of international differences in corporate governance. In: Bjoerkman, I.; Forsgren, M. (eds.): The Nature of the International Firm: Nordic contributions to international business research. Copenhagen, Munksgaard International Publishers, 51-68.

Tilly, C. (1990): Short hours, short shrift: causes and consequences of part-time work. Washington, D.C., Economic Policy Institute.

Tilly, C.; Tilly, C. (1994): Capitalist Work and Labor Markets. In: Smelser, N.; Swedberg, R. (eds.): Handbook of Economic Sociology. Russell Sage and Princeton University Press, 283-312.

Toedtling, F. (1995): The Uneven Landscapes of Innovation Poles: Local Embeddedness and Global Networks. In: Amin, A.; Thrift, N (eds.): Globalization, etc.Oxford, Oxford U.P., 68-90.

Toedtling, F. (1998): Firm Strategies and Restructuring in a Globalizing Economy. IIR-Discussion Paper (53). (Electronic document).

Tonry, M.; Reiss, A.J. (eds.) (1993): Beyond the Law: Crime in Complex Organizations. Chicago, University of Chicago Press.

Troy, L. (1986): The Rise and Fall of American Trade Unions: The Labor Movement from FDR to RR. In: Lipset, S.M. (ed.): Unions in Transition: Entering the Second Century. San Francisco, Institute for Contemporary Studies.

Troy, L. (1990): Is the U.S. unique in the decline of private sector unionism? Journal of Labor Research (11), 111-143.

Ulmer, N. (1994): The Global Marketing of Legal Services. In: Kostecki, M. (ed.): Marketing Strategies. Oxford, Pergamon, 163-72.

Useem, M. (1984): The Inner Circle: Large Corporations and the Rise of Business Political Activity in the U.S. and U.K. New York, Oxford University Press.

Uzzi, B. (1996): The Sources and Consequences of Embeddedness for the Economic Performance of Organizations: The Network Effect. American Sociological Review (61), 674-698.

Vandermerwe, S. (1994): Service Network Structures for Consumer-Oriented Strategies. In: Kostecki, M. (ed.): Marketing Strategies for Services: Globalization, Client-Orientation, Deregulation. Oxford, Pergamon Press, 41-64.

Van Kooij, E.H. (1990): Technology Transfer in the Japanese Electronics Industry. Zoetermeer, Netherlands: Economic Research Institute for Small and Medium-sized Business.

Vaughan, D. (1999): The Dark Side of Organizations: Mistake, Misconduct, and Disaster. Annual Review of Sociology (25), 271-305.

Von Furstenberg, G.M. (ed.) (1997): Regulation and Supervision of Financial Institutions in the NAFTA countries and Beyond. Boston, Dordrecht, London, Kluwer Academic Publishers.

Von Hippel, E. (1987): Cooperation between Rivals: Informal Know-how Trading. Research Policy (16), 291-302.

Von Hippel, E. (1988): The Sources of Innovation. Oxford, Oxford University Press.

Walsh, V. (1997): Globalization of innovative capacity in the chemical and related products industry. In: Howells, J.; .Michie, J. (eds.): Technology, Innovation, and Competitiveness. Cheltenham, Edward Elgar, 89-125.

Walter, I. (1990): The secret money market: the dark world of tax evasion, financial fraud, insider trading, money laundering, and capital flight. New York, Harper and Row, Ballinger.

Walter, I. (1996): Global competition and market access in the securities industry. In: Barfield, C. (ed.): International Financial Markets. Washington, D.C.,AEI, 84-150.

Walton, C.C.; Cleveland, F.W. (1964): Corporations on Trial: The Electric Cases. Belmont, CA, Wadsworth.

Warf, B. (1995): Telecommunications and the changing geographies of knowledge in the late 20th century. Urban Studies (32), 361-78.

Weber, H. (1995): Management und Logik des schlanken Zuliefersystems. Kaiserslautern: Universität Kaiserslautern, FB Soziologie, Discussion paper, 501.

Weber, M. (1978): Economy and Society, ed. by G.Roth and C.Wittich. Vol. 1: 24-26; 85-86; Vol 2:654-58; 1375-80.

Weick, K.E. (1969): The Social Psychology of Organizing. Reading, MA, Addison-Wesley.

Weick, K.E. (1976): Educational Organizations as Loosely Coupled Systems. Administrative Science Quarterly (21), 1-19.

Weiss, L. (1997): Globalization and the Myth of the Powerless State. New Left Review, (225, Sept.Oct.), 3-27.

Wellman, B.; Berkowitz, S.D. (eds.) (1988): Social Structures: A Network Approach. Cambridge, Cambridge University Press.

White, H.C. (1992): Identity and Control: A Structural Theory of Action. Princeton, Princeton University Press.

White, L.J. (1991): The S&L [Savings and Loan] Debacle: Public Policy Lessons for Bank and Thrift Regulation. Oxford, Oxford University Press.

Williamson, O. (1975): Markets and Hierarchies. New York, Free Press.

Williamson, O. (1985): The Economic Institutions of Capitalism. New York, Free Press.

Williamson, O. (1996): The Mechanisms of Governance. New York, Oxford University Press.

Wilson, J.W.; Dobrzynski, J.H. (1986): And now, the post-industrial corporation. Business Week (March 3): 64-71.

Wind, Y.; West, A.P., Jr. (1991): Reinventing the Corporation. Chief Executive (71), 72-75.

Wood, P. (1988): The economic role of producer services: some Canadian evidence. In: Marshall, J.N. (ed.): Services and Uneven Development. Oxford, Oxford University Press.

Wood, P. (1990): An integrated view of the role of services. In: Teare, R. et al (eds.): Managing and Marketing Services in the 1990s. London and New York, Cassell, 3-17.

Yamagishi, T.; Cook, K.S.; Watabe, M. (1998): Uncertainty, Trust, and Commitment Formation in the United States and Japan. American Journal of Sociology, (104, No.1), 165-194.

Yeager, P. (1991): The Limits of Law: The public regulation of private pollution. Cambridge, Cambridge University Press.

Yergin, D.; Stanislaw, J. (1998): The Commanding Heights: The battle between government and the marketplace that is remaking the modern world. New York, Simon and Schuster.

Zhou, X.; Tuma, N.B.; Moen, P. (1997): Institutional change and job-shift patterns in urban China, 1949-1994. American Sociological Review (62), 339-365.

Zimmerman, D.L. (1994): Copyright in Cyberspace: Don’t throw out the Public Interest with the Bath Water. Annual Survey of American Law (103).

Zuboff, S. (1988): In the Age of the Smart Machine. New York, Basic Books.