Interorganizational networks (ION) are a venerable subject in sociology and organizational theory. Recently, however, the concept of the “network” has become even more popular, as pundits, management consultants, and organizational theorists promote the “network” as the interorganizational form of the future (Powell, 1987; Powell and Smith-Doerr, 1994) and even the emerging form of society (Pescosolido and Rubin, 2000). This popularity has not brought clarity to a subject that is already broad and eclectic. For example, the “network organization” means many things to many people, as DiMaggio (2001) discusses. Different researchers examine different aspects of the network organization, and different consultants put different features of it into practice. Given the broad and fragmented field of interorganizational networks, our goal in this chapter is sensemaking: We propose a way to structure this field in a way that imposes order on it, captures contemporary debates and issues, highlights unanswered questions, and points to some new and emerging directions for future research.

We offer the concept of the interorganizational network or ION “box,” a three-dimensional array that captures the main concepts in the field. We show, for example, how different foci—dyads, triads, organization set, organizational field, and interorganizational network—fit into this framework. We illustrate these components of the ION box by reviewing key studies in the field of interorganizational networks. We discuss three categories of contemporary debates—embeddedness, institutionalization, and the rise of the network organizational form. Finally, we offer new directions for study, showing that our structuring of the field suggests new avenues of research even for old questions about interorganizational networks:

- What is an organization’s network?
- What is interorganizational embeddedness?
- What are the conjoint activities of organizations?

We conclude with a shift of perspective from a view of interorganizational networks of as a “network of interlocking organizations” to a “network of interlocking domains.”
Structuring the Field of Interorganizational Networks

The field of research on ION draws from a diverse array of theories and spans levels of analysis from microstructures (Laumann and Marsden, 1982) to organizational fields (DiMaggio, 1991) and the entire economy (Burt, 1992). To structure this eclecticism, we propose a framework we call the interorganizational network or ION “box,” a versatile three-dimensional rectangular matrix of organizations and activities. This ION box is inspired by developments in network theory and analysis, such as three-dimensional blockmodeling (Baker, 1986).

A simple illustration of the ION box is shown in Figure 22.1. This box arrays the interrelationships of three populations – producers, suppliers, and buyers – across domains. Suppliers and customers can be thought of as specific organizations or segments. Some of the major domains identified in the field of interorganizational studies include:

1. **market exchange**, e.g., Baker (1990)
2. **strategic alliances**, e.g., Gulati (1995)
3. **joint participation in an underwriting syndicate**, e.g., Podolny (1993)
4. **director interlocks**, e.g., Mizruchi (1996)
5. **political action**, e.g., Neustadl and Clawson (1988) and Mizruchi (1989)
6. **family ties**, e.g., Zeitlin et al. (1974)
7. **illegal activities**, such as price-fixing conspiracies (e.g., Baker and Faulkner 1993).

These domains of activities occupy what we call k-space in the ION box. Like an accordion, the ION box can be expanded or contracted to change levels of analysis, units of observation, or range of activity domains. For example, many other domains could be added to our Figure 22.1. And, a single domain in our illustration could be expanded. For example, the market domain could be elaborated into multiple markets.

The ION box is divided into three main blocks. The middle block contains a set of focal organizations: these are principal subjects of the analysis.¹ In this illustration, we consider these focal organizations to be producers. The left block contains the suppliers (upstream) and the right block contains the customers (downstream). In the middle block, we assign each producer to a row (n) and corresponding column (m) for each relation (k). Figure 22.1 shows five types of relations (k), chosen to illustrate the diversity of interorganizational ties (business, interlocks, political action, family, and illegal activities). Of course, additional or different k relations could be included. In the middle block, each k matrix is square, because a single population of producers is arrayed on both the rows and columns. In Figure 22.1, each i, j, k entry represents the relationship between producer i and producer j for relation k. An i, j, k entry could be binary, indicating the presence or absence of a relationship, such as the presence of an interlock between two producers, or an i, j, k entry could be continuous, indicating a quantity or quality associated with the relationship, such as the quantity of goods manufactured in a joint venture between two producers.

The left block contains organizations that supply the middle block. We assign the suppliers to the columns, and the producers to the rows, of each k matrix in the left block. Unlike k-matrices the middle block, which are square because a single population is arrayed along the rows and columns, the k-matrices in the left block are rectangular,
because two populations are arrayed along the rows (producers) and the columns (suppliers). The right block contains the customers of the middle block. We construct the right block in a way similar to the left block. We assign the customers to the columns, and the producers to the rows, of each $k$ matrix in the right block. Like $k$-matrices the left block, $k$-matrices in the right block are rectangular, because two populations are arrayed along the rows (producers) and the columns (customers).

Our following review shows how the ION box captures commonly used interorganizational concepts, as it suggests new areas of research. We organize this
review according to units of analysis: dyad, triad, organization set, and organization field. Key studies are summarized in Table 22.1.

**DYAD**

It is a truism to say that a dyad – a pair of interacting organizations – is the basic unit of analysis in interorganizational research. But the dyad is not as simple as it may seem. For example, our ION box captures six types of dyads. An $i, j, k$ cell in the middle block represents a dyad of producers for a particular domain. If we consider all $k$ for the pair, however, we have a dyad set: the multiple relationships between two producers. Similarly, an $i, j, k$ cell in the left block represents a dyad composed of a producer and a supplier for a particular domain. If we consider all $k$ for the producer-supplier pair, however, we have another type of dyad set: the multiple relationships between a producer and a supplier. Finally, an $i, j, k$ cell in the right block represents a dyad composed of a producer and a customer for a particular domain. If we consider all $k$ for the producer-customer pair, we have the third type of dyad set: the multiple relationships between a producer and a customer.

In-depth studies of dyads help to make sense of interorganizational relations by learning "what flows across the links, who decides on those flows in the light of what interests, and what collective or corporate action flows from the organization of links" (Stinchcombe, 1990, p. 381). A study of dyads focuses tightly on the contents of a single dyad or dyad set in the ION box, such as Larson's (1992) informant and respondent centered ethnographic study of the exchange relationship between an entrepreneurial firm and its partnered organization. Observations of four entrepreneurial firms and seven dyadic ties to key upstream suppliers and downstream customers show how alliances were forged, strengthened, and sustained. The industries represented were telephone equipment, clothing, computer hardware, and environmental systems. Repeated interfirm dyadic exchanges lead to interdependencies. Social partnership emerges as a primary mechanism for governing business-to-business transactions. Social orientations are tucked into market relationships; reciprocity weighs as much as competitive pricing tactics. Eventually informal understandings replace formal contracts. Mutual obligations and strategic interests converge, slowly and cautiously at first, followed by a rapid upturn in perceived interdependence. The operations of a pair intertwine and one's success is dependent on the other's. Managers speak of "co-destiny," a phrase used by one firm's vice president in talking about the thick alliance-like behaviors with a supplier. The informal convention was "no suprises." This meant that both parties would share information, graciously offer disclosures about order flows, frankly discuss pricing, and willingly provide early warnings about potentially costly contingencies.

Interfirm alliances and "co-destiny" cultures demonstrate just how complex and interesting governance arrangements between firms can be across the $i, j, k$ spaces. Close inspection of pricing practices in a dozen or so manufacturing firms would be an ideal laboratory for beginning to understand how organizations behave as both suppliers and buyers, the heart of the exchanges in the $i, j, k$ matrix. Complications arise when a business unit transacts with firms in the market and also has business relations "inside" its own firm, transacting with other divisions. Thus, the single $i, j, k$ dyad could also
### Table 22.1  Key studies of interorganizational networks

<table>
<thead>
<tr>
<th>ION space domains</th>
<th>Studies</th>
<th>Methods</th>
<th>Outcomes</th>
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<td>Dyads</td>
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<td>IXX/16</td>
<td>Coordination/trust</td>
<td>Cooperative relations</td>
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<td>IXA/13</td>
<td>Costs/dilemmas</td>
<td>In(ex)ternal markets</td>
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<td>XXA/K</td>
<td>(Il)legitimacy/penalty</td>
<td>Coverage/reviews</td>
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<td></td>
<td>Gargiulo, 1993</td>
<td>n.a.</td>
<td>Counter controls</td>
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<td></td>
<td>Baker and Obstfeld, 1999</td>
<td>XXA/K</td>
<td>Social capital</td>
<td>(Dis)union designs</td>
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<td>Della Porta and Vannucci, 1999</td>
<td>IXA/&lt;H</td>
<td>Corruption</td>
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<td></td>
<td>Davis, 1979</td>
<td>n.a.</td>
<td>Network toolbox</td>
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<td>Evan, 1966</td>
<td>n.a.</td>
<td>Focal firm's linkages</td>
<td>Sensitizing concept</td>
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<td></td>
<td>Baker, 1990</td>
<td>IXA/&gt;K</td>
<td>Autonomy/robustness</td>
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<td>Uzzi, 1999</td>
<td>IA/23</td>
<td>Survival/firm</td>
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<td>Baker et al., 1998</td>
<td>IXA/&gt;K</td>
<td>Survival/relationship</td>
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<td></td>
<td>Baker and Faulkner, 1993</td>
<td>XXA/24</td>
<td>Secrecy/verdict/penalty</td>
<td>Conspiracy/collusion</td>
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<td>Organization field</td>
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<td>DiMaggio and Powell, 1983</td>
<td>n.a.</td>
<td>Isomorphism</td>
<td>Sensitizing concept</td>
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<td>Laumann and Knoke, 1987</td>
<td>IXA/K</td>
<td>Power/leverage</td>
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<td>Suchman, 1998</td>
<td>IXA/H</td>
<td>Pollution/capital</td>
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<td></td>
<td>Powell et al., 1996</td>
<td>IA/&lt;H</td>
<td>Learning/synergies</td>
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<td></td>
<td>Scott et al., 2000</td>
<td>IXA/H</td>
<td>Discourse/strategies</td>
<td>Reform/markets</td>
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Notes:
- Methods: I = interview, O = observation, A = archives, X = this method of data collection was not used in the design and implementation of the interorganizational study.

- N = number of organizations and/or representatives of organizations employed as units of observation and analysis in the empirical study: H=hundreds, K=thousands.

- Interviews may be either “respondent” or “informant” based. Observations may be either “systematic” or “ethnographic.” Systematic observation of interorganizational networks is typically “tightly” structured. The aim of data collection is to standardize the way in which ION connections are observed by the investigator and to tightly control the way in which they are recorded. This facilitates reliability and matrix analysis. Fieldwork, on the other hand, explores organizational domains and interorganizational connections in an open-system and multi-method fashion. Explicitly qualitative work is by design “loosely” administered. One aim is to capture the “richness” of the interplay within the i, j, k domains. The other aim is to discover unanticipated connections and linkages across the domains. Students of organizations and IONS have underutilized multi-method research. Multi-method contrasts with much organizational research, in which archives and documents appear to embody all the information that is relevant to the ION, somewhat like the role that “price” plays in economic theory (where price embodies all the information that is relevant to the transaction).
represent an intraorganizational transfer between divisions of a single firm. In an observation, interview, and archival study, Eccles and White (1988) show that "firms" operate in a market but also in a hierarchy. Fieldwork in three chemical companies showed that the imperatives of the market might only partially align with the imperatives of the firm. A divisional pricing policy that dictates or mandates "full cost pricing," requires divisions to do business with their "home" firm. Market considerations, such as price, take a secondary role because top level divisional chiefs set the target goals. Dyadic relations between firms are thereby shaped by policies internal to each firm. Interfirm outcomes in the ION box for dyads are shaped by intrafirm requirements.

**Triad**

Our ION box captures twelve types of triads. The first six consider sets of three for one domain: three producers, three suppliers, three customers, two producers and a supplier, two producers and a customer, and the producer–supplier–customer triad. As we consider all $k$ for the triads, we get six triad sets: the multiple relationships for three producers, three suppliers, three customers, two producers and a supplier, two producers and a customer, and for the producer–supplier–customer triad.

Triads analysis has a long and rich history in network analysis – see, for example, Davis’s (1979) review of the Davis/Holland/Leinhardt studies – but most work has focused on interpersonal ties, not interorganizational networks. The few exceptions are Laumann, et al.’s (1978) microstructural analysis of networks of community organizations, Burt’s (1992) theory of structural holes, Gargiulo’s (1993) concept of two-step leverage, Baker and Obstfeld’s (1999) triads census of six types of alliances in the global automobile industry, and Della Porta and Vannucci (1999) study of the illegal exchanges between the government, business, and the Mafia – the so-called iron triangle – see also Gambetta (1993).

Two logics drive interorganizational triads, according to Baker and Obstfeld (1999). A "union logic" drives the selection of ties; a "disunion" logic drives the avoidance of ties. For example, Corning employs the union strategy when it closes a structural hole between two of its alliance partners, introducing them to each other and encouraging them to create their own alliance. General Motors’ long-term avoidance of Ford Motor Company’s main investment bank, Goldman Sachs, reveals a disunion logic used to maintain a structural hole. Baker and Obstfeld (1999) quantify these logics by taking a complete triads census of six types of alliances in the global automobile industry: joint ventures, manufacturing/assembly, technology sharing, supplier relationships, marketing/distribution, and equity investments. The use of union and disunion logics varies by type of alliance. For example, disunion triads occur more often than by chance in joint ventures, technology sharing, and manufacturing/assembly. Union triads occur more often than by chance in supplier ties, marketing/distribution, and equity investments. This study shows that the statistical analysis of triads can yield new insights into interorganizational networks. The triads approach to the analysis of interorganizational networks is a fruitful area of future research, especially when one considers the essential nature of market competition as a triad: two (or more) sellers vying "for opportunities of exchange" with a buyer (Weber, ([1922] 1978: p. 635; Swedberg, 1994, p. 271); see, also, Simmel (1950, pp. 154–62).
**Organization Set**

The ION box indicates several types of organization sets for a single relation \( k \): a producer’s set of ties to other producers, a producer’s set of suppliers, a producer’s set of customers, and putting them all together – a producer’s combined set of ties to other producers, suppliers, and customers. As we consider all \( k \) for all sets, we get a horizontal plane of organizational sets: a producer’s set of ties to other producers, suppliers, and customers across all domains; see Figure 22.1, middle, for an illustration.

The organization set is a venerable concept in research on interorganizational networks. Some of the classic case studies of organizations include analyses of an organization and its suppliers or customers, such as the Tennessee Valley Authority and its relations with suppliers and governmental bodies (Selznick, 1949). Such studies foreshadowed the concept of the organization set, but Evan (1966) formalized it. Since then, organizational researchers have examined various types of organizations sets. For example, Baker (1990) analyzed the cross-sectional relationships between each of 1530 corporations and their organization sets of investment banks. Uzzi (1999) considered the financial \( k \)-space from the other side of the exchange, examining the ties between commercial banks and their organization sets of corporate customers.

Baker et al. (1998) examined the dynamics of organizations sets, analyzing the continuity and dissolution of ties between 398 corporations and 1644 advertising agencies from 1971 to 1993. Using event-history methods, they found that the continuity and dissolution of market ties was a function of three forces: competition, power, and institutional forces. Competition was the weakest force; institutional forces were the strongest. Competition always increased the risk of dissolution of market ties. Power could raise or lower the risk of dissolution: when agencies had more power, market ties tended to last; when clients had more power, market ties tended to dissolve. Most institutional forces reduced the risk of dissolution. This study illustrates trends in the sociological study of markets and interorganizational networks: a shift from cross-sectional data to longitudinal data, and a movement from single theories to multiple theoretical perspectives.

**Organizational Field**

An organizational field comprises the “organizations that, in the aggregate, constitute a recognized area of institutional life: key suppliers, resource and product consumers ... and other organizations that produce similar services and products” (DiMaggio and Powell, 1983, p. 148); see also, Aldrich (1999, pp. 49–50). This concept is captured as a vertical plane in our ION box, indicating the set of producers, suppliers, and customers involved in a particular domain of activity; see Figure 22.1, bottom, for illustration. Examples of research on organizational fields include DiMaggio’s (1991) study of US art museums, Laumann and Knake’s (1987) network analysis of the organizations involved in energy and healthcare national policy making, and Suchman’s (1998) investigation of law and finance in Silicon Valley.

The task of explaining how viable organizational communities coalesce over time poses a challenge to the analysis of organizational fields. It also offers a solution to the
"structuration puzzle" or the process through which coherent and consistent social relations - shared meanings and stable role enactments - emerge within a group of previously isolated firms. Suchman (1998) gathered a range of qualitative data (informant interviews) and quantitative data (content analysis of 100 actual venture capital financing contracts) to explore the culture and structure of interorganizational relations between venture capital firms, law firms, and emerging growth companies in Silicon Valley. Various financing practices blossom but then solidify or center around a limited repertoire of contractual archetypes, driven mostly by the tightening organization-to-organization activities in the community's legal and financial services sectors. From 1975 to 1990, Silicon Valley developed a tightly scripted set of standardized financing archetypes. The choice of contract archetype in any given firm-to-firm transaction was made largely on features of historical timing and interorganizational network embeddedness.

The discussion of dyads, triads, organization sets, and organization fields highlights the various component parts of interorganizational networks. Together, they constitute interorganizational networks: the entire set of relationships among producers, suppliers, and customers across all k domains. The ION box itself represents interorganizational networks; see Figure 22.1, top. Few studies have attempted to capture interorganizational networks as a whole. A partial exception is Burt's (1983) analysis of economic transactions, captured in the form of input-output tables of exchanges between producers, suppliers, and customers, and director interlocks, but this study considers only two of the many domains that exist in the k-space: business transactions and interlocks. Obviously, this is an area where more work needs to be done.

**Contemporary Issues and Debates**

Issues and debates about interorganizational networks have changed over time. Here we highlight three major categories of contemporary concern: embeddedness, institutionalization, and the rise of the network organizational form.

**Embeddedness**

The theoretical proposition encapsulated in the term "embeddedness" has captured and fired the imagination of interorganizational researchers. Early on, economic anthropologist Polanyi (1957) described the extent to which economic institutions are enmeshed and embedded in political and social institutions. But it was Granovetter's (1985) theoretical development of the idea that vivified research on the relationships across the k-space in our ION box. For example, Uzzi has produced a stream of research documenting and specifying the effects of social structure on economic transactions. For example, he shows that the extent of embeddedness influences the survival rates of contractor firms in the New York garment industry; this relationship is curvilinear, where the highest survival rates are achieved by firms located between the extremes of arm's-length ties and fully embedded ties (Uzzi, 1996, 1997). Similarly, he documents a curvilinear effect in relationships between commercial lenders and small business customers: The customers who pay the lowest interest rates are located between the same extremes (Uzzi, 1999; Uzzi and Gillespie, 1999).
Extant research on embeddedness in interorganizational networks generally considers a small range of possibilities captured in the ION box, though Dacin et al. (1999) demonstrate the virtues of thinking about embeddedness in a wider and broader way. For example, Uzzi’s structural foci are only the dyad and the organization set. The original formulations of the embeddedness proposition (Polanyi 1957; Granovetter 1985), however, imply the need to study a wider range of embeddedness phenomena. Framed according to the ION box, embeddedness could mean the correlation of $k$-matrices among producers (the middle block of Figure 22.1), among suppliers in terms of their relationships to producers (the left block), among customers in terms of their relationships to producers (the right block), or even the correlation of $k$-matrices involving suppliers, producers, and customers. Studies outside the field of interorganizational research, such as Padgett and Ansell’s (1993) network analysis of Florentine merchants, bankers, and families, highlights the promise of enlarging the field of analysis of embeddedness in interorganizational networks.

**Institutionalization**

Contemporary organizational theorists draw heavily on institutional theory to understand many aspects of organizational life. DiMaggio and Powell (1983) developed the seminal statement, delineating three mechanisms of institutionalization: mimetic, normative, and coercive. Isomorphism of the organizational field of U.S. art museums, for example, is largely shaped by conformity to the requirements of federal funding agencies (DiMaggio, 1991). Lawyers in Silicon Valley, through the process of developing standardized venture capital financing contracts, stabilize and routinize the relationships between venture capital firms and start-up technology firms (Suchman, 1998). Mimetic forces influence patterns of corporate gift giving to nonprofit organizations (Galaskiewicz and Wasserman, 1989). Mimetic isomorphism drove the adoption of the “poison pill” hostile takeover defense, as executives learned about such tactics through their director interlocks (Davis, 1991). Mimetic isomorphism itself can be divided into different types of interorganizational behaviors, such as “trait imitation,” “outcome imitation,” and “frequency imitation” (Haunschild and Miner, 1997).

Recently, organizational scholars have raised some cautions about the ease with which institutional theory is invoked to explain interorganizational processes. “Most often,” Scott (1995, pp. 64–90) argues, “a process argument is little more than a historical account – a narrative frequently consisting of ‘stage-naming’ concepts that provide a description of a sequence of events.” Mizruchi and Fein (1999) argue that the DiMaggio and Powell (1983) article is often merely an honorific citation in organizational studies, and that in practice it is difficult to distinguish between the three isomorphic processes. Baker et al. (1998) note that other forces play major roles in interorganizational networks. They show that the hazard of dissolution of an interorganizational tie is a function of power dynamics and competition, as well as institutional forces. The inclusion of power as a force reminds us of the importance of resource dependence (Pfeffer and Salancik, 1978), and the inclusion of competition reminds us that market forces also drive the dynamics of interorganizational relations. Sometimes the basic fact that competition forms the context of interorganizational networks appears to be lost or forgotten. The role of the state in shaping interorganizational
relations is more often assumed than studied, though Fligstein (1996) reminds us that markets are politics; see, also, Schumpeter's (1942) call for a "fiscal sociology." We agree with Powell's (1991) call for an "expanded institutionalism" that views competitive and institutional forces as variables that coexist in all social institutions.

**RISE OF THE NETWORK ORGANIZATIONAL FORM**

Organizational theorists have charted the demography of organizational forms, such as the rise of the multidivisional form (Fligstein 1985) and the decline and deinstitutionalization of conglomerate firms (Davis et al., 1994). Since the late 1980s, observers of organizations have noted the rise of a new form: the network organization. Some emphasized its internal organizational features (Baker, 1992), while others stressed its super-organizational structure (Powell, 1990), but it is clear that this form is a set of both internal and external networks (Baker 1994). The network form is consistent with, and supported by, the emerging social network model of society (Pescosolido and Rubin, 2000). The diffusion of this organizational form is now so widespread that DiMaggio (2001) has coined the term "the network conception of control."

The rise of this form has clear implications for interorganizational research, because interorganizational networks and permeable boundaries are some of its defining and constituent features. Researchers have studied important parts of the external networks associated with this organizational form. For example, Powell and associates (Powell, 1990; Powell et al., 1996) focus on collaborative ties between biotechnology startups and large pharmaceutical companies. Gulati (1995) studied alliance dyads, showing how past alliances beget new alliances; see, also, Gulati and Singh (1998). Such studies of parts of the network organizational advance our understanding of this new organizational form, but no study has yet attempted to study the "whole" of it – as represented by the ION box.

**Unanswered Questions and New Directions**

Contemporary issues and debates illustrate what has long plagued the field of interorganizational networks: its vast and fragmented nature (Oliver, 1990). What the field needs is completeness: a more comprehensive view of interorganizational networks, a broader and wider perspective that takes in more of the phenomena than can be revealed by studies of dyads, triads, organizational sets, or even organizational fields. Our comparison of the foci of existing studies with the ION box shows that enormous tracts of the ION territory are unexplored and uncharted. Our following discussion offers some directions for exploring these tracts.

**WHAT IS AN ORGANIZATION’S NETWORK?**

This question has been answered by focusing on parts of an organization’s network, but not the whole. For example, interorganizational researchers may focus on a producer’s alliances with other producers, but ignore its market ties to suppliers and customers. Clearly, these market ties influence patterns of alliance formation among producers, and
should be included in the analysis. The study of an organization’s market ties is often relegated to the fields of marketing and strategy. We need to bring the market back in, and not cede this territory to other disciplines. The ION box shows that a producer’s network includes its market ties to suppliers and to customers as well as its links to other producers. Of course, an organization’s network includes its ties across the complete k space of domains. An organization’s network, therefore, is an entire horizontal plane in the ION box, as shown in Figure 22.1 (middle).

A single horizontal plane represents a producer’s interorganizational form. A network organization, for example, would exhibit an expansive set of ties to suppliers, customers, and other producers, across the k domains. This suggests that the extent to which a producer has adopted and implemented the network model could be quantified; see Baker (1992). Two organizations with similar horizontal planes have implemented the same interorganizational model. The comparison of multiple horizontal planes in the ION box would reveal the various forces at work in structuring interorganizational networks. For example, a leader-follower pattern would be shown by one horizontal plane (the follower) becoming more and more like another horizontal plane (the leader).

Indeed, the similarities and dissimilarities of organizations’ networks, observed by comparing horizontal planes, would reveal the underlying “shared rules” or “institutions,” such as rules of exchange, governance structures, and conceptions of control (Fligstein, 1996, p. 658). Competitive rules of exchange, for example, discourage producers from using the same suppliers (often referred to as conflicts of interest). If such rules were in effect, we would expect to see high levels of disagreement between the horizontal planes, such as a negative correlation of the two matrices. (Network analysis provides several measures, in addition to the correlation, that could be used to evaluate structural similarity, e.g., Wasserman and Faust (1994). Because the purpose of our chapter is not methodological, we do not address the issue of measurement. Rather, we use the correlation as a means of describing the intuition of our argument.) Prior to institutionalization, however, we would expect to observe a correlation close to zero. The emergence phase of a market (Fligstein, 1996), for example, is the period of greatest fluidity because roles, rules of exchange, governance structures, and other aspects of the social structure and culture of the market are not yet solidified (Fligstein, 1996, p. 664).

**What is Interorganizational Embeddedness?**

Like the first question, this one has been answered by focusing on parts of an organization’s network and subsets of its k space, but not the whole. Typically, relations between only two populations are studied, such as supplier-producer ties, or producer-customer ties; and, only two k domains are examined at a time, such as bank lending relationships and personal ties (Uzzi, 1999; Uzzi and Gillespie, 1999), interlocks and investment banking services (Baker, 1990), or interlocks and contributions to political action committees (Mizruchi, 1989). It is quite likely that these studies are underspecified; unmeasured domains may cause the observed correlation of the two k spaces. A comprehensive study of interorganizational embeddedness would extend the typical analysis in two ways. It would include more of an organization’s network (ties to suppliers, producers, and customers), and it would include more domains of activity. In Figure 22.1, this is the correlation of vertical planes (k relations) from front to back in the ION box.
WHAT ARE THE CONJOINT EXCHANGE ACTIVITIES OF ORGANIZATIONS?

This is a view of the ION box from its sides. For example, each “slice” of the right block represents a buyer’s organizational set vis-à-vis producers across k domains. Two customers with similar “slices” are structurally equivalent in their networks of relationships to producers. For example, high correlations across these “slices” would indicate the extent to which the downstream market is structured by its ties to producers. Similarly, each “slice” of the left block represents a supplier’s organizational set vis-à-vis producers across k domains. Two suppliers with similar “slices” are structurally equivalent in their networks of relationships to producers. High correlations across these “slices” would indicate the extent to which the upstream market is structured by its ties to producers. One could even compare slices between suppliers and customers, which would indicate the extent of institutionalization across the upstream and downstream populations.

Domains are interrelated through the conjoined exchange activities of a population of organizations. The ION box with its k space facilitates this shift in perspective. From this vantage point, we see corporate actors engaged in several markets simultaneously. They watch each other (White 1981; Baum and Haveman 1997), spend considerable time and energy on devising strategies for taking investment “positions” in multiple markets, and develop solutions to the problems of managing their resources in the face of competition. At times they compete, squaring off against one another in markets. At other times they cooperate in alliances, or engage in illegal collective action (Baker and Faulkner, 1993). The introduction of new and novel instruments of trade or technologies prod organizations into action, sometimes disrupting the status quo, at other times resulting in the diversion or shifting of resources across k domains. Whatever the range of activities and the magnitude of resource allocation, the market economy can be viewed as a network of interlocking markets as well as a network of interlocking organizations.

Paradoxically, the “network of interlocking organizations” appears to prevail in organizational theory and research, while the “network of interlocking markets” has only begun to emerge in economic sociology. While it is recognized that socio-economic behavior of firms result in “positions” in markets, it is less well appreciated that these “positions” may be conceptualized as the “behavioral k linkages” across markets themselves. For example, finance strategy advises risk-averse organizations (as investors) to diversify their portfolios of investments. Accordingly, the organization will take positions in multiple financial markets. These positions are the concrete linkages or threads across the markets. From an elevated view of the ION box, the interrelationships of markets are formed by the collective behavioral linkages of a population of organizations as market actors. The result is an observable intermarket structure. Examining only one market and its organizational participants asserts that action occurs on a single plane in the k space. Examining only a pair of markets, as is typically done in economics, forces the assumption that other markets do not substantially influence the pair under study. Examining only a pair of markets also glosses over the domains and how other contexts of interorganizational behavior (i.e., political, cultural, familial-kinship, illegal) influence economic behavior.

Recent developments in organizational ecology examine the interactions of organizations across multiple markets. In this perspective, populations are comprised of heterogeneous micro-niches in which organizations interact, both competitively and
cooperatively (Baum and Singh, 1994; Baum and Haveman, 1997). These multi-market ecology models do not incorporate networks directly. Thus, the marriage of multi-market ecology models and network models would produce enormous breakthroughs in the understanding of markets as social institutions.

**Networks of Interlocking Markets**

Some initial definitions provide the foundation for what is to follow. The $k$ space in the ION box (Figure 22.1) denotes specific markets. For simplicity, four markets are the $k$ relations for our illustration. A *market* is a set of exchanges involving a specific product or service. Examples from the financial sector include the markets for US Treasury bills, GNMA mortgages, and foreign currencies (Baker, 1987). *Trader* refers to an organization as a market actor. A *trader population* refers to all organizations that participate in one or more market domains. *Trader participation* refers to the “open positions” a trader has in a given market. An open position is the number of contracts held by a given trader in a given market at a specified point in time. *Inter-temporal* exchanges of traders in domains and the consequences of new domains for traders are of considerable importance (we will postpone a discussion of this for now). *Type of participation* refers to the economic purpose of a position.

A vector represents each trader’s participation in a set of markets. An entry in a vector corresponds to a trader’s open position in multiple markets. We use binary data for simplification in the examples to follow. A “1” in the vector represents the presence of an open position in a market. A “0” represents the absence of an open position in a market. For example, consider the market positions (or organization market set) for the hypothetical organization $W$, represented by the following vector:

<table>
<thead>
<tr>
<th>MARKETS</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRADER W:</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

This vector shows that trader $W$ holds open positions in three markets ($A$, $C$, and $D$) and has no position in a fourth market ($B$).

Add market participation vectors for three more traders. These four vectors now form a matrix in the ION box. This is a “two-mode” matrix (Wasserman and Faust, 1994). Each row corresponds to a trader’s participation in four $k$ spaces or markets; each column corresponds to all the positions the trader population holds in an individual market. This *trader by market* matrix is arrayed as follows:

<table>
<thead>
<tr>
<th>MARKETS</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRADER W:</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>X:</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Y:</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Z:</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

In its present form, this trader by market matrix does not reveal any intrinsic pattern(s). But if the rows and columns are rearranged so that similar vectors are grouped to-
Together, a distinct pattern emerges. First, row vectors are rearranged, preserving the order of column vectors. The matrix now appears as:

<table>
<thead>
<tr>
<th>MARKETS</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRADER W:</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Y:</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Trader W and trader Y are clustered together because they have similar (in this case, identical) vectors. Trader X and trader Z are clustered because they also have similar (in this case, identical) vectors. (The horizontal line represents the partition between the two subsets of traders.)

By clustering traders who have similar vectors, subsets of traders are identified in which each subset is comprised of traders who participate in the market system in similar ways. Traders with similar patterns of participation are structurally equivalent across markets. Traders in $k$-space are structurally equivalent if they have very similar vectors (or patterns of participation) across domains (the four hypothetical markets, A, B, C, and D).

This partitions the trader population (rows) into discrete subsets of market actors. Each subset of structurally equivalent traders may be viewed as a single class of traders. In the matrix above, two classes of traders are now identified: the subset (W, Y) and the subset (X, Z). The first subset is referred to as trader class [A], and the second subset is referred to as trader class [B].

The columns of the matrix also may be rearranged according to the same rule of structural equivalence. The trader by market matrix now looks like this:

<table>
<thead>
<tr>
<th>MARKETS</th>
<th>B</th>
<th>A</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRADER W:</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Y:</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Trades B constitutes a single class of markets (referred to as market class “A,” and markets A, C, and D constitute another class of markets (referred to as market class “B”).
Now that the rows and columns of the matrix have been reordered so that traders are
grouped together and markets are grouped together, the intrinsic structure of this mar-
ket system is cast into sharp relief. The partitions derived by applying the rule of struc-
tural equivalence to the traders (rows) and to the markets (columns) divide the trader
by market matrix into four distinct patterns. We have now rearranged the market box
to reveal an interorganizational and intermarket structure. By coding the submatrices
containing all “1” entries as “1” and the submatrices containing all “0” entries as “0,”
the newly partitioned matrix can be reduced to a smaller matrix that shows the market
system at a more aggregate level. At this level, the individual organization (the trader)
and the distinct domain (the market) are ignored. The market system is viewed on the
level of trader classes and market classes. The resulting matrix (or image) appears as:

<table>
<thead>
<tr>
<th>MARKET CLASS</th>
<th>“A”</th>
<th>“B”</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRADER CLASS</td>
<td>[A]</td>
<td>0</td>
</tr>
<tr>
<td>[B]</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

In this market box image, a “1” indicates the participation of a class of traders in a
class of markets. A “0” indicates that a class of traders does not participate in a class of
markets. Each “1” on the collective level represents a position in the market system.
There are two positions in this hypothetical market system. The position of trader class

A position represents an area of high intermarket concentration in the market domain.
Some conceptualizations of intermarket concentration focus on a single large trader’s
position in one or more markets. While this approach is useful in exploring how a
trader’s attributes (size, endowment, capabilities) affects market participation and power,
the approach is deficient since intermarket concentration may involve a subset of struc-
turally equivalent traders who trade heavily in more than one market. The ION box and
k spaces developed in this chapter can be used to examine the position of a single trader
in one or more markets, and more importantly, to discover the aggregate positions of a
subset of traders (i.e., a trader class) who are similarly concentrated in a subset of
financial markets.

The overall configuration of an image reveals important features of the structure of
the market as a system. In the example used above, there are two mutually exclusive
market centers represented by the two positions. Since trader class [A] trades only in
market class “B,” and trader class [B] trades only in market class “A,” the market
system is shown to be divided into non-overlapping subsets of markets.

Many other overall configurations are possible. Consider the intermarket structures
represented by the following 2 x 2 images:

A. 0 0  B. 1 1  C. 1 0  D. 1 0  E. 1 0  F. 1 0  G. 1 1 
   0 0 1 1 0 0 0 1 1 0 1 1 0 0

Each of these hypothetical images represents a characteristic structure of organizations
as classes of traders in markets and, at the same time, markets as interrelated through the
conjoint activities of their organizations. Images A and B represent two possible intermarket
structures: The former indicates no trading takes place in the market system, while the
latter indicates that all traders participate in all markets. Image C depicts a single market center: One trader class uses one market class, but the other trader class does not trade at all. Image D represents the exclusive market centers discussed above. Image E indicates that both trader classes hold positions in the same class of markets, but neither trader class participates in the other market class. Consequently, the market class in which both trader classes participate contains the core markets in the market system. Image F indicates that both trader classes take positions in one market class (the “core”) while only one trader class uses the other subset of markets. The class of markets in which only a single trader class participates contains the peripheral markets. Hence, image F represents a core-and-periphery intermarket structure. Image G represents a unified market structure: One trader class holds positions in both market classes, but the other trader class is comprised of nonparticipants.

In contrast to the conventional economic view of the market as an abstract and generalized market mechanism, we propose that the market may be conceptualized and modeled as a social network of interlocking markets. A market economy is a “structure of social structures” (Baker, 1983, 1987; Faulkner, 1983; White, 1992). In contrast to the conventional sociological view of the market as a matrix of relations among concrete organizations, we propose that the market may be seen as a social network of interlocking trader classes. Interorganizational behavior shorn from its anchoring in work activity or domain participation is the sociological equivalent of neo-classical abstraction. From the perspective of this chapter, the critical issue is not measurement of organizational networks as much as how to think about a matrix—the ION box of organizations and domains. The empirical study of interorganizational networks has long been impeded by lack of an adequately conceptualized model of the k domain space across which organizations and organizational classes participate. A single domain or single market cannot make up an economy. Any market economy is more than a single set of relationships around a single object. We have illustrated briefly how an economic domain (k space with markets A, B, C, and D) is a set of sets—a grouping of multiple markets.

If markets (and by implication, other domains) are interconnected by the conjoint exchange activities of actors across the set of constituent domains, then the ION box and the images we have described and illustrated may be used to evaluate intertemporal changes in the behavior of organizations across domains. For example, it may be applied to answer many of the pressing questions about new domains opening up or shutting down, represented by the accordion-like expansion and contraction of the k-space of our ION box.

Connections Across Levels

The three network chapters cover a broad sweep of network phenomena, ranging from interpersonal networks inside organizations (Raider and Krackhardt) to (inter)organization sets (Gulati, Dialdin, and Wang) to interorganizational networks (Baker and Faulkner). These chapters fit like Chinese boxes, one inside the other: the intraorganizational network is contained in the egocentric network of organizations which fits, in turn, inside the ION box we propose in this chapter. They illustrate that network theory is robust: the network concepts that apply to interpersonal networks also apply to interorganizational relations. For example, the “ego” in an egocentric network can be a person or an
organization, while the “alters” can be other people or other organizations (Raider and Krackhardt versus Gulati, Dialdin, and Wang, respectively). Indeed, the chapters show that the entire network toolkit can be used to study organizational networks, no matter what the level of analysis may be.

The ease with which network concepts can be generalized across levels and units of analysis is a liability as much as a benefit for research on organizational networks. Organizational theory has always suffered from a tendency to treat an organization as if it were a person. Network theory makes this fallacy even easier to commit. For example, when the concept of “ego” is used to represent a corporate actor instead of a natural person, we nearly forget that a legal fiction does not have drives, motives, interests, and values. It is difficult—if not impossible—to impute the goal or purpose of human behavior (Black, 2000). Confusing humans and organizations makes it even more difficult.

Raider and Krackhardt operate under the radar of the other two chapters. By looking inside a “node” in an interorganizational network, they remind us that an organization is a form of collective action. For example, the observed configuration of an organization set—or, as Gulati, Dialdin, and Wang call it, the egocentric network—is as much the result of the intraorganizational power struggle as the attempt to manage resource dependence or reduce transaction costs. An organization is not as free to choose its alters as Gulati, Dialdin, and Wang imply: competition, power, and institutional forces all influence the configuration of an organization set (Raker et al., 1998). The ION box attempts to capture some of the larger forces that shape interorganizational relations.

**Conclusion**

The three network chapters suggest two different but complementary angles of attack. Taken together, the three chapters show the need to integrate across levels, examining the interplay of intraorganizational networks, the (inter)organization set, and interorganizational networks (e.g., the ION box). Integration across levels in research on interorganizational networks is a specific instance of a general problem in social theory: the micro-to-macro problem in explanations of system behavior (Coleman 1990). This problem plagues social theory but it is particularly acute in research on interorganizational networks. Few studies have tried to examine, for example, how the internal power politics of an organization are played out in decisions about the composition of an organization set, and in turn how the macrostructure of interorganizational networks constrains the possible organization sets to choose from, though there is some work on this problem (Baker et al., 1998).

Our chapter presents a macro-level research problem: the concrete analysis of interorganizational networks and interlocking domains as a complete social system. We lay the foundation for an exploration of interorganizational networks in domains and domains across networks. Organizational sociology has accumulated an impressive array of technical tools for the analysis of interorganizational networks. But we need new conceptual equipment for our toolkit. Our main conceptual framework is the interorganizational network or ION box. We used the ION box to structure the eclectic, fragmented field of research on interorganizational networks. This three-dimensional array captures the main concepts in the field—dyads, triads, organization set, organiza-
tional field, and interorganizational network – as it suggest new avenues of research. For example, the ION box shows that an organization’s network extends far beyond the usual boundaries imposed by most research. It also provides an expanded view of the concept of interorganizational embeddedness. Finally, by providing a comprehensive conceptualization of interorganizational networks, we shift from the view of interorganizational networks of as a “network of interlocking organizations” to a “network of interlocking domains.” This shifts the emphasis of research from organizations to networks of domains.

Notes
1 A focal organization can be a firm, establishment, or line of business. At one level of analysis, for example, the organization could be a corporation itself; at a lower level, it could represent the divisions of a corporation. For simplicity, we consider the focal organization as a “firm.”

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