European Planning Studies, Vol. 11, No. 5, July 2003

Carfax Publishing
Taylor & Francis Group

Competition and Cooperation in Industrial Clusters: The Implications for Public Policy

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[Paper first received, June 2001; in final form, November 2002]

ABSTRACT *Alfred Marshall believed that, while the benefits of clusters resulted from cooperation between firms, competition was an important driving force. In contrast, contemporary theories of clusters place most emphasis on collective action. This article seeks to distinguish processes of competition and cooperation within clusters, through a critical reading of different theoretical approaches. This distinction has important implications for the scale and nature of public policy. An emphasis on competitive processes implies a more macro-economic role for public agencies in seeking to raise investment in innovation while the fostering of cooperation implies measures to support decentralized public–private research collaborations.*

1. Introduction

For Alfred Marshall, the concentration of firms in close geographical proximity within 'industrial districts' allowed all firms to enjoy the benefits of large-scale industrial production and of technical and organizational innovations. While the benefits resulted from cooperation in knowledge creation and innovation, Marshall believed it was competition which drove industrial districts. The importance of localization of production within industrial districts is that, by providing opportunities for entrepreneurs to specialize and for the industrial district as a whole to secure internal economies of scale and external benefits denied to isolated firms, it improves the competitive position of individual firms. Collective action may assist the prospect of success of individual firms but there is the risk it blunts initiative and inhibits competition. In contrast to Marshall, contemporary theories of industrial districts or clusters place great emphasis on collective action. To some extent, competition is now a neglected consideration within theoretical conceptions of clusters.

This article seeks to distinguish processes of competition and cooperation within clusters, while emphasizing that they are not polar opposites, and to identify the implications for the scale and nature of public policy. The striking feature of different theories of clusters is their diversity. Some common ground is established but the various theoretical approaches draw upon an immensely wide set of arguments in establishing the advantages to firms locating within a cluster, the extent to which these advantages arise only in local concentrations of

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ISSN 0965-4313 print/ISSN 1469-5944 online/03/050521–12
DOI: 10.1080/0965431032000088489

activity, and the balance between competition and cooperation in the generation of these advantages. Moreover, while each of the theoretical traditions has some policy implications, none of them provides much practical guidance in the formulation of economic development strategies.

In this article, clusters are defined as by Porter (1998) as "geographic concentrations of interconnected companies and institutions in a particular field [which] encompass an array of linked industries and other entities important to competition" (Porter, 1998, p. 78). Needless to say, this definition prompts questions of what is meant by a number of further terms, such as 'geographic concentration', 'field' or 'industry', and 'competition'. Some of these, particularly the latter, are returned to later. Finally, it should be noted, as has already been the case, that terms such as 'clusters', 'industrial districts' and 'new industrial districts', 'new industrial areas' and 'milieux' will be used almost interchangeably despite the awareness that they often emerge from very different theoretical contexts.

The article is organized as follows. Section two reviews the different theoretical approaches to clusters. Five different traditions are identified but it should be stressed that a number of arguments overlap. The boundaries between these schools of thought are therefore somewhat artificial and other writers will no doubt draw them elsewhere. In addition, this review is necessarily very selective since the literature is voluminous. The focus here is upon key or representative contributions. Section three starts by identifying four issues central to the appearance and development of clusters. The first three issues—the sources of advantage to firms within clusters; the degree of 'localness' of clusters; and the balance between competition and cooperation—are discussed further in this section. The fourth issue—the implications of different theories for public policy—is considered in section four. Finally, section five has a brief statement of the key conclusions.

2. Industrial Clusters: A Critical Reading of Different Theories

2.1 Standard Agglomeration Theory, From Marshall Onwards

Marshall, in his writings on Sheffield, Lancashire and other British regions, viewed the main source of external economies as the 'commons', the infrastructure and other services from which each individual firm in an industrial district might draw (Marshall, 1921). Examples include, in modern terminology, improved job search and job matching, more favourable access to capital finance and inter-firm labour migration. The availability of such common resources to a number of firms then enhances their size and diversity as both capital and labour are attracted to such areas to exploit the larger markets for their services. This in turn leads to reductions in factor prices and/or increases in factor productivities. These are the ways in which the external benefit to firms of a location in the industrial district manifests itself. Unit production costs will be lower within the industrial district than outwith it.

Parallel to his studies of industrial organization, in the various editions of his *Principles of Economics*, Marshall (1890, 1920) helped develop what was to become standard agglomeration theory. This was then built upon subsequently by a number of writers. For example, Scitovsky (1954) identified a further category of 'pecuniary external economies', Perroux (1955) contributed his famous theory of growth poles, and Chinitz (1961) applied the notion of agglomeration economies to the economic development of New York and Pittsburgh. More recently, Krugman (1991, 1995) has emphasized the importance of increasing returns as a favourable condition for the development of external economies. Porter (1990) can also be understood as belonging to this lineage in the sense that external economies make up many of the key relationships within his famous 'diamond'.

Standard agglomeration theory provides an explanation of why firms might cluster

together, sharing a 'commons' of business services and a diversified labour force, and forming extensive local linkages with other firms. However, it conforms to neo-classical theory in that local economies are viewed as collections of atomistic businesses, aware of one another solely through the intermediation of price/cost signals. Firms continue to compete with each other although Marshall was keen to warn of the risks that firms' collaboration, in the development of shared inputs, risked blunting competitive forces.

2.2 Transaction Costs: The 'Californian School'

In the writings of the 'Californian school', the disintegration of productive systems leads to an increase in firms' transaction costs (Scott & Storper, 1986; Scott, 1988; Storper, 1989). Changes in market and technological conditions have led to increased uncertainty and greater risks of over capacity (of labour and capital) and of being locked into redundant technologies. The response of deepening the organizational division of labour leads to an increase in the number of formal market transactions external to the firm. There may also be an increase in the unpredictability and complexity of transactions. The costs of carrying out certain types of transaction—especially those where tacit knowledge is important or trust is required and thus complete contracting is impossible—varies systematically with distance. Thus, agglomeration is the result of the minimization of these types of transactions costs in a situation where such minimization outweighs other production cost differentials.

The Californian school sought to explain observed agglomerations of economic activity. The argument centred on the localization of traded interdependencies—or simple input–output relations—but this is at best only a partial explanation, not least in being unable to distinguish convincingly between 'good' and 'bad' agglomerations. Agglomerations have been found in high wage, technologically advanced industries and low wage technologically stagnant ones alike while there are technologically dynamic agglomerations which lack the dense inter-firm linkages and coordinating institutions of a 'new industrial district'.

Nor is it clear whether markets will succeed in coordinating transactions within clusters (Cooke & Morgan, 1993). The management of traded interdependencies is exactly what we think of as the business of markets but there may nevertheless be market failure. Thus, certain "transactions—in labour markets, in inter-firm relations, in innovation and knowledge development—tended to have points of failure in the absence of appropriate institutions" (Storper, 1995, p. 199). With this concern for the institutional arrangements within clusters, the 'Californian school' came to share certain of the arguments of the flexible specialization theorists who are discussed next and the institutional and evolutionary economists who are considered shortly.

2.3 Flexible Specialization, Trust and Untraded Interdependencies

While neo-classical economics views firms as atomistic businesses, aware of one another only through formal market signals, modern industrial district theory emphasizes the interdependence of firms, flexible firm boundaries, and the importance of trust in creating and sustaining collaboration between economic actors within the districts.

These themes arose first in the literature on flexible specialization in the 'Third Italy' (Brusco, 1982) but was later extended to Baden-Würtemberg and other regions (Piore & Sabel, 1984). The sources of flexibility lay in collaborative networks of (mostly) small firms and supporting institutions. These networks permitted the establishment of trust between actors, a crucial argument within most contemporary approaches to clusters. The reasoning is that firms within networks of trust benefit from the reciprocal exchange of information—particularly tacit information that cannot be codified—but are simultaneously bound by ties of

obligation which regulate behaviour. Trust thus reinforces mutually beneficial relationships between firms. The implicit assumption is that trust is more likely to be sustained in geographically concentrated networks than more dispersed ones (Belussi, 1996).

Firms may cooperate in seeking to get new work and may bid together on large projects. They may form consortia to access cheaper finance. They may jointly purchase materials and conduct or commission joint research. They may plan together and receive technical, financial and other services from the 'commons'. However, despite all these examples of cooperative relationships, founded on or reinforced by trust, because they remain privately owned businesses, firms within clusters continue to compete, with one another and with other firms, often more on quality than price.

The embedding of economic relations into a wider social framework appears to be most common where business activity is conditioned by local politics, religion and close kinship and friendship relationships. Thus, "it is probably not a coincidence that the most successful districts have tended to be the most racially and culturally homogeneous" (Harrison, 1992, p. 479). Equally, national (or other broader) economic, legal and policy traditions are relevant. The development of inter-firm cooperation is more likely in some countries, such as Italy, than in others, such as the UK, because of differences in the operation of labour markets and competition policy.

According to theorists such as Granovetter (1985), trust arises from the 'digestion' of experience. Trust accumulates from repeated interactions between firms and other actors in which they contract and recontract, formally and informally, strike deals, and help each other out at times of crisis. Trust results from a process of learning through experience which actors can be relied upon. Personal contact facilitates such repeated interactions and this in turn is likely to depend on proximity.

This focus on untraded interdependencies is very different to the transactions costs approach to agglomeration. The latter concerns the cost minimization of traded relations while untraded interdependencies point to wider processes of the optimization of non-market or non-contract exchanges (Raco, 1999).

Finally, it is important to note that untraded interdependencies can not only facilitate effective collective learning and action but also impede it. Especially where familiar conventions become well established, 'sclerosis' can set in. Areas can become locked into outdated and inferior technologies and institutions.

2.4 Innovative Milieux: The GREMI Group

There have been various schools of thought on the relationship between innovation, high technology industry and regional development. One line of enquiry has focused on the conditions for the establishment and growth of such high technology complexes as Silicon Valley and Route 128. While many factors have been identified, the most discussed is the role of local research intensive universities, Stanford in the case of Silicon Valley and MIT in the case of Route 128. A large literature on the relationship between innovation, research universities and regional development has been spawned (Saxenian, 1985; Castells & Hall, 1994; Storper, 1993).

Another direction of research has been in pursuit of the notion of an innovative milieu, the key theoretical concept of the GREMI (Groupement Européen des Milieux Innovateurs) group of regional economists (Aydalot & Keeble, 1988; Camagni, 1995). Clustering enables firms to benefit from a 'collective learning process', operating "through skilled labour mobility within the local labour market, customer–supplier technical and organisational interchange, imitation processes … and informal 'cafeteria' effects" (Camagni, 1991, p. 130). This process draws upon "an intricate network of mainly informal contacts among local actors … made up

of personal face-to-face encounters, casual information flows, customer–supplier cooperation and the like" (Camagni, 1991, p. 131).

However, there is a certain ambiguity as to what precisely milieux are. By some readings, a milieu is a set of institutions, practices and rules which provide a framework for development which guides and coordinates the activities of innovators. By other readings, a milieu is a network, of firms, research institutes and policy-makers, which provides the necessary coordination for successful innovation.

These different interpretations, together with the very intangibility of milieux, are the sources of major intellectual problems. Thus, the GREMI group "has never been able to identify the economic logic by which a milieu fosters innovation. There is a circularity: innovation occurs because of a milieu, and a milieu is what exists in regions where there is innovation … they do not specify the potential mechanisms and processes by which such milieux function" (Storper, 1995, p. 203).

2.5 Institutional and Evolutionary Economics

A further approach derives from institutional and evolutionary economics (Nelson & Winter, 1982; Amin & Thrift, 1992; Amin, 1999). Technological change is seen as path dependent since it involves sequenced, and not simultaneous, choices which are often irreversible. There is a spatial dimension to such choices with interdependencies between organizations being both traded and untraded. The latter include rules and conventions which shape the development and communication of knowledge between local actors. Given that there are strong irreversibilities, observed clusters are to some extent accidents of history, reflecting the impact of past choices, although their development is also influenced by the appearance and growth of reinforcing institutions.

This approach is potentially very fruitful in understanding the nature of competition in contemporary capitalism (Dosi *et al.*, 1987). Standard economic theory conceptualizes competition as the location on a production possibility frontier that maximizes a firm's comparative advantage given an existing set of factor prices. Competition is a state, characterized by the absence or minimization of monopoly rents (Nickell, 1996). In contrast, drawing upon an Austrian perspective, institutional and evolutionary economics views competition as a process of economic change, spurred by constant technological change. Thus, if innovation is the driver of competition, a firm (or locality) may possess technologies which are superior to those of others regardless of the level of factor prices.

This distinction has come to be known as that between 'weak' competition and 'strong' or Schumpeterian competition (Hudson, 1999). Weak competition involves the search for lower cost means of producing existing goods with existing technologies. Strong competition is a strategy which involves the creation of new goods or of new technologies to produce existing goods.

3. Areas of Agreement and Disagreement

The various theoretical approaches to the appearance and development of clusters reviewed earlier can be classified according to the answers they provide to a number of questions. Firstly, what are the sources of the advantages to firms locating within a cluster? Secondly, to what extent do these advantages accrue only in local concentrations of economic activity? Thirdly, what is the balance between competition and cooperation in the generation of economic advantages to firms in clusters? Fourthly, even if the theories concerned do not address policy issues, as is often the case, what are the policy implications of the theoretical arguments?

Table 1. A schematic representation of the principal theories of industrial clusters

	Sources of advantage	**Degree of 'localness'**	**Competition and cooperation**	**Policy implications**
Standard agglomeration theory, from Marshall onwards	Firms share a 'commons' of labour supply, infrastructure, and business services	External economies most likely where common services are concentrated locally—but not confined to these circumstances	Advantages to firms in clusters derive from cooperation but firms continue to compete	No obvious policy implications unless markets fail to provide the 'commons'
Transaction costs: the 'Californian school'	Transaction costs are lower for firms in clusters, a cost advantage which is assumed to outweigh any increase in production costs	Certain transaction costs reflect the maintenance of personal contact; these will usually vary with distance	Some transaction costs can be reduced by cooperation but, in general, this is not important	Markets may typically be assumed to coordinate transactions successfully within clusters
Flexible specialization, trust and untraded interdependencies	Firms within networks of trust benefit from the reciprocal exchange of information	Trust is more likely to be sustained in geographically concentrated networks	Firms within clusters compete with each other, often on quality rather than price, but there are strong cooperative relationships	Social and familial networks are key to the development of trust but national economic, legal and policy norms are relevant
Innovative milieux: the GREMI group	Milieux provide the frameworks and necessary coordination for successful innovation	Institutions and practices conducive to innovation depend partly on personal contact; thus more common within localities	Balance between competitive and cooperative firm relationships not well specified but presumption that the latter are important	Policy-makers have a role in forming and supporting networks of firms, research institutes and so on
Institutional and evolutionary economics	Clusters reflect the impact of past choices and the subsequent development of reinforcing institutions	Particular trajectories can develop at a number of spatial scales	Technological change, along particular paths, is a driver of competitive processes	Policy interventions are only one—and frequently a minor—determinant of how innovative trajectories develop

A schematic summary of the answers which the different theoretical traditions would give to these four questions is presented in Table 1. The first three issues are considered further in this section, the implications of different theories for public policy in the next section.

How are we to explain the continued, or even increased, importance of spatial industrial specialization at a time of improved global transport and communications and ever more sophisticated skills of organizational management? Apart from a few devotees to one school of thought or another, most writers would concede that the explanation lies in both traded and untraded interdependencies—while differing in the relative weight to be given to the two. Certainly, arguments about 'learning regions' and 'learning firms', which frame much of the current discussion about clusters, draw upon both (Morgan, 1997; Hudson, 1999). Agglomer-

ation contributes to learning through traded and untraded interdependencies. Market transactions between local economic actors are part of the webs by which information is developed and exchanged. Untraded interdependencies are even more closely linked to information flows.

This is not to say that all the arguments underlying clusters are compatible with each other. There may be conflicts between different cluster conditions. For example, the presence of agglomeration economies may actually represent a deterrence to investment in the strengthening of social networks and trust between local actors. Thus, there is a disincentive for firms to invest in human capital where labour is open to poaching. Where benefits are easily externalized, there is a disincentive to invest.

The 'rediscovery' of the region as an important spatial scale (Storper, 1995) has prompted arguments that the region or locality is often a crucial part of the 'supply architecture' of technological and organizational innovation. However, agglomeration is not always part of the supply architecture of innovation. Nor are untraded interdependencies, whether spatially concentrated or not, static. More research is needed to identify the conditions in which untraded interdependencies do determine location and those in which they are crucial to innovation but do not strongly influence location.

Another problematic issue is that advocates of the importance of collective learning can be almost cavalier with regard to the spatial scale at which it takes place. A number of writers have pointed out that ideas which originated with national systems of innovation (Lundvall, 1992) have now been transferred wholesale to the regional or sub-regional level (Mackinnon *et al.*, 2000).

Furthermore, it is crucial that regional networks, however significant, not be emphasized at the expense of wider State strategies and interventions. The latter may be key to the survival of clusters since it may be that "strong embedding is simply not sustainable under the onslaught of competitive pressures from larger, more powerful, more distant and impersonal economic forces" (Harrison, 1992, p. 479). Institutional cohesion does not necessarily generate successful regional development, as witness the north-east of England (Hudson, 1995). There are also instances of the opposite case, of places which display economic dynamism but lack any of the important features of learning regions. An example, again from England, is the M4 corridor.

Various writers, such as Coe and Townsend (1998) and Gordon and McCann (2000), have questioned the existence of local clusters, arguing that classic cluster effects will often be observed at the regional, or frequently much larger, scale. Whatever the favoured approach, none of the exploitation of external economies, the minimization of transaction costs, or the operation of social or organizational networks need be, or is, confined to local levels. Moreover, the incidence of larger scale effects can be expected to increase as new communications technologies reduce a whole variety of spatial distance transactions costs. Amin and Thrift (1992), in a case study of the City of London, argue that over the last 30 years it has ceased to be a 'conventional' Marshallian industrial district. Instead, it has become what they term a 'neo-Marshallian node', still a localized complex but simultaneously part of a network of financial services which operates globally.

However, Storper (1995) has suggested that the existence of long distance linkages is not in itself a contradiction of (most) cluster models since typically it is not required that the degree of localism is complete or even very high but is simply sufficient to generate the necessary benefits of agglomeration. This line of argument is not terribly convincing, not least because it is not specified what degree of localism is 'sufficient'.

There are further problems of the survival of local clusters in the face of intensified global competition. Efforts to develop local institutional capacities may yield short lived benefits if similar competitive pressures are in operation elsewhere. Indeed, this type of focus may simply

lock areas into a vicious spiral of competition for mobile capital. Nor does spatial concentration in itself mean that social networks "are any less prone to misunderstandings, competitive pressures or deceitful and untrustworthy behaviour … communicative interaction does not necessarily lead to mutual understanding, shared norms and values and collaborative agendas" (Raco, 1999, p. 964).

The sources of advantages to firms within clusters and the degree of 'localness' of clusters are bound up with the further issue of the balance between competition and cooperation within clusters. There is no necessary contradiction between collaboration and competition. Collaboration between firms can help them become more innovative as a means to capturing or sustaining competitive advantage. Thus, "the benefits of collaboration can overcome the negative externalities of corrosive competition and diseconomies of scale" (Raco, 1999, p. 965). Particularly for small firms, cooperation in the establishment of marketing or training facilities or of research and product design laboratories may facilitate the realization of collective external economies of scale which in turn yield efficiency gains. Collective economies provide "a way of resolving the conflict that can exist between productive and allocative efficiency by simultaneously allowing small firms to gain access to economies of scale whilst enhancing competition in the product market" (Oughton & Whittam, 1997, p. 11).

The importance of trust based behaviour is that it reduces the risks of collaboration between firms, specifically the risk of opportunism. However, there are immense problems of creating and maintaining trust given mounting pressures of competition which may tempt firms to try to appropriate collective assets. While collaboration provides opportunities for firms to pool resources in purchasing, marketing or training, the overriding imperative will remain that of being competitive and innovative so as to meet the challenges of other firms, including other local firms, in the market. Essentially, the decision to develop closer relations with others then becomes a trade-off between the benefits of mutual collaboration and the potential loss of competitive advantage.

These various arguments stress the tensions between cooperation and competition within clusters. However, in some circumstances, there may be a mutually reinforcing positive relationship between the two. Competition between firms may provide the market disciplines which ensure the continued competitive advantage of a cluster and, in turn, attract new firms to it. This is the hypothesis advanced by Keeble and Nachum (2001) in their comparison of the economic performance of business service firms in a central London cluster with those in dispersed locations in East Anglia and south-west England. The growth rate of business service firms is significantly greater in clustered firms while the number of identified competitors is also greater. Keeble and Nachum (2001) suggest that active local competition may be instrumental in the ability to meet the demands of sophisticated and discriminating customers and thus reproduce the competitive advantage of the London cluster.

4. Policy Implications

These theoretical considerations have important implications for the scale and nature of public policy although, as will be clear very shortly, cluster theories do not necessarily provide much detailed or specific guidance in the construction of economic development strategies.

First of all, as Cooke (1998) illustrates, different national and regional economic, legal and policy traditions strongly influence the range of policy options. Cooke distinguishes three different policy models. In the grassroots model, innovation is initiated from within the locality. Research is generally highly applied or near market and the level of technical specialization is low. Examples of this model are the technology centres for support of small and medium sized enterprises (SMEs) in Japan and the Italian industrial districts. Silicon

Valley, although obviously a high technology complex, is a 'grassroots' system in that systemic coordination comes from within the district.

In the network model, innovation is driven at different levels, local, regional, State and supra-national. System coordination will generally be high, because of the number and diversity of stakeholders. Research is mixed, with both pure and applied, 'blue skies' and near market activities, targeted to large and small firms. Innovation is funded within a reasonably formal framework involving banks, firms and government agencies. The classic example is Baden-Würtemberg.

In the dirigiste model, innovation is driven from outwith the region by central government policies. The level of coordination is very high. Research is often basic or fundamental and targeted on the needs of large, possibly State owned, firms, both in and outwith the region. Funding is largely centrally determined even if State institutions have devolved agencies in the regions. The best example is France.

Of the different theories of clusters reviewed earlier, neither standard agglomeration theory nor the minimization of transaction costs appear to imply a significant role for policy. In their different ways, both of these approaches suggest that firms will reap mutual advantages from co-location. They can internalize external economies or reduce transactions costs themselves by locating together. Since it is in their own self-interest, we might expect to observe what Marshall (1921, p. 600), in a discussion of the Lancashire textile industry, called the 'automatic cooperation' of firms. There is thus no necessary implication that the State, at whatever level, has any role to play in encouraging the further concentration of firms and other organizations. Within these schools of thought, any policy intervention presumably stems from evidence of some market failure, of markets failing to provide the 'commons' or of failing effectively to coordinate transactions within clusters.

The balance between competition and cooperation within clusters is an important determinant of the direction of policy. Care is needed to ensure that exaggerated contrasts are not drawn but, broadly, an emphasis on formal transactions and competitive processes implies a more macro-economic role for public agencies while the fostering of cooperation implies measures to support decentralized public–private research collaborations and other mechanisms to promote collective learning processes.

In years gone by, the macro-economic policy role might have involved coordinated action to direct large businesses in key sectors to certain locations and the provision of general public goods. Indeed, the latter remains a core element of policy in many countries and at European Union (EU) level. More recently, there has been a shift in policy with a greater focus on efforts to raise investment in innovation and create a 'knowledge driven economy' (Department of Trade and Industry, 1998).

Otherwise, the focus of the macro-economic policy role is on competition policy and the creation of a 'level playing field' for all firms. However, competition policy does not necessarily preclude the fostering of cooperation. Competition policy, in the US, EU and elsewhere has shifted in recent years, to allow some accommodation of cooperative agreements. For example, in the EU, joint research and development of new products and processes is exempted from the provision of Article 85(1) (of the Treaty of Rome) which lists the prohibitions of agreements between firms deemed to be a restraint on trade between member states.

Policy could potentially be pushed a great deal further in this direction. Deakin *et al.* (1997) argue for the extensions of exemptions to the regulation of procurement processes and the activities of trade associations. Oughton and Whittam (1996, p. 75) argue that EU policy towards the SME sector much more explicitly should support cooperation among such firms and that the effect would not be to reduce but "to maintain or increase the degree of competition within industries. Moreover, to the extent that SMEs form a competitive fringe

of price-taking firms, co-operation over input activities will be prevented from spilling over to co-operation (collusion) in product markets".

However, it should be said that these types of proposal and the (generally minor) shifts in policy frameworks that have already taken place go against the thrust of policy developments in the EU and elsewhere. Competition policy and much industrial policy is premised on models of atomistic competition, the outlawing of all perceived restraints on free trade and the promotion of economic integration. The tide of deregulation continues apace.

Other mechanisms of fostering cooperation, including most of those available to regional and local policy-makers, focus upon the support of public–private collaborations and the promotion of collective learning processes. At one level, this can be easily stated as requiring the encouragement of networks and partnerships between large companies, the SME sector, trade associations, universities and research institutes, further education colleges, training providers, promotional and economic development agencies—and any other actors that have been missed out from this list! However, while in some circumstances different places can learn from each other, in general there are few easy opportunities to borrow institutions. Instead, there is the complex task of 'institution building' appropriate to the social, economic, legal and cultural conditions of different localities. Indeed, it is not obvious that shared values and norms can be purposively cultivated as opposed to developing organically. Just as there are technological trajectories, there are trajectories of organizations and institutions and norms and conventions.

Finally, mention should be made of a whole set of important issues which have scarcely been touched on in this article, namely the implications of clusters for economic (and other) inequalities. In this regard, the article reflects the literature, most of which makes no reference to power relationships within contemporary capitalism and thus has little to say on the distributional (and environmental) impacts of cluster developments. Nevertheless, we should not be at all surprised if "the emphasis on growth as a positive tool … come[s] at the expense of wider environmental degradation and inter- and intra-regional inequalities" (Raco, 1999, p. 965).

5. Conclusions

This article has sought to demonstrate the diversity of perspectives underlying the theories of clusters. A key aspect of that diversity is the relationship between competition and cooperation between firms and other actors within clusters. We might expect the relationship between cooperation and competition to vary across regions and countries. For example, in the US and the UK, with more flexible labour markets and 'orthodox' competitive norms, collaborative arrangements between firms may be less likely to develop. However, it has proved extraordinarily difficult in practice to distinguish the different theoretical approaches to clusters at an empirical level. There is a pressing need for "a new phase of research which examines these ideas empirically, and uses the findings of such research to refine and develop key theoretical constructs such as 'learning regions', 'innovative milieux' and 'industrial districts' " (Mackinnon *et al.*, 2000, p. 23). As this article has further sought to show, clarification of the relative importance in different contexts of the various mechanisms which drive the development of clusters is essential because it has implications for the appropriate level and form of public policy intervention.

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