

THE STATE OF THE ART

Regional economies, open networks and the spatial fragmentation of production

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In this article, we review recent developments in the extensive literature on territorially embedded production systems in the developed world, with a particular eye towards changes that have (or have not) occurred over the last decade. Improvements in transportation and communication technologies and the advent of global production networks have put newly into play the degree to which industrial communities must be located in specific and discretely bounded territories. What had been a relatively territorially circumscribed, and thus fundamentally *organizational*, fragmentation of production has acquired a more pronounced *spatial* dimension in recent years. This has raised new questions for regional economic governance that require new study of links not only within regions and sectors, but also between them. In particular, there is a need to understand whether and how local sources of competitive advantage can be transposed to include global dimensions.

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In this article, we review recent developments in the extensive literature on territorially embedded production systems in the developed world, with a particular eye towards changes that have (or have not) occurred over the last decade. We do so because improvements in transportation and communication technologies and the advent of global production networks oriented increasingly towards the ever more sophisticated production capabilities available across the low-wage world have combined, some fear, to undermine—or at least to alter—the relevance of spatial proximity in such systems. To foreground our

conclusions, we ultimately concur with Zeitlin (2007, p. 17) that ‘successful industrial districts are becoming more conscious and more organized’, as well as ‘less self-contained and more integrated into global supply chains and knowledge exchange networks’ than in years past. However, knowledge of the manner and modes by which this can be made actively to occur—that is, what sort of institutions and policies are required—remains rudimentary if provocative.

This article is divided into six parts. Section 1 provides some background to the debate, Section 2 turns to definitional questions, while Section 3 speaks to key dimensions of variation between local industrial systems. In Section 4, we describe the trend towards an increasingly ‘spatial’ fragmentation of production and the general consensus that this has affected the structure and salience of territorially embedded production networks in both the developed and the developing world. We look then in Section 5 at different ways in which the ‘global’ has been understood to have interpenetrated the ‘local’ in recent years. We focus particularly on the implications of ‘modular production networks’ (Sturgeon, 2002, 2003), ‘transnational community’ (Saxenian, 2002, 2006) and the ‘open network firm’ (Chiarvesio *et al.* 2004, 2006) for the governance of territorially embedded production systems. In that discussion, we give special—but by no means exclusive—attention throughout to developments in the Italian industrial districts and Silicon Valley (and their connections to other regions) because they have played such an important role in the literature for so many years and thus permit greater continuity in our treatment of the larger theoretical questions. Section 6 is a conclusion.

1. Globalization and the resurgence of regional economies

There is a certain irony to contemporary fears that new technologies and the globalization of markets have altered the relevance of territorial proximity. After all, as Storper (1995, p. 191) has written, it was precisely these forces that led ‘something funny’ to happen in the early 1980s. The region, once the disciplinary province only of geographers, planners and historians, was ‘rediscovered by a group of heterodox political economists, sociologists, political scientists and geographers’ because a crisis of mass production—driven in part by the advent of flexible technologies and the globalization of markets and production—led to the vertical disintegration of production and to an opening up of new productive spaces for territorially embedded networks of firms enmeshed in a tangle of cooperative, competitive and social relations (Piore and Sabel, 1984).

The initial rediscovery, to be sure, was driven in part by the *possibilities* of a regional focus. Lessons were drawn from ‘industrial districts’ in northeastern and central Italy that had demonstrated a capacity for impressive economic performance in terms of wages, employment and exports across a broad range of industries. The Italian economists Becattini (1990) and Brusco (1982) revisited

the ideas of Alfred Marshall on external economies and an 'industrial atmosphere' to argue that the new global economy need not affect all regions equally. Certainly, capital was freer than ever, but the local was hardly powerless. Flexible and intertwined agglomerations of small and medium-sized enterprises, they showed, were quite able to stimulate the learning required for innovation in product and process and could thus readily exploit rapid shifts in demand composition.

A spate of studies of relatively analogous phenomena—termed variously as 'industrial districts', 'local production systems' or 'clusters'—across Western Europe, North America and Asia soon followed, pushing interest in industrial districts well beyond their 'neo-Marshallian' core at the intersection of economic geography, regional planning and economic sociology. Renewed interest in the causes and consequences of agglomerations of interdependent firms has since found its way, for example, into the economics literature by way of the work of Krugman (1991), Arthur (1989) and David and Rosenbloom's (1990) work on increasing returns to scale, imperfect competition and pecuniary externalities, into the business strategy literature (e.g. Porter, 1998), into the literature on innovation systems and on knowledge and learning (e.g. Cooke, 2001b) and beyond.

But it should not be forgotten that the rediscovery was about more than possibility. A regional focus was also rendered virtually *necessary* by what Marcuse (1997) refers to as 'really existing globalization'. The same forces that had forced large corporations—the 'shakers and shapers of the world economy' (Amin and Robins, 1990)—to restructure also enabled them to avoid national-level regulations and to leverage localities against one another in a competition for scarce capital investment. This effectively destroyed the 'spatial Keynesianism' (Brenner, 2004) of the post-war era, in which social peace had been premised upon demand-led growth and its redistribution by means of 'collective consumption goods' such as welfare payments and economic development subsidies (see e.g. Jessop, 1999, 2002; Brenner and Theodore, 2002; Brenner *et al.*, 2003; Peck and Tickell, 2002; Tickell and Peck, 2003).

The ensuing 'rescaling' of state structures to allow for 'territorial regime competition' (Burroni, 2005, p. 131) has forced both scholars and policymakers to radically rethink the nature of economic development, to shift their focus towards the supply side and 'collective competition goods' (Crouch *et al.*, 2001) and to recognize that the region represents perhaps the 'fundamental basis of economic and social life "after mass production"' (Storper, 1995, p. 191). Indeed, as McDonald and Belussi (2002, p. 5) write, 'the widespread occurrence of the phenomenon of geographical concentrations of firms has led local, regional, national and international governmental agencies to create and implement policies to boost competitiveness and to help regional economies to develop by encouraging firms to form and build up industrial districts/clusters'.

Though this sense, both of possibility and of necessity, amounts to a consensus that the region has 'mattered' even in a global economy, there has not been a full consensus on just *how* it has mattered. Studies of clusters and industrial districts have at some times rendered the concept so narrow as to be virtually inapplicable, and at other times in such a 'fuzzy' (Markusen, 2003) and 'chaotic' (Martin and Sunley, 2003) manner as to be easily twisted by powerful actors in the name of policies with little actual relevance to regional economic development (Lovering, 1999). Beyond the agreement that specialized agglomerations of firms in similar industries are a prominent feature of both historical and contemporary economies, there remains considerable debate over which agglomerations—and which aspects thereof—are most usefully incorporated into definitions of industrial districts and clusters. Our next order of business is thus simply to discuss key conceptual issues regarding the definition and governance of regional economies. We do so as background to our treatment of the implications of an increasingly 'spatial' fragmentation of production for clusters and industrial districts.

2. Clusters, districts and external economies

The term 'cluster' is often used in ways that are agnostic as regards territorial scale. The best known formulation is undoubtedly the relatively generic definition put forth by Porter (1998, p. 78) in his work on competitiveness, summarized by Belussi (2005) as 'geographically proximate group[s] of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities'. The term 'industrial district', by contrast, tends to be applied in a more specific way, with the best known uses of the term along the lines outlined by Becattini (1990, p. 38), who maintained that industrial districts should be seen as a 'socio-territorial entity . . . characterised by the active presence of both a community of people and a population of firms in one naturally and historically bounded area'. Such a definition is premised on a common social culture of workers, entrepreneurs and politicians that underpins an 'industrial atmosphere' that diffuses innovation and generates flows of external economies that remain internal to the local productive system (Bianchi, 1994).

Each of these conceptualizations has its problems. Clusters—and Porter's work thereon in particular—has scathingly been derided by Martin and Sunley (2003, p. 6) as a 'chaotic concept' that is 'deliberately vague and sufficiently indeterminate as to admit a very wide spectrum of industrial groups and specializations'. Porter's willingness to stretch the concept to any scale, they write, has reduced it to a 'world-wide fad, a sort of academic and policy fashion item' that can be used on the one hand to justify state willingness to tolerate uneven development, and on the other to justify virtually any policy of support for local industry that powerful local interests desire (see also Lovering, 1999).

Communitarian views abstracted largely from the Italian experience (and to some degree from Silicon Valley) have been chided for the opposite problem. The canonical model of the Marshallian industrial district, Zeitlin (2007, p. 4) writes, surely offers 'theoretical coherence and heuristic value', but its deep rooting in the particular experience of relatively culturally cohesive regions in Italy comes perilously close to presuming district success as a matter of definition (see also Morgan, 2004).

These opposing viewpoints, however, have tended in recent years to converge on a relatively "unified" perspective of analysis' (McDonald and Belussi, 2002, p. 63) premised on a baseline consensus captured in Maskell and Lorenzen's (2004, p. 1001) description of 'clusters [as] real-life phenomena characterised by the co-localisation of separate economic entities, which are in some sense related, but not joined together by any common ownership or management'. Rather than spending energy drawing semantic distinctions between clusters, systems and industrial districts, this unified perspective relies on what Zeitlin (1992, 2007, p. 5) refers to as a "thin", "open" model that is capable of accommodating a variety of empirically observable forms' while also leaving room for the consistent historical finding that 'stagnant or declining districts' at times 'display many of the same structural features (such as geographical localization and an extended inter-firm division of labor) as their more vibrant counterparts' (2007, p. 5). Such a model, Zeitlin (2007, p. 5) explains, begins with 'Marshall's original definition of the district as a geographically localized production system based on an extended division of labor between small and medium-sized firms specialized in distinct phases or complementary activities within a common industrial sector'. But it remains an ideal type, its purpose to accentuate real-world variation on the 'degree of localization, the size distribution . . . and the extent of inter-firm linkages' in order to better understand the interplay of district structure and the mechanisms by which external economies and increasing returns are (or are not) generated within such structures.

There is also general agreement on the types of external economies that may be associated with spatial proximity and that thus generate the increasing returns that lead agglomerations to persist in time. There are the 'allocational' (comparative) advantages that facilitate re-specialization and de-standardization of inputs insofar as firms have access to external scale economies and shared labor markets or can more easily transact with neighbouring firms (Storper, 1995). However, particularly since the early 1990s, more attention has been given to dynamic (competitive) advantages that derive from firms' greater ability to innovate insofar as there is 'localized learning' (Malmberg and Maskell, 2006). Such advantages, McDonald and Belussi (2002, p. 19) explain, occur when 'localized systems of firms . . . have strong webs of contacts, supplier linkages, innovation flows and learning processes'. Sometimes generically termed 'technological spillovers', these

derive not simply from what economic geographers refer to as ‘buzz’, or the simple effects of ‘being there’ and running into people in a similar trade. A localized division of labor also facilitates learning by interacting in ‘vertical’ production relationships, while the co-location of ‘horizontally related’ firms in overlapping industries encourages benchmarking and comparison (learning by monitoring) (Sabel, 1994; Bathelt *et al.*, 2004; Malmberg and Maskell, 2006).

These external economies do not, however, follow in any *necessary* way from spatial proximity. They depend rather upon the actual structure of relations between firms and other actors in particular regions, as evidenced by the decidedly mixed findings in empirical studies of the effects of simple localization economies on firm performance (Håkanson, 2005). Indeed as Grabher’s (1993) study of the decline of the Ruhr Valley has shown, tight social ties impede some forms of learning even as they foment others—which raises, of course, the all-important question of when and why localization economies are generated. That is, it raises questions of *governance*.

3. Governance

Even in the ostensibly too-optimistic Italian debate, it was recognized early on (its global press notwithstanding) that a simple faith in a proximity-induced cultural disposition towards trust and cooperation was hardly sufficient to automatically and sustainably generate the necessary external economies. Industrial districts, ‘*when they are successful*’, wrote Brusco (1992, p. 196—italics added), ‘are creative, display originality, are often able to discover new markets, continuously introduce incremental innovations, some of which may prove important, and enhance social mobility and worker participation’. The district in this sense, he argued, was not so much a unit of analysis as it was a ‘unit of initiative’ whose ‘development is slowed down or impeded by bottlenecks that public action must turn into opportunities’ to resolve problems the private sector would be unable to solve alone (*ibid.*). A core contribution of the Italian literature was thus the identification of intermediate institutions to broker compromise between the players in the local economy and to produce ‘local collective competition goods’ (Crouch *et al.*, 2001). These include such mechanisms of governance as: entrepreneurial, artisan and worker associations providing services to their members; local technical schools generating needed skills; credit cooperatives enabling local artisans to underwrite each others’ loans to lower interest rates by reducing default risk; and strong networks of local banks closely tied to the community lending cheaply on the basis of an extensive knowledge of clients’ trustworthiness (Brusco and Righi, 1989; Capecchi and Alaimo, 1992; Ferri, 1997; Padoa-Schioppa, 1997).

Recently, an extended period of slow growth in Italy has re-ignited the 'old debate' (Bellandi and Caloffi, 2006, p. 466) over the structural deficits of an economy heavily dependent on small firms and a sectoral specialization weighted towards relatively mature products that are particularly exposed to low-wage competition. Detailed analyses, however, have shown that these issues are hard to 'blame' on the country's reliance on industrial districts. A study conducted for the Bank of Italy, for example, made clear that although some have experienced difficulties (e.g. Prato), the overall economic performance of provinces dominated by industrial districts was superior to that of the rest of the country, whether measured in terms of employment growth, productivity growth or share of national exports (see also Rinaldi, 2005; Signorini and Omiccioli, 2005; Becattini and Dei Ottati, 2006).

At the same time, to say that the model remains relevant is not to say that its structure is static. As Italian producers have been forced even further upmarket, demands for improved innovation and quality have led to the formation of 'quasi-hierarchies' that concentrate output through lead firms functioning as 'system integrators'. Burroni (2006) shows, for example, that the most dynamic districts have been characterized by a greater presence of medium-sized firms. (This is not to say that larger firms outperformed small ones, but rather that districts with greater size heterogeneity grew faster.) Moreover, there is evidence that contracting firms are less willing to leave agreements implicit and informal but rely more often on written contracts, tier suppliers and maintain 'preferred' relationships with some of them (Innocenti, 1998). Districts are increasingly dependent on 'lead' firms that control 'groups'—multiple juridically distinct firms held together by ownership relations, whether through cross-shareholding or by all belonging to a single subject or family (Cainelli *et al.*, 2006). These shifts, though they have not undermined the need for collective institutions, have altered the functioning of those institutions—as evidenced in Rinaldi's (2005) observation that Emilia-Romagna's famed ERVET regional development agency has been forced by budget cuts and other pressures to become more market-oriented even as the region continues to rely heavily on the collective agreements and compromises between the regional government, business associations and trade unions that have historically underwritten district success.

The trajectory of relative scholarly consensus regarding the seminal American case, Silicon Valley, has parallels to the evolving understanding of Italian developments. Saxenian's (1994, p. 46) seminal comparison of developments in Silicon Valley and Route 128 in the 1980s was initially celebrated particularly for its finding that the success of the former could be traced to its denser and overlapping social networks rooted in 'an underlying loyalty and shared commitment to technological excellence' among employees and entrepreneurs. Yet even with her emphasis on an embedded territorial culture, Saxenian and much of the literature

since have been attentive also to the role that more formal institutional elements and practices have played (or failed to play) in fomenting entrepreneurship and sustaining the relevant social networks (see e.g. Bresnahan *et al.*, 2001).¹ Venture capitalists, for example, have contributed to information circulation by functioning essentially as a *keiretsu* in which the venture firm as the lead holding company often placed its own managers in start-ups to introduce knowledge of best business practices and potentially applicable technologies being developed by other start-ups in the group (Cooke, 2001a). Likewise, though many of Silicon Valley's associations were highly informal, especially early in the district's development, the negative impacts of uncontrolled growth induced an increasing reliance on formal business associations. These have served both to represent the industry to higher levels of government and to provide local collective competition goods, including management assistance services, seminars and educational activities, trade shows, standard setting and market research (Saxenian, 1994). In short, as the cluster matured, private sector actors in Silicon Valley developed associations to work with local government and to build broad, localized competence, while their counterparts in Route 128 organized primarily to secure tax incentives. Indeed, though there is certainly evidence to back the claim that differences between Silicon Valley and Route 128 include a cultural proclivity towards information sharing and entrepreneurship, this has at the least been mediated by self-conscious efforts to build institutions that support entrepreneurship and that are capable of governing conflicts internal to the district and addressing emerging external challenges.

Beyond these archetypal cases, considerable work has been done to classify different modes by which, as Markusen (1996) writes, particular regions 'manage to remain "sticky" places in "slippery" space' by identifying differences in the governance of horizontal and vertical relations between co-located firms and in the ways in which 'local collective competition goods' are produced (see also Storper and Harrison, 1991). Markusen's (1996) typology adds to more 'classic' industrial districts the 'hub-and-spoke district where regional structure revolves around one or several major corporations', the 'satellite industrial platform' comprised of branch plants of multi-national corporations (MNCs) and the 'state-centred district' where 'a major government tenant anchors the regional economy'. Or in another prominent statement, Crouch *et al.* (2001, p. 213, 221–223) point to three models by which 'local production systems' are governed, focusing in particular on different modalities by which 'local collective

¹To mention a prominent exchange, Kenney and von Burg (1999) and Saxenian (1999) have substantive disagreements regarding the relative importance to give to the initial technological specialization in explaining the different trajectories of Route 128 and Silicon Valley, but agree that institutions that sustain entrepreneurship are central to the story.

competition goods' are produced. There is again the classic 'industrial district' in which local community and associations play a strong role, but they also observe 'networked firms' in which hierarchy takes the lead in the production of collective goods (though often together with the state or associations) and also admit a residual category of 'empirical clusters' in which the market prevails. In their comparative study of local production systems in Italy, Germany, the UK and France, they find (as in the Italian case mentioned earlier) a general—but not unilinear—trend towards the 'networked firm'.

Greater attention to within-type variation has importantly shown that even local production systems that share seemingly quite similar structural characteristics (e.g. heavy reliance on small firms and external economies) may nonetheless be governed quite differently. This finding has in turn underwritten a series of blistering (and basically fair) critiques of the 'new regionalism' and clusters as a 'policy panacea' with one-size-fits-all recommendations to local governments (Lovering, 1999; Martin and Sunley, 2003). However, such critiques notwithstanding, the recognition that extensive and interrelated variation in technology, industry, local culture, organization and physical infrastructure generates unique conditions (both strengths and weaknesses) that demand individual policy approaches for each cluster does not mean that no general lessons have been drawn. Successful clusters, Zeitlin (2007, p. 9) explains, have in common that they have established some sort of 'public deliberative forum or policy network open to the full range of relevant local actors within which effective solutions to common problems can be jointly discovered'.

That is, they often rely upon what Meyer-Stamer (2004, p. 343–344) refers to as 'reflexive' locational policies that establish institutions or routines that engage in constant reflection (learning by monitoring). Such policies, he argues, differ from both the sorts of uncontroversial 'generic' policies often included in cluster initiatives that target 'obstacles to business created by the various layers of government' as well as from more demanding 'strategic' policies in which policymakers articulate a particular development path and line up the relevant local players in its support. They are exemplified, Meyer-Stamer writes, in the case of the ceramic tile cluster in Castellón, Spain. Bancaixa, Castellón's regional bank, which serves as the main source of credit for local firms and is thus notably dependent upon the sector's success for its own, hosted in 1999 a series of workshops with key cluster actors—including Italian business agencies and firm representatives—to build their knowledge base and enhance the actors' capacity for making informed strategic decisions. Importantly, the purpose of meetings was not so much to line up support for any particular policy, but rather to put companies in the know as to the intentions of others in the cluster, as this was a prerequisite to coordinating the creation of local collective competition goods in ways that recognize that 'it is not always up to [local state actors] to

decide which route companies are to follow in their effort to establish a competitive advantage' (Meyer-Stamer, 2004, p. 344). A note of caution is in order, however. Though collective governance of some variety is understood to be important to the continued success of clusters and industrial districts, such governance is not easily established. Rather, it generally builds upon existing policy networks that include collective non-governmental actors, particularly business and labor organizations, and may be limited in that emerging entrepreneurs in expanding industries often see little need to organize and seek political support, whereas mature industries may already be well organized but controlled by powerful actors more interested in maintaining rentier status than in collectively retooling to capture emergent opportunities elsewhere (Glassmann and Voelzkow, 2004; Meyer-Stamer, 2004; Whitford and Enrietti, 2005).

4. The spatial and organizational fragmentation of production

The very notion of the industrial district, Sforzi writes (2002, p. 442–443), was 'made possible by the technical divisibility of the production process' and favored by an 'expansion in demand for non-standardized goods . . . characterized by marked qualitative fragmentation and temporal variability'. However, such fragmentation generates an organizational problem. The diffuse coordination of multiple and changing phases of production across firms generates a need for 'versatile integration' of the 'knowledge that derives from technical progress (codified knowledge) and that [which] arises from practical experience (tacit knowledge)'. In the case of clusters and industrial districts, such integration has depended upon the 'territory, rather than with the company, as happens in industrial poles dominated by large size firms'. It is premised, in short, on 'local learning'—though this has never presumed (misreadings to the contrary) that particular systems ever were (or could have been) self-sufficient in terms of knowledge (Malmberg and Maskell, 2006). It was recognized early on that industrial districts' vibrancy depended very much on firms' simultaneous embedding in both local and global economies and knowledge networks (Brusco, 1994). The presumption was simply that the flexibility and tacit knowledge required to recombine destandardized inputs to meet the needs of uncertain markets was favored by social proximity and thus by spatial proximity. The resurgence of regional economies was in this sense a functional response to what might be thought of as a fundamentally *organizational* fragmentation of production. Certainly, standardized inputs could—and often did—come from elsewhere, but the need to continuously adjust and recombine the production process required that many of the relevant productive players jointly be embedded in a localized 'network within networks' (cf. Dicken and Malmberg, 2001).

However, in recent years the fragmentation of production has become far more ‘spatial’,² arguably reducing the integrating salience of territorial proximity. Jones *et al.* (2005), for example, show that growth in world trade averaged only 6.5% between 1990 and 2000 (as GDP growth averaged 3.7%), but trade in parts and components grew by 9.1% per year. This divergence has occurred across numerous industries. Lall *et al.* (2004) use East Asian and Latin American trade data to show that both the electronics and the automotive industries have been fragmenting rapidly. Data on international subcontracting in the textile industry are limited, but Graziani (2001) analyzes ‘outward processing traffic’ to and from the European Union to document a ‘dramatic’ increase in the likelihood that products were sent across borders for a phase of production between 1990 and 1995. Yeats (2001) looks at the machinery sector and finds that 30% of global manufacturing goods trade is in components and, more importantly, that trade in components grew considerably faster between 1978 and 1995 than did trade in manufactured goods overall. Ando and Kimura (2006; see also Ando, 2005) similarly find a dramatic increase in ‘vertical’ intra-industry trade in the machinery industry in the 1990s between countries in East Asia and between countries in Western Europe and Central and Eastern Europe (CEE). This trade, they write, reflects an expansion of back-and-forth transactions in vertically fragmented production processes across borders (they do find differences between the regions with greater connections between countries *within* East Asia).

These patterns suggest that what Fröbel *et al.* (1980) referred to as the ‘new international division of labor’ has been replaced by what Hutchinson (2004, p. 3) describes as a “‘newer’ international division of labor’. Where sophisticated production tasks were concentrated in the core and industrial production based on standard technologies distributed about the periphery, one can now find ‘a number of high-performing regions in both developed and developing countries carrying out tasks of varying skill and technological intensity’. The old rule of thumb in the high-wage world—hard stuff here, easy stuff there—has been challenged in two ways: (a) the development of sophisticated manufacturing capabilities in parts of China, India, Eastern Europe and Latin America means that even complex goods can more easily incorporate producers in lower wage regions; and (b) changes in organizational and information technologies have arguably reduced the difficulties of coordinating production at a distance, potentially enabling firms more easily to fragment production processes not just within

²By this we mean a greater division of processes and functions for a particular end-product *across* regions. Obviously, the organizational fragmentation of production has a spatial dimension as well. Our point is to distinguish between ‘organizational’ and ‘geographic’ distances. For data reasons, available figures often refer to countries or groups of countries, though within-country spatial fragmentation ought also to be relevant.

but also across regional economies (Ernst and Kim, 2001; Lall *et al.*, 2004; Gereffi *et al.*, 2005).

The newer international division of labour has been driven in no small part by intra-firm trade across borders: the sourcing of components by multinational companies from subsidiaries across the globe represents a large and growing proportion of world trade (Hanson *et al.*, 2005). But it is not to be forgotten that MNCs have increasingly transformed themselves into what Ernst and Kim (2001) refer to as 'global network flagships', coordinating production in ways that involve not only distant subsidiaries but also independent enterprises linked to lead actors in a variety of ways (e.g. contract manufacturers, suppliers, partners in joint ventures, Lall *et al.*, 2004). These subsidiaries are thus, in Kristensen and Zeitlin's (2004) terms, 'local players in global games'. Ando and Kimura (2006, p. 12), for example, observe that component shipments to and from Central and Eastern Europe (CEE) tend to be *intra*-firm (largely involving branch plants of Western European MNCs), whereas the dominant pattern of trade in machinery components between East Asian countries is *inter*-firm. The reason, they conclude, is that unlike in East Asia, 'local firms in CEE have not yet successfully penetrated into international production networks, partially due to the lack of agglomeration', which results in 'low local procurement' and 'inactive transactions'. In East Asia, by contrast, production even in less developed countries seems more consistently to occur in agglomerations with some local linkages. This is evidenced in studies such as Zhou and Xin's (2003, p. 129) analysis of the Beijing high-tech cluster, in which 'local firms' collaboration with MNCs provides them with vital technological and organizational training which the local firms use strategically to develop their market networks and innovative capacity in the home market' (see also Yeung *et al.*, 2006). More generally, Fan and Scott (2003) confirm that the liberalization of market activity since the 1980s led to the substantial emergence of specialized industrial agglomerations, particularly in the Pearl River Delta and around Shanghai and that clustering is associated with higher productivity. This is particularly so among industries with a 'proclivity to form vertically disintegrated networks (electronics, furniture, garments, and so on)'.

There is a way in which this is, of course, the same old thing. It has long been recognized that the resurgence of regional economies owed much to the globalization of markets. So it is no surprise that the incorporation of the developing world into those markets generates new agglomeration. Scott (2006, p. 60), for example, looks more generally at the changing global geography of the clothing, footwear and furniture industries between 1984 and 2004 to show that even though production clearly expanded a great deal in certain less developed countries, 'steady improvements in technologies of communication and transportation over the last few decades' have not undermined 'the general propensity

of these industries to cluster together'. Yet it matters that a substantial and growing proportion of the trade today is in components—that is, that it is a spatial *fragmentation* of production and not simply a spatial *dispersion* (disagglomeration). Fragmentation means that external linkages now interpenetrate territorially embedded production systems at multiple levels and in multiple ways, which potentially challenges the established imagery of clusters and districts as sticky Marshallian knots of thick localized ties in a dispersed global network. This shift has led analysts of clusters and industrial districts in recent years to reach a relative consensus that such systems are no longer well understood, in Sabel's (2004) terms, as the 'world in a bottle'. They are instead 'windows on the world' or 'open networks' (Chiarvesio *et al.*, 2006) whose prospects and functioning depend even more on the interplay between—and variation in—modalities of local and global actions.

5. From the local-in-the-global to the local-and-the-global

A consensus that territorially embedded production systems *are* becoming more open does not, however, equate to a consensus on just *how* they are opening, nor does it imply that they are all opening up in the same way. The key question has been whether and how spatial fragmentation can occur without undermining (or, indeed, even newly creating) the sorts of dynamic external economies that got such systems into the international spotlight in the first place. Interestingly, arguments to date seem roughly to focus upon the same elements—market,³ community, collective institutions—employed in the 'classic' debates as possible sources of those economies in industrial districts. They do so, however, in ways that endeavor to understand how those sources have been (or could be) transposed beyond the local dimension.

In this section, we discuss three prominent (but not mutually exclusive) ways that have been put forth in the literature as potentially allowing localized sources of external economies to be transposed from the local to the global. We begin with the 'market' as exemplified in Sturgeon's (2003, p. 199) descriptions of 'modular production networks' and his claim that they enable co-located firms to use 'the benefits of proximity to help build and manage global-scale production networks' through relatively arm's-length ties. We then turn to the possibility that translocal ethnic and epistemic communities might (paradoxically) serve both to strengthen and to open territorially embedded production systems, and we close with a discussion of the possible transposition of the third classic source of external

³'Market' here is understood in the sociological sense not simply of requiring institutions but *as* institutions. Markets are a specific type of institution in which the strategies of competing parties are coordinated by prices (Fligstein, 2001).

economies—collective institutions. This last, we argue, is not yet well understood, but it does point towards what we believe to be some of the most important—but to date unanswered—questions for future research.

5.1 *Modularity and the spatial fragmentation of production*

In an article entitled ‘What really goes on in Silicon Valley’, Sturgeon (2003, p. 199) argues that ‘value chain modularity’ can explain patterns of spatial clustering and dispersal in which some ‘specialized industrial clusters’ have used advances in information and communications technologies to become ‘command and control hubs for global networks’. In a modular value chain, Sturgeon (2002, 2003, p. 201) writes, ‘distinct breaks . . . tend to form where information regarding product and process specifications can be highly formalized’. Within nodes, ‘activities tend to remain tightly integrated and based on tacit linkages’, while external ‘linkages are achieved according to widely agreed upon protocols’ or standards and thus both permit a ‘rich flow of information between firms’ and ‘provide many of the benefits of arms-length market linkages—speed, flexibility, access to low-cost inputs’. This then encourages a division of labor between lead firms that design and market products and ‘turn-key’ suppliers that ‘contain “generic” productive capacity that can easily be re-deployed to serve a range of lead firms as conditions change. . . . The fluidity of the network is supported by the ability to handoff relatively codified product and process specifications at the inter-firm link, which has the effect of reducing asset specificity and making suppliers and lead firms substitutable’ (see also Langlois, 2002; Sturgeon, 2003, p. 202).

Such networks, Sturgeon argues (2003, p. 202), differ fundamentally from ‘more “relational” network models where lead firms and suppliers are more locked into their trading relationships . . . through social and spatial propinquity’ but nonetheless retain an essential spatial component. In the developed world, he writes (2003, p. 216), global network flagships continue to rely on industrial clusters that ‘have many of the characteristics of the “Marshallian industrial districts” of the Italian model and the captive model of Japan in that they depend on dense territorially based external economies, but with an important difference: local agglomerations are relatively open systems that can fulfill a specialized role within a larger, global-scale production network’. That role is to enable ‘informal meetings and workshops’ that bring together ‘key players’ to solve common problems. Underscoring that this is essentially a reconstruction of (more open) Marshallian nodes that coordinate global networks, Sturgeon explains (2003, p. 19) that as often as not, those common problems amount to the ‘need to better codify information, especially through standards’, so that firms in the cluster can push more economic activities towards lower cost locations.

Sturgeon (2003, p. 221) recognizes that ‘the standards that enable the codification of product and process specifications are different in different industries and are constantly evolving’ and that ‘some value chains have characteristics that are more modular than others’. But he argues nonetheless that ‘the broad [albeit contested] historical trend appears to be toward value chain modularity’, which would in turn lead production to fragment spatially even as proximity—*in certain places*—becomes more important than ever. In this view, proximity matters where it generates a particular sort of localized external economy: the leveraging of dynamically created standards that allow for the ‘rich flow of information between firms’ even across great distance via relatively ‘thin’ ties. Insofar as modularity in design is feasible, Sturgeon argues, regions in the developing world become preferred loci for production and investment even as they are excluded from global knowledge networks, accentuating what Schmitz (2004, p. 4) describes as the fundamental difference between developed and developing country clusters: both rely on ‘collective efficiency’, but the former are constrained by the need to ‘work to specifications that come from outside’, whereas those in the developed world ‘are often global leaders and . . . play a decisive role in innovation and product design’.

From this perspective, modular production, particularly in electronics and to some degree, in automotive industries, should be seen as part and parcel of the rise of ‘global suppliers’ with locations in both the coordinating clusters and in dispersed low-cost areas. Their presence in the former allows them to ‘support the set of important interactions that resist codification . . . such as co-design, prototype development and manufacturing processes validation’, while their presence across the latter allows them to ‘provide lead firms with the ability to ramp production output levels up and down without installing or idling in-house capacity’ (Sturgeon, 2003, p. 215). As a result, value chain modularity makes ‘supplier-oriented upgrading’ in developing world clusters less feasible *even as* it drives substantial foreign direct investment in the developing world by MNCs and leads to the emergence of cross-border production networks (Sturgeon and Lester, 2003). Contract manufacturers must be able to produce the same goods to exacting specifications in multiple locations, which requires that they maintain tight ties to ‘global network flagships’ in design hubs (e.g. Silicon Valley) and that they control a far-flung network of manufacturing facilities in the developing world. But concerning knowledge embodied in the modules themselves, those facilities have but a limited interest in transferring technical competence to local suppliers. Rather, they obtain only ‘simple, standardized, and slow changing components such as bearings where there is a wide market that supports adequate scale economies’ (Sturgeon and Lester, 2003, p. 29). This means, for example, that the automotive industry in China would remain a ‘veneered’ industry for a long period in which even Chinese firms that are

major suppliers to assemblers must be propped up by imports (e.g. even for wire harnesses, 85% of materials came from Japan and Korea).

5.2 *Transnational community and the spatial fragmentation of production*

In contrast to the 'thin' ties of modular production networks, recent studies of translocal communities point instead to the continued salience of 'thick' ties even between dispersed clusters in global production networks. For example, in an excellent early study of patterns of industrialization in four regions in China since efforts to integrate into the world economy began in earnest, Christerson and Lever-Tracy (1997) found that 'specialized towns' in the Pearl River Delta and areas around Shanghai 'in many ways resemble the industrial districts of the third Italy and other archetypal industrial districts. They are globally competitive in producing for fast-changing fashionable market niches', are 'marked by networks of relatively autonomous small firms ... [and] display high degrees of local government involvement in small enterprises'. Yet these specialized towns, Christerson and Lever-Tracy write, differ from the classic model of the Marshallian industrial district: 'very few factories buy parts, equipment, or raw materials from suppliers within their local village or township'. They depend instead on 'regional networks of Chinese factories and ethnic Chinese Hong Kong and Taiwanese investors, suppliers, and clients [that] display the same tendencies toward cooperation, trust and long-term relationships. These long-term relationships, however, do not seem to require spatial concentration, as family and personal ties replace daily face-to-face interaction as the foundation of trust'. Such 'ethnic embeddedness' casts 'doubt on the notion that flexible, vertically disintegrated production for fast-changing market niches must take place in spatial proximity to designers, suppliers and final markets' (Christerson and Lever-Tracy, 1997, p. 2003–2004).

More recently and influentially, Saxenian (2002, p. 184–185, 2006) has shown that where ethnic and technical communities overlap, they can 'provide a significant mechanism for the international diffusion of knowledge and the creation and upgrading of local capabilities – one that is distinct from, but complementary to, global production networks'. 'In the old industrial model', she writes, 'technical communities were primarily inside corporations'. The firm was 'seen as the privileged organizational form for the creation and internal transfer of technical know-how that is difficult to codify', and thus forced largely to internalize global production (see also Amin and Cohendet, 2004; Håkanson, 2005). However, the experience of Silicon Valley and other industrial districts has since made it clear that tacit knowledge can be transferred also 'through informal communications or the inter-firm movement of individuals', even as new transportation and communications technologies have come to 'allow even the

smallest firms to build partnerships with foreign producers and tap overseas expertise' if they can manage to 'locate foreign partners quickly and to manage complex business relationships across cultural and linguistic boundaries' (Saxenian, 2002, p. 185). In this context, Saxenian writes, Silicon Valley's status as a magnet for talented young engineers from poorer developing countries is particularly fortuitous because it generates an ample supply of first generation immigrants in possession of the language, cultural and technical skills to 'provide the critical contacts, information, and cultural know-how' to 'link dynamic – but distant – regions in the global economy'. As they go back and forth between Silicon Valley and their countries of origin, these 'new Argonauts' create 'social networks that enable even the smallest producers to locate and maintain mutually beneficial collaborations across great distances and facilitate access to foreign sources of capital, technical skills, and markets' (Saxenian, 2002, p. 185; 2006). Moreover, these budding entrepreneurs bring with them also the connections and information to ensure that these new technology regions develop 'distinctive specializations and capabilities' that are *complementary* to Silicon Valley, leaving each 'more innovative than they could be alone' (Saxenian, 2006, p. 115).

Returning entrepreneurs are aware of market opportunities and potential collaborations with partners in Silicon Valley. But they can also capitalize on low cost and technically skilled 'home-grown' talent and, particularly in Taiwan and Israel, have worked closely with local policymakers and others to reshape local institutions in ways that promote entrepreneurship. Even as information systems have improved the ability to formalize tacit knowledge (e.g. using standards), 'most new or complex products still require periodic face-to-face collaboration by technical leaders and product managers'. Such collaboration occurs generally within the context of 'epistemic' communities that learn a common technical vocabulary (Breschi and Lissoni, 2001). New Argonauts, however, 'retain an advantage in these long-distance collaborations because their shared language, culture, and professional and educational experiences help them avoid the miscommunication, cultural misunderstandings, and conflicting expectations that frequently plague long-distance work'. Transnational technical communities, in short, offer 'the essential mix of local knowledge and global connections required to initiate and motivate the experimentation and co-development that are transforming producers in once-peripheral locations into industry leaders'. They allow, say, Taiwan to quickly evolve from a maker of cheap PC clones into a leading center of global logistics and design (Saxenian, 2006, p. 327). This has led Silicon Valley producers 'no longer [to] view locating in or sourcing in India or China as an efficient way to reduce costs; instead they frequently argue that the reason to do work in those locations is to gain access to local talent'—talent they can tap because the regions have become so tied that, for example,

‘people are going back and forth between Silicon Valley and Hsinchu (Taiwan) so frequently, you can learn about new companies and new opportunities in both places almost instantaneously’ (Saxenian, 2006, p. 328, 395).

5.3 *The limits of modularity versus the contingency of culture versus open networks*

The concept of the transnational community as a means to interpret an even more spatially fragmented global production regime is attractive not least because it so cleanly transposes a ‘classic’ understanding of localized learning to the global dimension. Such communities clearly exist and are not to be discounted. But it must not be forgotten that they are also highly contingent. ‘Thick’ ties at a distance may drive an exchange of information and lead regions to develop complementary specializations that leave each more innovative and/or productive than they could be alone, but an ethnic diaspora is for the most part something that particular regions either have or do not.⁴ Modularity and standards, by contrast, are attractive precisely because they obviate the need for such thick ties even as they allow firms to leverage locally generated external economies across global networks. But they too offer *at best* a very partial picture of the implications of an increasingly spatial fragmentation of production for territorially embedded production systems. As Sabel and Zeitlin (2004, p. 394) point out, standardization can ‘become a barrier to systematic innovation and lock component manufacturers into a potentially obsolete product architecture’. Even Sturgeon, they note, ‘presents such “modular production networks” as a new and potentially dominant form of industrial organization’ but nonetheless ‘concedes that such contract manufacturing accounted in the year 2000 for just 13 percent of the market for circuit-board and product level electronics’ (see also Brusoni and Prencipe, 2001; Faust *et al.*, 2004; Sabel and Zeitlin, 2004, p. 395; Brusoni, 2005).

If transnational communities are relatively rare and if it is more the exception than the rule that external economies encapsulated in modules and standards allow firms in Marshallian nodes to control global networks, what then are the more general implications of the spatial fragmentation of production for territorially embedded production systems in the high-wage world? The question has been attacked with some vigour in the literature on the Italian industrial districts

⁴This does not then mean that there are no implications to be drawn from accounts that point towards ethnic embeddedness as enabling regional economic development. To be sure, both Christerson and Lever-Tracy (1997) and Saxenian (2002, 2006) make abundantly clear that translocal community is only an enabling condition and explicitly argue that local institutions remain important. But the implications they draw are limited to cases where there is an ethnic diaspora upon which to draw.

in ways that are particularly instructive for our purposes. The Italian districts, after all, are often in industries subject to competition from the low-wage world and neither tend to be in the sorts of industries in which ‘modular production networks’ are particularly salient, nor do they generally benefit from patterns of transnational migration. Drawing on an extensive survey of firms in 45 districts across a range of industries, Chiarvesio *et al.* (2006, p. 24) report a key initial finding: there has been ‘a profound transformation in the structure of Italian industrial districts. Leading firms are enlarging the boundaries of their supply base and increasingly investing in proprietary and semi-proprietary commercial networks at an international level’. At the same time, ‘internationalization is not necessarily synonymous with good performance: to be competitive, “open networks” need to couple an international presence with a mix of innovation efforts in terms of product, process, and technologies’.

The distinction between a district characterized by ‘open networks’ as opposed to the simple devolution of production abroad is illustrated in Sammarra and Belussi’s (2006b) comparison of two ‘fashion-led’ industrial districts in Italy that have devolved substantial production to Eastern Europe in quite different ways and with quite different effects (see also Sammarra and Belussi, 2006a). The process in Vibrata–Tordino–Vomano (VTV) took place amid a ‘real “price war” among district firms’. The district saw a ‘severe selection of district firms’ as delocalization took the form of ‘replicative relocation’ (Sammarra and Belussi, 2006b, p. 15). That is, ‘activities still kept within the district are not intrinsically different from the ones relocated abroad’ and relations with foreign subcontractors, though typically stable, are ‘characterized by a low degree of interaction with respect to the work to be done’ (Sammarra and Belussi, 2006b, p. 30). Firms in the Montebelluna sport shoe district likewise began in the 1990s to relocate or internationally subcontract simple and labor-intensive phases like shoe assembling and saw firms in the region reduce their local labor force by more than 10%. But in contrast to the VTV district, Montebelluna remains generally vital, ‘has not lost its spatial identity’ and is still ‘rich [in] selective manufacturing activities and specialized suppliers’ (Sammarra and Belussi, 2006b, p. 20). The difference is that Montebelluna ceded only the ‘more standardized “tail” of production and held onto the ‘most valuable and creative phases of the sportswear filiere’. It has done so, they argue, in part because firms in the region have continued to invest in R&D, but also because the externalization of productive phases has been accompanied by a considerable transfer of resources and personnel abroad, including the opening of directly controlled plants (many in an emerging cluster in Timisoara, Romania) and the co-migration of Montebelluna subcontractors, some of which had suddenly lost their ‘outsourced orders’ and

decided either to move production abroad or to move abroad to manage affiliated firms (Sammarra and Belussi, 2006b, p. 19).⁵

Beyond the recognition that spatial fragmentation or offshoring, which the Italian literature refers to as ‘delocalization’, can either be a sign of stagnation or represent what the global value chain literature refers to as ‘functional upgrading’, there remain some very fundamental questions. De Arcangelis and Ferri (2005) report that the Italian districts have tended increasingly to sell ‘instrumental’ rather than ‘final goods’, finding a correlation between districts’ growth in exports of machinery and the degree to which districts have made recourse to delocalization. This surely reflects functional upgrading, but it is not unproblematic. The Italian dominance of many light capital goods segments has rested on complementary relations with producers of final goods for testing of prototypes, familiarity with market trends and so on (e.g. tilemaking machinery *and* tiles are made in Sassuolo; textile machinery *and* textiles are made in Biella). It is hardly obvious that this particular intersectoral balance will maintain itself over time. It is put into play in the first instance, as Italian final goods producers may be wary of sharing information on trends that ultimately helps competitors elsewhere; in the second instance, as Italian final goods producers themselves delocalize production and lose local knowledge of the particularities, problems and interactions between stages of a fragmented production process; in the third, as machinery that has been exported is exposed to ‘reverse-engineering’, which can generate new low-wage competition for machine producers themselves (Russo, 2006).

There is thus a need to better map the implications of different ways in which such systems become tied to external actors and, by consequence, to understand the scope of local governance mechanisms to influence the character of those ties. The Italian literature has begun to ask whether sources of competitive advantage that owe to local collective organization can be transposed beyond the local level, with Bellandi and Caloffi (2006, p. 466) usefully drawing a distinction between ‘strategies of local reaction’ and ‘strategies of internationalization’.⁶

These two sorts of strategies, Bellandi and Caloffi (2006, p. 466) explain, are not necessarily opposed but combine in ‘different ways in different local contexts and in different types of district production systems’. The principles underlying

⁵Though there do clearly seem to be relatively complex ties between many Italian firms and firms in Romania, the level of ‘districtualization’ of the Timisoara local productive system is not to be overestimated. It is still highly dependent on Italian capital and expertise and ‘horizontal’ linkages (Cutrini, 2003; Montagnana, 2005).

⁶Outside the Italian context, see especially Nadvi and Halder (2005) on ties between a German (Tuttlingen) and a Pakistani (Sialkot) surgical instrument cluster, as well as the edited volume by Schmitz (2004) that brings together cluster and global value chains approaches.

‘strategies of local reaction’ are essentially those that have long enabled and encouraged networks of small and medium-sized producers to compete in global markets through quality, innovation and rapid response; they point towards the sorts of local collective competition goods discussed in Section 3 of this article. Strategies of internationalization, by contrast, capture the hope that local institutional fonts of external economies might somehow be transposed beyond the local. Such strategies are not simply about ‘the “de-localization” of phases from a district to parts abroad’, but refer rather to how that takes place, that is, to encouraging positive sum exchange by encouraging ‘long-term relations and commercial, socio-cultural and institutional exchange between systems that are located in different national contexts but that are of similar or complementary profile in terms of production activities and processes of innovation’. Put in terms of the comparative case study noted earlier, the question is: what can be done in terms of local governance to lead industrial districts to internationalize more like Montebelluna and less like VTV?

Unfortunately, the answers to that question are today preliminary at best. But some progress has been made in identifying what must be identified. Bellandi and Caloffi (2006, p. 472) note that ‘firms and associations of firms’ can collaborate with state actors to create collaborative networks that also include actors in the area of ‘re-localization’. The prerequisites for such a strategy have been taken, for example, by the union of industrialists of Treviso (where Montebelluna is located), which has opened an office in Timisoara (Fumagalli, 2006), and by the Italian Association of Tilemaking Machinery producers, which maintains a presence in the tilemaking cluster in Castellon, Spain (Meyer-Stamer *et al.*, 2004). Caloffi (2006, p. 3) describes ‘trans-local public goods’ more generally to include such things as the training of people to serve as linguistic, technological, cultural or managerial ‘interfaces’ between systems (that is, figures cognate to Saxenian’s ‘new Argonauts’) and the establishment of ‘rules that facilitate a certain degree of reciprocity in exchange’. The intrinsically relational character of such public goods suggests also that they will in many cases take the form of what Sabel (2007, p. 44) refers to as ‘new public services’. These differ from traditional public goods in that they ‘are so idiosyncratic and mutable that they have to be in effect co-designed by client users if they are to be useful at all’. That is, they are the sorts of services that do not merely support networks. Rather, they build and re-build ‘networks of networks’ through ‘new pragmatic disciplines’ of ‘learning by monitoring’ that consist of practices such as collective benchmarking and procedural quality assurance standards that can ‘facilitate cooperation in design and production across organizational and geographical boundaries by making tacit knowledge explicit’ (Zeitlin, 2007, p. 17; see also Helper *et al.*, 2000; Sabel, 2004, 2007).

6. Conclusion

We began this review with the observation that the ‘resurgence of regional economies’ a quarter century ago owed on the one hand to structural changes in the global economy that had created new possibilities for local action, and on the other to inadequacies and inattention at other levels that had made autonomous local action even more necessary for regional prosperity. The crisis of the Fordist state manifested itself in many ways, but important among these were an end to ‘spatial Keynesianism’, the devolution in many places of policymaking autonomy (if not resources) to local and regional actors, and the ensuing advent of territorial regime competition (Brenner, 2004; Burroni, 2005). In the meantime, the large vertically integrated firms that had been such an engine of post-war growth were themselves in crisis as greater technological and market uncertainties left them unable to meet demands for greater flexibility and more rapid innovation without ‘fragmenting’ even complex production processes across multiple specialized organizations. An explosion of studies of clusters, industrial districts and the like ensued, coming to the conclusion that what fragmentation had taken apart was often most effectively reassembled in localized industrial communities that managed somehow to institutionalize mechanisms for collective decision-making and for the creation of ‘local collective competition goods’ (Crouch *et al.*, 2001).

Today, as Herrigel (2007, p. 2) has observed, there is new reason to question whether industrial communities must be ‘located in specific and discretely bounded territories’ or that social and territorial proximity necessarily overlap. What had been a relatively territorially circumscribed, and thus fundamentally organizational, fragmentation of production has acquired a more pronounced spatial dimension in recent years as even complex processes have been spread across even more geographically disparate locales. And while this shift has certainly not rendered irrelevant the localized learning and other territorial sources of external economies so central to debates over the prospects and functioning of territorially embedded production systems in a globalizing world, it has raised important new questions. In contemporary analyses, the *necessity* of local action remains a constant—the rescaling of the nation state has not been undone. Yet the *possibilities* of local action are today being rethought to account for the consensus that clusters and industrial districts have increasingly become ‘open networks’ (Chiarvesio *et al.*, 2006). Local collective competition goods remain as important as ever. But their nature and production must be made consistent with a world with ever less space for the classic image of the industrial district as a closed system of firms with a minimal number of points of direct contact with external actors. The multiplication of external relations up and down the value chain has

engendered new constraints and opened new possibilities that firms and academics are only beginning to identify.

The key issue, we have argued, is to understand whether and how spatial fragmentation can occur in ways that do not undermine (or, indeed, that newly create) the sorts of dynamic external economies that got such systems into the international spotlight in the first place. We have suggested that the answers put forth to date have focused upon the same elements—market, community, collective institutions—that dominated the ‘classic’ debates as possible sources of those economies. However, going beyond the perspective of a single specialized cluster to incorporate inter-sectoral and inter-cluster linkages, they have done so in ways that seek to transpose those sources beyond the local dimension. Sturgeon (2003, p. 199), for example, argues that ‘modular production networks’ enable co-located firms to use ‘the benefits of proximity to help build and manage global-scale production networks’ through relatively arm’s-length ties, while Saxenian (2002, 2006) emphasizes instead that ethnic and epistemic identities need neither be bounded in space nor presumed irrelevant to the flow of knowledge even between distant locales. Investigation of the last classic source—the transposition of the local generation of collective competition goods to incorporate the global dimension—is somewhat less developed than are studies of modularity and transnational community (although even these are quite preliminary). But particularly because this is the form most available to the majority of sectors and districts and suggests a broad range of translocalization strategies, it represents in our view the most pressing issue for future research.

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