
Explaining the Underutilization of Business-to-Business E-Commerce in Geographically Defined Business Clusters: The Role of Social Capital

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This chapter explores the intersection between two important trends related to the ambivalent relationship between IT and social capital. First, the growing use of the Internet to support business-to-business (B2B) trade has unquestionably focused attention on the opportunities for improved efficiencies in procurement processes (Segev, Gebauer, and Färber 1999; Kaplan and Sawhney 2000; Laudon and Traver 2001). With the stress on transaction efficiencies, the dominant theoretical paradigm guiding analyses of B2B electronic markets has been transaction-cost economics, highlighting the ability of such markets to reduce various search and monitoring costs for participating firms (Bakos 1997, 1998; Segev, Gebauer, and Färber 1999; Steinfield, Chan, and Kraut 2000; Garicano and Kaplan 2001). At the height of the dot-com euphoria, hundreds of third-party B2B marketplaces across many different industries were developed, establishing the B2B e-hub as one of the most prominent new business models in what has been called the “digital economy” (Timmer 1998). Nevertheless, despite widespread optimistic projections by industry consultants, academic analysts, and government policymakers (Katsaros, Shore, Leathern, and Clark 2000; Department of Commerce 2000), most third-party-provided B2B marketplaces have not met with much success, and many have failed entirely (Laudon and Traver 2001; Tedeschi 2001).

The second trend, generally ignored in the e-commerce literature, is the renewed fascination with the significance of business clusters in cities, regions, and nations as a critical facet of economic growth and vitality (Porter 1990, 1998, 2000; Breschi and Malerba 2001). Unlike most e-commerce research, which usually begins from the assumption that

electronic networks make distance and physical location irrelevant (Cairncross 1997), those who study business clusters emphasize the crucial importance of proximity in encouraging knowledge sharing, reducing transaction costs, and stimulating innovation (Breschi and Malerba 2001). Indeed, explanations of successful local business clusters often focus on traditional social capital explanations, such as the importance of trust and social relationships, as a catalyst for knowledge sharing and innovation across firms that may not even be trading partners (Maskell 2001).

In this chapter, we bring these two disparate topics together, pointing out the fundamental disconnect that characterizes the current thinking. If geographically defined business clusters are of increasing significance, then electronic marketplaces that fail to take location and social relationships into account will be of little use in these contexts. In fact, research on electronic marketplaces has historically emphasized the need to free buyers and suppliers from the constraints of geography by enabling access to distant buyers and suppliers. This is hypothesized to occur because electronic networks reduce transaction costs that formerly served as a barrier to trade (Malone, Yates, and Benjamin 1987). Choice is broadened, the role for market governance is extended, and prices are lowered due to electronic markets. What, then, is the role of electronic commerce in such geographically defined business clusters? We suggest that there is ample evidence for the importance of location in electronic commerce (Steinfeld and Klein 1999), and new work on electronic commerce communities explicitly examines the social elements of network marketplaces (Hummel and Lechner 2002). Since most B2B electronic markets ignore location and social capital as critical components of economic exchange, however, they will be underutilized in local business clusters. Rather, much as Kumar, van Dissel, and Bielli (1998) observed in their study of the Prato textile industry, members of local business clusters are likely to find little added value in transaction-oriented interorganizational systems, which may offer little improvement to the already-low transaction costs they face using interpersonal means of coordination.

The remainder of this chapter is organized as follows. The first section provides an overview of the literature on B2B marketplaces, noting key

emphases and trends. The second section introduces perspectives on geographic business clusters, including economic and social capital views. The third section looks at the evidence to date on IT use and electronic markets associated with geographic business clusters. The fourth section explores emerging developments in the area of more socially aware e-commerce. Finally, this chapter concludes with some attention to the many research issues raised by the preceding discussions.

Business-to-Business Marketplaces on the Internet

E-commerce researchers generally expect the value of B2B electronic transactions to vastly exceed business-to-consumer (B2C) retail trade due to the enormous volume of goods and services traded among firms (Kaplan and Sawhney 2000; Subramami and Walden 2000; Garicano and Kaplan 2001; Laudon and Traver 2001). Laudon and Traver (2001), citing figures from a Jupiter Media Metrix report, estimated U.S. B2B trade at \$12 trillion in 2001—a surprising figure in that it exceeds the estimated gross domestic product of the United States that year. The potential for even a small fraction of this trade to be conducted over the Internet has attracted hundreds of new B2B market entrants. As early as 2000, the U.S. Department of Commerce (2000) reported that more than 750 B2B e-markets were operating worldwide in a range of different industries.

Estimates of the scope of B2B trade are made difficult by definitional problems. Generally, B2B trade refers to all electronic trade between firms. Some researchers include electronic data interchange (EDI)-based transactions in their calculations, however, while others do not. Additionally, Subramami and Walden (2000) point out interesting definitional paradoxes. For example, when an employee at one company orders a book from Amazon.com, Subramami and Walden do not consider it to be B2B e-commerce, despite the fact that the product is being transferred from one business to another. Rather, they suggest that B2B trade is a process involving the joint action of multiple firms.

B2B e-commerce typically is divided into two main categories based on the characteristics of the infrastructure and interfirm relationships of the participants: private industrial networks and Internet-based

marketplaces (Laudon and Traver 2001). The control of the network and the extent to which it is biased or neutral are common distinctions (Steinfeld, Kraut, and Plummer 1995). Early interorganizational ISs were often set up by large suppliers so that business customers could use terminals for their orders. Modern, Internet-based versions of these systems are simply B2B electronic catalogs or storefronts (Laudon and Traver 2001). These services are biased toward a single seller, and competitive strategy theorists note that such systems serve to increase buyer-switching costs and create “lock-in” (Bakos and Treacy 1986; Shapiro and Varian 1999). Early B2B electronic exchange was also often managed by a single buyer in an electronic data interchange (EDI) network or intranet organized in a hub-and-spoke structure. In these systems, powerful buyers required all of their suppliers to utilize the IS as a means of improving the buyers’ procurement efficiencies. The threat of the loss of the buyers’ business coerced suppliers to undertake the investment necessary to engage in electronic transactions.

The Internet is rapidly becoming the dominant platform for electronic B2B exchange. Third-party market makers have established a range of supposedly neutral (unbiased) markets offering many trade facilitation services to industry buyers and sellers. Moreover, single buyer and seller systems are evolving into private industry consortiums-based systems (Laudon and Traver 2001).

B2B Internet marketplaces have been classified according to two key dimensions of business purchasing: how businesses buy, and what businesses buy (Kaplan and Sawhney 2000). The “how” dimension distinguishes between spot purchasing to fill an immediate need, and systematic purchasing for planned, long-term needs. The former is often done using ephemeral, market-based transactions, without long-term contracts. The latter is frequently done after significant negotiation, and is generally used for purchasing in large volumes from trusted trading partners. The “what” dimension normally distinguishes between vertical (also called direct or manufacturing) inputs that relate to the core products of a firm and horizontal (often called indirect or MRO for maintenance, operating, and repair) inputs, such as office supplies, that are acquired by all firms. Laudon and Traver (2001) sketch out the following four types of Internet-based B2B marketplaces:

- E-distributors (supporting spot purchasing for horizontal inputs) such as Grainger.com or Staples.com offer electronic catalogs representing thousands of suppliers. Laudon and Traver (2001) call them the Amazon.com for industry since they operate much like retailers. The main benefit for buyers is simply the reduced search cost, although additional services like credit and account management are offered to help further reduce transaction costs.
- E-procurement services such as Ariba.com also offer MRO supplies, but focus on systematic rather than spot purchasing. Such B2B intermediaries provide a range of procurement services, including the licensing of procurement software that supports a variety of value-added services. They do not own the supplies but offer the catalogs of thousands of suppliers from whom they also obtain fees and commissions. They theoretically bring value by aggregating both buyers and sellers, decreasing search costs for both parties, and therefore are subject to significant positive network externalities (the more buyers they attract, the more suppliers will join, and vice versa).
- Exchanges such as ChemConnect are intermediaries that focus on bringing together buyers and sellers within a particular industry, and concentrate on the spot purchasing of manufacturing inputs. They charge commissions, but offer a range of purchasing services to buyers and sellers, supporting price negotiations, auctions, and other forms of bidding in addition to normal fixed-price selling. Buyers benefit from greater choice and lower prices, while sellers gain access to large numbers of buyers. These vertical markets are often used to unload surplus materials (for example, via auction). They are also subject to network externalities.
- Industry consortiums are best represented by Covisint, the electronic procurement system developed by the leading automobile manufacturers. These exchanges are typically jointly owned by large buying firms seeking to rely on electronic networks to support long-term relationships with their suppliers. Entrance is by invitation only, and the buying clout of the founders influences suppliers to make the investments needed to participate.

The high failure rate of third-party B2B e-hubs, coupled with the growth of industry consortiums, reflects an important dynamic. Businesses have established relations with their suppliers, and the trust engendered by reliable performance and commitment over the long run may be more valuable to firms than any short-term price advantages offered by the supposedly neutral marketplaces. Indeed, a new trend in the B2B electronic trade arena is the rise of “collaborative e-commerce” where networks are used for far more than simple transaction support. Joint product design, more tightly integrated inventory databases, and other forms of coordination between producers and suppliers occur over private intranets. In a sense, these developments are merely the latest manifestation of what Malone, Yates, and Benjamin (1987) refer to as electronic hierarchies, where firms rely on networks to facilitate outsourcing, but only to a small number of firms with which they are tightly integrated. Substantial empirical evidence exists suggesting that these interorganizational forms are more common and long lasting than the market exchanges (Steinfeld, Kraut, and Plummer 1995; Kraut et al. 1998).

The rise of industry consortiums, and the growth of collaborative e-commerce indicate that social capital concepts do indeed have an important place in B2B electronic markets. The experience of B2B electronic marketplaces reflects a movement away from an emphasis on arm’s-length transactions, to one where the networks are used to support existing relationships. Even in network marketplaces predicated on adding value through buyer and supplier aggregation, there is an emphasis on the role of social aspects and community. For example, several B2B e-hubs now offer support for community formation and communication in much more explicit ways than in the past. CommerceOne, for instance, advertises a “meeting support” service whereby members can engage in rich, multimedia interaction with each other. Still, many of the relational aspects of B2B e-hubs are necessitated precisely because of their virtual nature and the lack of social capital in the first place. These include:

- Emphasis on the value of communities from a network externalities perspective: That is, each new member adds new value for all members as a potential trading partner and source of market liquidity. This poten-

tially creates a positive feedback loop, but fails to consider the potential damage that the introduction of new competition has to established partners. Also, given the downward pressures that new competitors impose on prices, it is not surprising that many suppliers shied away from joining supposedly neutral B2B exchanges.

- Provision of reputation systems: Because electronic exchanges bring together unfamiliar trading partners, feedback and ratings systems can be used as a proxy for prior experience to help guide buyers and sellers to trustworthy partners.
- Member qualification: In order to help reduce the potential for opportunistic behavior, B2B marketplaces may engage in various activities to qualify members, such as ensuring that suppliers have adequate capacity for meeting orders, verifying buyer credit ratings, admitting entry by nomination or invitation, and so forth.

Social Capital Perspectives on Geographically Defined Business Clusters

Rarely are the roles of location and social capital discussed in the literature on B2B electronic markets. Yet economists and geographers have documented the significant role that location plays in the formation and maintenance of business trading communities, primarily within the context of discussions about business clusters (Porter 1990, 1998, 2000).

Porter (1998, 10) defines a cluster as a “critical mass of companies in a particular field in a particular location.” He further notes that they can include “a group of companies, suppliers of specialized inputs, components, machinery, and services, and firms in related industries.” They can also include “firms in downstream industries, producers of complementary products, specialized infrastructure providers, and other institutions that provide specialized training, and technical support” as well as industry groups such as trade associations. This description parallels the structure of many of the electronic business trading communities established over the past several years, except that Porter’s cluster members are physically colocated in a particular region.

Several of the primary economic benefits ascribed to business clusters are similar to the main benefits of participation in a B2B electronic

market: improved access to specialized inputs, lower transaction costs, and access to complementary goods and services. Additionally, Porter argues that the more important benefit is an improvement in the rate of innovation in geographically defined clusters.

Rather than relying on electronic networks and automation to achieve these transactional and informational advantages, clusters capitalize on proximity. A concentration of skilled workers, for example, increases access to needed labor inputs. Proximity helps in many less formal ways, however. As has been shown repeatedly in analyses of such clusters as Silicon Valley, knowledge sharing can occur through spontaneous or chance encounters among professionals living in the same community, enhancing the overall innovation capacity (Rogers and Larsen 1984; Maskell 2001; Saxenian and Hsu 2001). Porter (1998) further refers to the advantages of common language, culture, and social institutions in reducing transaction costs, and notes that local institutions are likely to be more responsive to the specialized needs of a cluster (e.g., for creating public infrastructure). He even points to peer pressure and the presence of rivals as causes for the enhanced competitiveness of firms that are embedded in a local cluster.

A growing group of theorists now explicitly recognize the significance of social capital as a resource that enhances competitive advantage in organizational settings (for reviews, see Adler and Kwon 2002; Nahapiet and Ghoshal 1998). Although definitions of *social capital* differ somewhat, especially given the application of social capital across disparate contexts and disciplines, the primary focus is generally on the resources arising from personal relationships that individuals may draw on in various aspects of their social life (see chapter 8). Hence, it functions much like other forms of capital in that it can be accumulated, and the social capital from one relationship in one context may be beneficial in other contexts. A businessperson, for example, may be referred to a new supplier through a common acquaintance he or she met at an athletic club or church.

Recent theoretical work stresses the multidimensional nature of social capital (Adler and Kwon 2002; Nahapiet and Ghoshal 1998; Tsai and Ghoshal 1998). Nahapiet and Ghoshal (1998) develop a framework to explain how social capital can provide advantages to individuals and

firms with three basic dimensions: structural, relational, and cognitive. The structural dimension refers to the pattern of social ties for a given individual. People are embedded in a network of ties, which can function as conduits to needed information and resources. The relational dimension underscores the importance of trust and the sense of obligation that arises from close, personal contacts. Empirical work has demonstrated that people often turn to trusted personal contacts, especially for high-risk transactions, in order to reduce their vulnerability to opportunism and other transaction costs (DiMaggio and Louch 1998). The cognitive dimension focuses on the notion that exchanges of information and other resources are facilitated by shared codes or knowledge that enable common goals as well as common understanding. It offers a distinct resource not tied directly to specific personal relationships, but develops as a public good in a particular social system based on interactions among its members. As discussed by Marleen Huysman (this volume), Nahapiet and Ghoshal's (1998) three dimensions are quite similar to Adler and Kwon's (2002) framework, in which social capital is viewed as operating by providing opportunities, motivation, and ability. Opportunities arise from participation in a network (structure), motivation arises from the qualities embedded in relationships (relational), and ability requires common understanding (cognitive).

Social capital theory supplies a powerful lens through which many of the advantages of geographically proximate business clusters can be understood and extended. Access to skilled labor may be enhanced, for example, when complemented by referrals from social contacts that help connect people searching for work with firms seeking employees. Spontaneous interactions, which Porter contends facilitate innovation, occur because social embeddedness and proximity afford opportunities for such encounters. Common language, culture, and social institutions represent the basis for a shared understanding and goals that comprise the cognitive/ability dimension emphasized by social capital theorists.

Although Porter does not dwell on the relational aspects of social capital, much of the cluster research provides ample evidence of the potential economic benefits arising from this dimension. The sense of obligation, goodwill, and reciprocity that emerges from strong relationships can have significant economic benefits. Social embeddedness

researchers posit that at least at the extremes, there are basically two kinds of relationships through which economic transactions occur: arm's-length ties characterized by short-term and constantly shifting ties among loose collections of firms or individuals; and embedded ties characterized by stable and long-term relationships (Powell 1990; Uzzi and Gillespie 1997; Uzzi 1999). Transaction-cost theory considers the former to be marketlike and efficient, allowing self-interested actors to avoid opportunism through their ability to easily switch to a new buyer or seller (Williamson 1975). In a transaction-cost view, economic exchanges that are dependent on social networks can result in inefficiencies as social obligations prevent actors from pursuing transactions with higher-quality or lower-cost partners. In contrast, social embeddedness researchers have found distinct advantages to the reliance by organizational actors on a limited number of trusted relations for their most critical economic exchanges. These include reduced search costs to find appropriate trading partners, lower monitoring costs as trust arising from social obligation and the importance of maintaining a reputation within a social structure work against undue opportunistic behavior, time savings through personal advice and referrals, higher-quality information transfer among actors, greater emphasis on joint problem solving, and an increased likelihood that new transactions will remain within a relationship rather than be directed toward new partners (Granovetter 1985; Powell 1990; Uzzi and Gillespie 1997). Uzzi and Gillespie (1997) found empirical support for these benefits in their study of social embeddedness in the garment business in New York.

To the extent that such strong ties develop over a long period of time and are sustained by interactions in other social contexts such as community associations or social gatherings, then clearly proximity should be correlated with their incidence. Hence, social capital theory offers fertile ground for understanding many of the dynamics that create vitality in local business clusters.

Evidence for IT Use in Business Clusters

Research on IT use in business clusters is limited and inconclusive. Johnston and Lawrence's (1988) seminal work on value-adding partnerships concentrated extensively on the Prato-area textile industry.

Their analysis examined how the large textile mills formed in the 1930s had disaggregated into small, specialized firms that focused on one part of the overall value chain in textile production (e.g., washing, coloring, cutting, etc.). They showed how networks of firms worked in concert to meet the market demands for the good of the network and pointed out how an interorganizational IS was being used to facilitate coordination (Johnston and Lawrence 1988). A decade later, though Kumar, van Dissel, and Bielli (1998) revisited the merchants of Prato, and found that the IS had been all but abandoned. The system offered no real added value in terms of transaction-cost reductions over the personal forms of coordination that had evolved over centuries of textile production in the region. Kumar, van Dissel, and Bielli (1998) suggest that trust and personal relationships—the social capital of the region—were effective substitutes for the interorganizational system, rendering it unnecessary.

Other research on interorganizational systems embedded within particular business communities also underscores the fallacy of ignoring the socially embedded nature of interfirm transactions. A case study of media buyers and sellers in France illustrates the sometimes oppositional nature of ISs built from a transaction-cost rationality and existing practices based on personal relationships (Caby, Jaeger, and Steinfield 1998). The market for television advertising had become more complex due to the liberalization of the market and the resulting increase in private channels. An electronic marketplace was created by the media industry, allowing media buyers to find available time slots and reserve them. Theoretically, this would reduce selling costs and improve transaction efficiencies. It was built on France's Minitel system, and so required minimal investment by the buyers. Yet it soon failed, largely because it prevented many of the relationship-based selling strategies that media representatives preferred. The buyers could not offer the best times and prices to their preferred customers, for example. Moreover, customers behaved strategically, often reserving time slots only to prevent competitors from obtaining them. Before long, the media representatives were bypassing their own system, only to return to their prior methods of selling media time.

Another study by Kraut and colleagues (Kraut et al. 1998) investigated personal and electronic forms of transaction coordination between producers and suppliers in several industries. Their research extends the

Kumar, van Dissel, and Bielli findings in important ways. In contrast to the Prato case, electronic networks were more likely to be used precisely when there were existing relationships among producers and suppliers, and greater use was associated with more tightly coupled producer-supplier relations. Kraut and Colleagues (1998) explain this by pointing out that to be able to conduct electronic transactions, investments are required by the participants. Suppliers are unlikely to make such investments unless they can expect a certain amount of business. Personal relationships still mattered, however, and indeed they were positively associated with electronic transactions. There was also an interesting interaction between the two: the more firms attempted to substitute electronic transactions for personal forms of coordination, the more errors and quality problems they experienced with transactions. If they complemented electronic transactions with personal coordination, such problems were mitigated.

A recent study by Schultze and Orlikowski (2002) provides further evidence of the damage that can occur when an Internet-based B2B market approach replaces direct personal relations among buyers and sellers. Their study of a health insurance intermediary firm identified the mechanisms by which the provision of Internet-based services can turn relationships that formerly were partnerlike into weaker, brokerlike ones. Agents in the firm complained that the reliance on information provided over the Web enabled clients to bypass them and reduced the sense of obligation that had formerly led clients to voluntarily funnel claims through them. This loosening of a sense of obligation meant a real loss of income, as their commissions were dependent on having served as the intermediary for such claims.

That electronic transactions might follow from physical proximity is further suggested by Castells's (2001) fascinating account of the geography of the Internet, where he points out the spatial concentration associated not only with producers of Internet content and infrastructure but among firms that use the Internet. The following quote illustrates Castells's thinking: "These advanced service centers are territorially concentrated, built on interpersonal networks of decision-making processes, organized around a territorial web of suppliers and customers, and increasingly communicated by the Internet among themselves" (2001,

228). Indeed, a study of Internet traffic by Kolko (2000) convincingly demonstrated that the majority of Internet protocol (IP) traffic flows within, rather than across, locations. B2B transactions are embedded in an enabling social and cultural context, yet in striving for transaction efficiencies, most efforts to create electronic networks to support transactions go to great lengths to ignore and even bypass this context.

Social and Locational Aspects of B2B Electronic Markets

Business strategists have recognized the value of on-line communities as a source of competitive advantage, viewing virtual communities as a form of a business model (Armstrong and Hagel 1996; Timmer 1998). Hummel and Lechner (2002) argue that despite the emphasis on transaction support, members of a B2B electronic market form a socioeconomic virtual community where a social atmosphere is created through two types of informational contributions: news or files that participants create and share with each other, and social information such as ratings, reviews, or recommendations. Following Hammann (2000), they analyze the social profile of B2B on-line communities according to the extent to which features are present that support four dimensions of community (Hummel and Lechner 2002). These four dimensions include a clearly defined group of actors, the nature of interactions among members, the bonding among members, and having a common place. Table 9.1 below illustrates the features defined by Hummel and Lechner that can be used to create a virtual community.

They rate a number of different virtual communities on these dimensions, scoring B2B virtual communities relatively low on the “common place” dimension due to the lack of analysis of the participants (for example, unlike B2C services, techniques such as collaborative filtering are less used), limited volunteerism, and the lack of rituals. Nevertheless, they do see B2B communities as relatively strong in three areas: the efforts to enhance interaction and knowledge transfer among members, having ties to off-line activities, and the efforts to create a trustworthy transaction environment.

Hummel and Lechner’s analysis demonstrates that B2B electronic markets may indeed offer more than simple transaction support. They

Table 9.1
Features of the four dimensions of community

Clearly defined group	Interaction among members	Bonding among members	Common place
<ul style="list-style-type: none"> • Clear limitations • References to real communities • Entry rules • Primary authorization • Rules of treatment • Punishment for misconduct 	<ul style="list-style-type: none"> • Chats/forums • Possibility for own postings • Screening of contributions • Active organization • Events • Regard to recent events 	<ul style="list-style-type: none"> • Privacy protection • Individualizing • Subcommunity • User friendliness • Identification of organizer • Identification of members 	<ul style="list-style-type: none"> • Archive • Analysis of participants • Voluntary work • Rituals • Role of members

Source: Adapted from Hummel and Lechner (2002)

are still relatively limited in their support for creating a sense of common place, however. Researchers are investigating many new strategies for incorporating social information into Web-based commerce that may help to enhance the social component of electronic commerce, including B2B e-commerce. Collectively, these techniques have been called “social navigation” (Dieberger et al. 2000). Dieberger and colleagues (2000) assert that people have a well-developed sense for relying on social information as an aid in day-to-day navigation. For example, we use crowds variously to tell us what places to avoid (when we are in a hurry) or what places to try out (as in a bustling restaurant). Social navigation tools are increasingly being built into e-commerce services, including collaborative filters, reputations, and ratings systems. The information traces left by others is used to guide buyers’ decisions.

New work by human-computer interaction researchers attempts to build even more explicit social navigation tools into on-line communities and e-commerce by providing tools to enhance participants’ awareness of the activity others (Erickson and Kellogg 2000; Jung and Lee 2000). Jung and Lee (2000), for instance, describe an electronic marketplace design that incorporates a range of tools to make the actions of other people visible to participants. Although they focus on B2C e-

commerce, the concepts may also have relevance for B2B communities. Users know how many others are in the marketplace, whether particular people (“buddies”) are present, and where they are in the market. Erickson and Kellogg (2000) incorporate a concern for privacy through the concept of social translucence in the design of social navigation systems. Translucent systems offer visibility and awareness (e.g., a user can see socially significant information and thus be aware of the presence or activity of others). Such systems also offer accountability because both parties are aware of the other’s knowledge. There is a distinction, however, between translucent and transparent systems, much as in real life. An onlooker may see that two people are conversing, but cannot listen in on the conversation without explicit permission.

The goal of these researchers is to design techniques to improve the sense of “place” in on-line spaces (Harrison and Dourish 1996). In this perspective, places differ from spaces in that there are social meanings attached to them. There are socially and culturally rooted norms for behavior and action in places that, on the surface, may share similar spatial features. Harrison and Dourish (1996) suggest that the greater use of social information can help turn on-line spaces into on-line places.

Collectively, these new trends in the design of socially aware systems offer insights into how interorganizational ISs might be applied to support regional business clusters. Nevertheless, despite the new emphasis on social information, the very basic notion of location still seems underdeveloped. Recent research on the role of physical presence in e-commerce indicates that there can be synergies between on-line and off-line activities (Steinfeld, Bouwman, and Adelaar 2002; Steinfeld, Adelaar, and Lai 2002). Members of a physical community have opportunities for off-line interaction and exchange that can be augmented in a shared, collaborative e-commerce system, without assuming that the system has to serve as a substitute for in-person or other forms of interactions.

Conclusions and a Research Agenda

The essential arguments of this chapter can now be restated as follows. There is widespread agreement on the importance of local business clusters for the economic vitality of cities, regions, and nations. There is

also agreement that the success of business clusters depends on the exploitation of social capital—proximity affords interaction opportunities, common language and culture enhance shared understanding, relationships facilitate knowledge sharing and thus innovation, and trust arising from relationships lubricates commerce and reduces transaction costs. Yet most efforts to improve B2B commerce focus on the construction of transaction support systems that are relatively opaque to—or even worse, attempt to substitute for—social information and assume that location is irrelevant. Hence, B2B electronic systems are underutilized by local business clusters. The current evolution from arm’s-length B2B marketplaces to collaborative e-commerce implies new opportunities to better support local business clusters with on-line systems. Such systems, however, must be infused with more social and location awareness, including on-line tools for social navigation as well as recognition that there can be synergies between on-line and off-line activities.

From this set of assertions, a number of new research questions are briefly noted below.

- Homogeneous versus heterogeneous business clusters: Some clusters may be comprised of relatively similar firms, or at least firms that represent the vertical stages in a particular industry value chain. On the other hand, researchers point to the inclusion of a rather heterogeneous mix of capabilities in a location—such as universities, government agencies, and infrastructure providers—that helps to sustain the cluster (Porter 1998). Do these aspects of cluster composition influence the design and viability of collaboration and commerce systems that might be employed?
- New versus established clusters: Much of the discussion assumes the prior existence of a business cluster. Yet there is also much interest in forming new business clusters, and the dynamics of new clusters that have not yet built up a reservoir of social capital may be quite different (Bresnahan, Gambardella, and Saxenian 2001). It may be that different features are required for systems to support these two distinct needs. New clusters require more features to help form relationships.
- Explicit versus implicit social support: Social navigation systems gather social information unobtrusively and often have a degree of translucence

designed to protect privacy (Erickson and Kellogg 2000). Hence, a system may tell a user how many others have also purchased some item, but not reveal who those others are, nor offer support for direct interaction with those other users. Yet if we assume a local business cluster already has trusted relationships, perhaps more direct and explicit social support would be more useful.

- **Role of tacit versus explicit knowledge:** There has been much discussion about the role of tacit knowledge in local business clusters (Brown and Duguid 1998; Breschi and Malerba 2001). It may explain the importance of proximity, in that direct personal interaction is needed to transfer tacit knowledge. On the other hand, it may also be that local business clusters strategically avoid codification to maintain their competitive advantage (Breschi and Malerba 2001). Can an on-line collaborative e-commerce system support the transfer of tacit knowledge? Or can these systems only facilitate exchange when knowledge is codified, which then might have the effect of dissipating the competitive advantage of local business?
- **Open versus closed systems:** Given the importance of trusted relationships, what should the membership policies be in collaborative e-commerce systems in local business clusters. Should these be open or closed to new members, and if open, can new members join without endorsement or approval by existing members? What role should customers, including nonlocal ones, play? As Porter (2000) notes, most business clusters exist to export goods to nonlocal markets. Shouldn't the e-commerce system in use support that?
- **Metrics for performance:** How can we measure the effectiveness of a B2B collaborative commerce? Steinfield et al. (2002) argue that too often, e-commerce systems are judged purely on the basis of sales, even though they may offer many other contributions not captured by such data.
- **Where are the synergies with between on-line and off-line activity?** Steinfield, Bouwman, and Adelaar (2002) argue that in both B2B and B2C e-commerce, there are opportunities for synergy among on-line and off-line activities. What types of synergies exist, and how might they be enhanced through system design?

- Relationships between local versus nonlocal social capital: Most studies of local business clusters treat them as isolated entities (Breschi and Malerba 2001). Yet there is evidence of the significance of nonlocal links for spurring innovation, especially for emerging clusters. For example, Saxenian and Hsu (2001) note how Taiwanese scientists and engineers educated in Stanford, California, maintained relationships with former peers now working in Silicon Valley. These relationships were conduits for social and economic links that facilitated the creation of the Hsinchu business cluster outside Taipei.

Clearly, the intersection of social capital theory, business cluster economics, and IT offers researchers abundant new opportunities for study.

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