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Competition, Collaboration and Cooperation: An Uneasy Triangle in Networks of Firms and Regions

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POLENSKE K. R. (2004) Competition, collaboration and cooperation: an uneasy triangle in networks of firms and regions, *Regional Studies* **38**, 1021–1035. Many analysts maintain that firms can meet the challenges of global competition by establishing improved competitive, collaborative or cooperative activities, hereafter called ‘the 3Cs’. The paper proposes that effective industrial and regional competition is often constrained by perceived and real spatial, labour, and organizational boundaries that limit the 3C relationships within the networks of firms and regions. The paper makes three contributions to the literature. First, it distinguishes collaboration from cooperation as collective types of behaviour and asserts that both can form part of an uneasy triangle of industrial interrelationships with competition. Second, it uses the 3C relationships to help explain the ‘success’ of industrial organizations as portrayed by analysts in alternative industrial and regional restructuring models, namely the Italian, Japanese and Global models. It examines how analysts deal with the spatial, labour and organizational boundaries in these alternative models. Third, it shows that none of the models was sufficiently general to cover all the restructuring issues as the world has moved into the globalization form of development. Throughout, the paper asserts that an understanding of the interrelationships among the 3Cs and the primary constraints affecting those relationships will help local and national government and industrial decision-makers make effective firm, labour and regional policies.

Competition Collaboration Cooperation Industrial and regional restructuring Networks

POLENSKE K. R. (2004) La concurrence, la collaboration, et la coopération: une alliance boîteuse triangulaire au sein des réseaux d’entreprises et de régions, *Regional Studies* **38**, 1021–1035. De nombreux analystes affirment que les entreprises peuvent relever le défi de la concurrence mondialisée par établir de meilleures activités du point de vue de la concurrence, de la collaboration et de la coopération, appelées ci-après ‘les trois C’. On laisse supposer que la concurrence industrialo-régionale efficace se voit entraver par des contraintes géographiques perçues et réelles à l’emploi et à l’organisation qui limitent les rapports 3C au sein des réseaux d’entreprises et de régions. L’apport à la documentation est à trois temps. Primo, on distingue la collaboration de la coopération comme un comportement plutôt collectif, et on affirme que tous les deux peuvent faire partie d’une alliance boîteuse triangulaire de relations industrielles avec la concurrence. Secundo, on se sert des rapports 3C afin d’expliquer la ‘réussite’ des établissements industriels que présentent les analystes dans divers modèles de la restructuration industrielle et régionale, à savoir les modèles italien, japonais, et mondial. Tertio, on laisse voir que pas un modèle n’était suffisamment général pour embrasser toutes les questions de restructuration au fur et à mesure de la mondialisation. Tout au long de l’article, on affirme qu’une meilleure compréhension des relations parmi les 3C et parmi les principales contraintes qui touchent ces relations-là aidera les administrations nationale et régionale, et les décideurs industriels, à mettre au point des politiques efficaces visant les entreprises, l’emploi, et les régions.

Concurrence Collaboration Coopération Restructuration industrielle et régionale Réseaux

POLENSKE K. R. (2004) Konkurrenz, Kollaboration und Kooperation: eine problematische Dreiecksbeziehung in Netzwerken von Firmen und Regionen, *Regional Studies* **38**, 1021–1035. Manche Analytiker behaupten, daß Firmen der Herausforderung des globalen Wettbewerbs nachkommen können, indem sie verbesserte, konkurrenzfähige, kollaborative und kooperative Betätigungsfelder aufbauen, die im Folgenden als ‘die 3 C’ (= competitive, collaborative-comparative) zusammengefaßt werden. Es wird die These aufgestellt, daß wirksamer industrieller und regionaler Wettbewerb oft durch so aufgefaßte und tatsächliche räumliche Arbeits- und Organisationsgrenzen eingeengt wird, welche auch die 3C Beziehungen innerhalb der Firmen und Regionennetzwerke einschränken. Es werden drei Beiträge zur diesbezüglichen Literatur vorgelegt: erstens eine Unterscheidung von Kollaboration und Kooperation als kollektive Verhaltenstypen, sowie die Behauptung, daß beide Teil eines problematischen Dreiecks industrieller Beziehungen mit Konkurrenz bilden können; zweitens werden die 3C Beziehungen dazu benutzt, den ‘Erfolg’ industrieller Organisationen erklären zu helfen, wie von Analytikern in alternativen industriellen und regionalen Umstrukturierungsmodellen, z.B. den italienischen, japanischen und globalen Modellen bereits vorgestellt. Es wird untersucht,

wie Analytiker mit den räumlichen, arbeitstechnischen und organisatorischen Grenzen in diesen alternativen Modellen fertig werden. Drittens wird gezeigt, daß keins dieser Modelle ausreichend allgemeine Ziele aufwies, um alle Umstrukturierungsfragen behandeln zu können, da die Welt sich auf die Entwicklungsform der Globalisierung zubewegt hat. In der ganzen Arbeit wird betont, daß Verständnis der Beziehungen zwischen den 3Cs und den Hauptbeschränkungen, denen diese unterliegen, Gemeinde- und Landesverwaltungen sowie Industriellen, die Entscheidungen zu treffen haben, helfen werden, eine wirksame Firmen-, Arbeits- und Regionalpolitik zu entwerfen.

Konkurrenz Kollaboration Kooperation Industrielle und regionale Umstrukturierung Netzwerke

POLENSKE K. R. (2004) Competición, colaboración y co-operación: un incómodo triángulo en las redes de empresas y regiones, *Regional Studies* **38**, 1021–1035. Muchos analistas mantienen que las empresas pueden hacer frente a los desafíos que conlleva la competición global mediante una mejora en sus actividades competitivas, colaborativas y co-operativas, a lo que de aquí en adelante se referirá como las 3Cs. El artículo propone que una competición regional e industrial efectiva se ve a menudo restringida por límites organizativos, laborales y espaciales tanto reales como percibidos que limitan las relaciones entre las 3Cs dentro de las redes de empresas y regiones. Este artículo contribuye a la literatura de tres formas. En primer lugar, hace una distinción entre colaboración y co-operación como tipos de comportamiento colectivo, y afirma que ambos pueden formar parte de un incómodo triángulo de interrelaciones industriales con competición. En segundo lugar, hace uso de las relaciones entre las 3Cs para explicar el éxito de las organizaciones industriales tal y como las presentan los analistas en los modelos alternativos de reestructuración regional e industrial, siendo estos el modelo italiano, el japonés y el global. Examina cómo los analistas tratan los límites organizativos, laborales y espaciales en estos modelos alternativos. En tercer lugar, muestro que ninguno de estos modelos fue lo suficientemente general como para abarcar todas las cuestiones de reestructuración a medida que el mundo se ha encaminado hacia una forma globalizadora de desarrollo. En todo momento, se afirma que un entendimiento de las interrelaciones entre las 3Cs y de las principales restricciones que afectan dichas relaciones ayudará a lo tomadores de decisiones tanto locales, nacionales como industriales a diseñar políticas regionales, laborales y de empresa efectivas.

Competición Colaboración Co-operación Reestructuración regional e industrial Redes

JEL classifications: L6, M0, M2, R30

INTRODUCTION

Major changes in global markets are affecting the way in which networks of firms and regions operate. In the late 1980s and 1990s, many analysts (e.g. AMIN and ROBBINS, 1990; AOKI, 1990; BEST, 1990; DORE, 1986; GERTLER, 1988; HARRISON, 1992, 1994; HIRST and ZEITLIN, 1992; IMAI and KOMIYA, 1994; MARKUSEN, 1996; ODAGIRI, 1992; PIORE and SABEL, 1984) analysed industrial and regional growth and attributed successful restructuring of firms/regions to how they could meet the new challenges posed by establishing improved competitive, collaborative or cooperative activities, hereafter called the '3Cs'. It is proposed that effective industrial and regional growth is often constrained by perceived and real labour, organizational and spatial boundaries that limit the 3C relationships within the local, national and global networks of firms.¹

The present paper makes three contributions to the literature. First, it distinguishes collaboration from cooperation as collective types of behaviour and asserts that both can form part of an uneasy triangle of industrial/regional interrelationships with competition. Second, the 3C relationships are used to help explain the 'success' of industrial organizations as portrayed by analysts in alternative industrial and regional restructuring models, namely the Italian, Japanese and Global models. It is examined how analysts deal with the spatial, labour and organizational boundaries in these alternative models. Third, it is shown that none of

the models is sufficiently general to cover all the restructuring issues as the world has moved into the globalization form of development. Throughout, it is asserted that an understanding of the interrelationships among the 3Cs and the primary constraints affecting those relationships will help local and national government and industrial decision-makers make effective firm, labour and regional policies.

The following series of questions has driven the present author's research for the paper. Do collaboration and/or cooperation help a firm attain a competitive advantage over other firms? Do they have an effect on regional boundaries, specifically on the types of networks and regional and global supply chains being established? How do these relationships constrain or enhance local, national and global networks of firms? What effect do the constraints and enhancements have on industrial and regional restructuring? The paper does not explicitly furnish answers to these questions, but they did provide the impetus for much of the author's thinking.

UNEASY 3C TRIANGLE

As the global economy is rapidly being created and restructured, analysts have altered their view on the relationship between competition, collaboration and cooperation. Initially, analysts were prone to think of competition as being the ideal type of behaviour for the firm, in that it was the one that maximized profits.

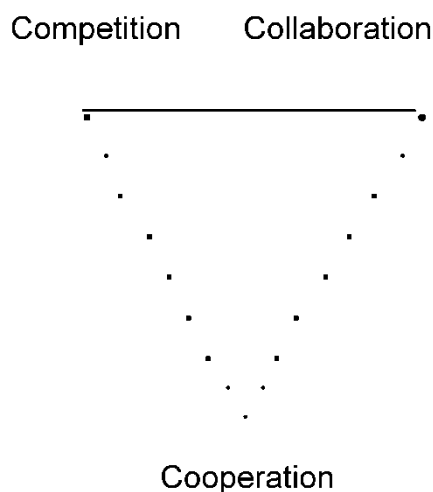


Fig. 1. Uneasy 3C triangle

Today, as shown above, many analysts think that collaboration and/or cooperation are needed for a competitive firm to be effective. The author believes that the three types of behaviour are best viewed as being on different end points of a triangle (Fig. 1). When a relationship exists, such as between competition and collaboration in Fig. 1, a solid line is used; when it does not exist, as between collaboration and cooperation and competition and cooperation, a dotted line is used.

An analyst can shorten or lengthen the sides of the triangle as the relationship varies from being a closer to a more distant relationship, respectively; thus, it is an uneasy triangle over space, organizational entity and time. In some periods and regions or for some organizational structures of firms, collaboration and competition can occur almost in tandem; in other cases, cooperation and competition can be the closest of the three; in still other cases, collaboration and cooperation can be almost united. Illustrations of such cases will be given below and this simple diagram will be used to help illustrate an important dimension of the differences among the industrial and regional restructuring models analysts posed in the latter 20th century.

COLLABORATION, COOPERATION AND COMPETITION: CHANGES IN BOUNDARIES

Collaboration and cooperation are similar forms of collective behaviour in some ways. First, either collaboration or cooperation may occur among actors (e.g. private or public firms, the public sector, local organizations, members of the labour force or other agents) within the entity or region or across regional, national and international boundaries. Second, in both cases, the interaction may occur among firms in the private sector, between a private firm and the public sector, and/or among other types of agents, such as trade

associations and unions. Third, they may or may not be adopted to enhance the competitiveness of a firm. Fourth, either one may last a long or a short time, depending upon many economic, social and political factors. The similarities may be part of the reason many scholars treat the two concepts as synonymous, but the present paper stresses the distinctions that separate collaborative from cooperative forms of behaviour.

Collaborative relationships are defined to include direct participation by two or more actors in designing, producing and/or marketing a product (process). The relationships among these actors are often internal arrangements that are usually vertical, sometimes among divisions in the same firm or along supply chains. They may include joint ventures. The WORD dictionary (Version 4.1, thesaurus) gives the words 'teamwork' and 'partnership' as synonyms. Those collaborative arrangements that require firms to perform in teams or to form partnerships usually take far longer to build than those cooperative ones that may just require firms to assist each other voluntarily.

Cooperation relationships are defined to include when two or more actors agree through formal or informal arrangements to share information, support managerial and technical training, supply capital, and/or provide market information. The relationships among these actors are usually external and horizontal, i.e. the actors do not work together on designing, producing and/or marketing a product (process). Cooperative arrangements are similar to public goods because they allow for the provision of collective goods under the non-exclusion principle (LORENZ, 1992, p. 195), whereas collaborative arrangements are generally exclusionary. Collaborative and cooperative arrangements are two of many ways a firm has to expand its organizational and spatial boundaries.

Both types of arrangements affect costs. Here, the way in which these two forms of behaviour affect, especially the cost structure of a firm, will be shown, noting that these ideal types do not always fit the reality as well as they should.

Costs of collaboration and cooperation

There are several ways to distinguish the costs facing a firm. Typically, economists have looked at internal and external economies to distinguish movements along the average cost curve from changes in the position of the average cost curve, respectively. Others now are looking at adaptive costs (DONER and SCHNEIDER, 1997; HAGE and ALTER, 1997, MCCORMICK, 1998) versus transactions costs (NORTH, 1981, pp. 18–19; NORTH, 1990, p. 28; POLENSKE, 2001; WILLIAMSON, 1975). Adaptive costs are those associated with a firm acquiring new products, skills and capital, in addition to learning to innovate and to diffuse new technologies fast. Transaction costs are those costs, such as banking, communication, compliance, exchange,

finance, insurance, retail and wholesale trade, transportation, and any other transfer costs, other than production costs, that result from the trading of goods or services.

The ability to lower costs, of course, is only one of the objectives the firm may have when entering into a collaborative or cooperative arrangement. Firms often enter into these two types of collective agreements to obtain access to information, goods, particular labourers, services, funds, etc. Internationally, automobile firms, for example, made collaborative agreements to maintain their competitive edge, in order to gain market access or market control, rather than for cost-reduction reasons (SCHOENBERGER, 1994, p. 56). With a collaborative agreement, the firm usually obtains unique access to one or more of these factors; whereas for the cooperative agreement, all firms that sign the agreement have access, often equal access, to the factors. One reason for trying to distinguish between collaborative and cooperative arrangements is because each type of behaviour will affect costs in different ways.

Collaborative arrangements often lead to internal economies of scale, affecting the position the firm has on its long-run, average-cost curve; in other words, by entering into a collaborative agreement, firms expect to move to a lower position on their long-run, average-cost curve. By collaborating on designing and producing a product, for example, two firms can lower their adaptation costs and innovate new products faster, have workers acquire new skills and obtain more capital investment. Another possibility is that by having an agreement that a supplier will design a particular product, a firm can pass the design costs on to the supplier, which may benefit by agreeing to do this only if the customer agrees to purchase a given amount of the product.

Examples of collaborations are many, some formal and others informal. Joint ventures between two or more private firms and the establishment of public-private corporations by the state and a private firm are a prevalent type of collaboration today. Other types noted by restructuring analysts (e.g. ANGEL, 2002; KELLEY and ARORA, 1996) include the offering of a product or process engineering by customer firms to supplier firms, setting up industry councils of small and medium enterprises to assist supplier firms to fulfil industry quality-control standards, and demonstrating technologies and training workers at centres that make products for the client firm, with incentives given through leasing arrangements to encourage the client firm to buy the machinery for installation in their own firm. These training centres have been established with support from the US National Institute of Standards and Technology (NIST) for a number of years. As I note below, firms now are using some of these types of collaborative arrangements to increase their competitiveness in a global economy.

Industrial-organization scholars document numerous other types of collaborative activities focused on adaptive costs, such as the technology transfer of computer numerical control equipment (KELLEY and BROOKS, 1992) and the adoption of advanced manufacturing technology (CHEW *et al.*, 1991). All these affect adaptive costs. In the study by the Massachusetts Institute of Technology multiregional planning research team of the restructuring of the Chicago metalworking and transportation sectors, POLENSKE *et al.* (1996) identified additional ones, such as the computer transfer of production specifications among firms and participation on problem-solving teams. In addition, some Midwest automotive producers collaborate with Midwest metalworking firms that are designing certain parts for the automotive firm, i.e. the metalworking supplier offers engineering and design assistance to the automotive customer (MCCORMICK, 1996a). MYTELKA (2001, pp. 130–131) indicates that in Europe, the initial one-way linkages between customers and suppliers in the 1980s changed into two-way collaborative relationships in the 1990s. Mytelka attributes this to three factors affecting the pattern of production and the nature of competition, a trend that started in the 1970s: (1) the increased knowledge-intensity of production, (2) the increased speed with which new products are developed and (3) the increased speed of innovation diffusion. The globalization, Mytelka maintains, led to mergers and acquisitions that reduced the firms' flexibility. To overcome this inertia, firms build strategic alliances (partnerships and oligopolies) and learn through these partnerships. ZELLER (2002) provides illustrations of the collaborative arrangements for the exchange of knowledge and technologies between initially competitive biotechnology and pharmaceutical firms.

In contrast to these collaborative agreements, cooperative arrangements often lead to external economies of scale, affecting the overall position and shape of the cost curve, helping a firm to reduce the average cost of producing at all scales of production. Firms frequently enter these arrangements to lower their transaction costs. A cooperative arrangement differs from a collaborative one in that information about the research and development, product and process engineering, etc., may be shared among many firms, because of the non-exclusionary nature of the arrangement, but each firm works separately from the other. For example, some firms in the Italian industrial districts, as discussed below, share training costs or have credit associations to which the given firms can apply for funding. Other examples include the enhancement of information exchange (SABEL, 1993; MCCORMICK, 1996a, b; LINCOLN *et al.*, 1992) and capacity building within a sector (KELLEY and ARORA, 1996). ASHEIM and ISAKSEN (2002) show how industries in two of the three Norwegian regions they studied, namely the shipbuilding industry in Sunnamøre and the electronics/

micro-electronics sector in Jæren, have close inter-firm (technological) cooperation. In both regions, cooperation occurs both within the firm/region and externally with technical research institutes in Norway or internationally. By reducing transaction costs, a cooperative type of collective arrangement usually helps to reduce costs for each firm that makes use of the information/product.

Collaboration or cooperation normally takes time and money, making the firm weigh the costs against the benefits gained. 'The opportunity for mutual gain from cooperation comes into play when the gains from the other's cooperation are larger than the costs of one's own cooperation' (AXELROD, 1984, p. 173). If feasible, firms can compare the overall economic, political, and social benefits and costs of cooperative versus collaborative behaviour against purely competitive behaviour. Many non-market forces also play an important role in making collaboration or cooperation successful. Many of these can be grouped under the concepts of 'trust' and 'learning', including inter- and intra-firm learning, learning regions, and learning economies.

PROXIMITY, TRUST AND LEARNING

In the current globalization and flexible versus lean-production era, managers and workers often encounter new codes of behaviour and need to consider new work rules, norms and many other differences in customs, laws and behaviour. 'Proximity', 'trust' and 'learning' all seem to have important implications for both collaborative and cooperative arrangements.

Regional political economists and geographers often emphasize the importance of geographic proximity for firms within an industry to grow rapidly. Among others, GERTLER (1995) finds that different work ethics and the 'rules of the game' are usually easiest with which to deal if those who are collaborating or cooperating with one another come from the same country (or region), culture, and social, religious or political groups. Within different sectors, different types of proximity may be important. ZELLER (2002), for example, discusses different types of proximity required in the pharmaceutical and biotechnology sectors, separating those that are internal to the firm from those external to it. From Gertler, Zeller and other analysts, the present paper distinguishes the six types of proximity that appear most to affect industrial and regional development: (1) physical (geographical), (2) organizational (interaction, shared workplace practices, training), (3) cultural (common language, modes of communication, customs, conventions, social norms), (4) temporal (the time that elapses), (5) technological (shared perceptions of technology) and (6) electronic (the form and intensity of electronic communication between economic agents).² ZELLER (2002, p. 286)

indicates that the second to fifth proximities may become substitutes for diminishing spatial proximity. Because the actors come from different economic, political and/or social domains with respect to any of these types of proximity, effective interaction may be hindered, even if the producers supposedly belong to the same network of firms, as discussed below.

'Trust' is a critical component of collective relationships (TEUBAL *et al.*, 1991; LORENZ, 1992; SABEL 1992). ZELLER (2002) emphasizes its need for the building of collaborative relationships. Trust probably is most needed if firms are collaborating; it is less needed if firms are cooperating; and, it is even less needed if firms are competing individually in the market place.³ The basis of trust between firm owners, workers and others may change over time, evolving from an 'ascribed' trust among those in the same social group within a region to 'earned' trust among outsiders in the global market (SCHMITZ, 1996). 'Learning' is another important characteristic for collaborative and/or cooperative activities. The present paper argues, along with others (e.g. ASHEIM, 1996, 1998; LUNDVALL and JOHNSON, 1994; PIORE and SABEL, 1984), that a major qualitative change is taking place as capitalist economies make the transition from Fordism to Post-Fordism, as collective learning enters the workplace. The learning may be intrafirm, interfirm and/or regional. Thus, one can adapt the Lundvall-Johnson concept of the learning economy to Asheim's learning region. Within the learning region, the firm, local government, educational establishments and community all work together to determine the industrial and regional development policies for the region.

Both managers and workers sometimes need special training in how to work together in collective-learning environments. KELLEY and BROOKS (1992) state that the best adoption of computer-numerical-control technology occurs through interfirm learning, and if the innovation source is external to the firm, networks of sources, e.g. firms and non-market institutions, are the best way to facilitate the transfer. Appropriate training, however, may be difficult for policy-makers to implement. As GLASMEIER and FUELLHART (1996, p. 28) maintain, analysts have not been able to measure 'what type of learning occurs within different geographic spaces and across different organizational configurations'.

ASHEIM (1998, p. 3) persuasively argues that learning regions promote innovation through interlinking cooperative partnerships that range from work organizations within a firm to activities outside the firm, all of which he defines as 'regional development coalitions'. These coalitions change over time, as collective interactive learning leads to cooperation as a strategy to promote innovations in regionally based networks (LAZONICK, 1993, p. 4). To sustain a global competitive advantage, PORTER (1990) argues that firms need continuously to initiate organizational and institutional

innovations that promote cooperation or collaboration. The organizational form in Scandinavia of learning regions is, according to ASHEIM (1998, p. 7), a group of firms in which there are high levels of worker participation in the decisions of the firm, helping to create loyalty to the firm by the workers and the managers. This intrafirm cooperation is supported by interfirm cooperation, which takes the form of interfirm networks. Thus, collaborative and/or cooperative activities are important ways in which a firm can enhance its competitive position in the market.

NETWORKS

If three or more firms collaborate or cooperate, they almost always form a formal or informal network. Scholars analyse several distinct types of networks, such as social networks (GRANOVETTER, 1985; FRIEDLAND and ALFORD, 1991) and innovation networks (DEBRESSON and AMESSE, 1991; MARCEAU, 1995; MATHEWS, 1995; ANGEL, 2002), and they discuss networks of firms, information, labourers, organizations, etc. The present paper mainly discusses the network of firms, the main purpose being to see if a network of firms differs from firms forming a collective through collaboration or cooperation efforts and if the network enhances the competitive advantage of firms that collaborate or cooperate.⁴

How do these networks of firms differ from older types of alliances? According to HAGE and ALTER (1997, p. 95), they differ in four ways: (1) the coordination tasks are more complex; (2) the alliances span industrial sectors rather than being within one sector; (3) a given firm may be involved in more than one alliance, such as a joint venture to produce products and a strategic alliance to set national standards; and (4) alliance memberships are more diverse, often involving a member who oversees enforcement of agreements. A fifth difference could be added in that interfirm networks generally span across regions or even countries.

Either collaboration or cooperation can be done by two or more firms alone or as part of a network of firms. In many ways, both modes of behaviour start to change the 'rules of the game' concerning competitive economic behaviour, regardless of whether the firm is inside or outside a network. In the above discussion of collaboration and cooperation, it was implied that such collective actions make analysts think differently about the model of a competitive firm operating in isolation from other firms, and if the firm is part of a network of firms, analysts also must alter the earlier image of a firm. The production boundaries of the firm that is part of a network may be expanded backwards or forwards along the 'supply chain' of the firm and/or over space. As an example, MCCORMICK (1996a) cites the case where previously an automobile firm in

Detroit, USA, designed and produced a particular part for the vehicle, but now it has a metalworking firm in Chicago design and produce the part. This is an expansion of the boundaries of the firm both along the supply chain and across regions.

What is known about network formation? When are they more or less likely to form? Firms establish/join a network for many reasons. They may want to reduce technological and market uncertainties or to participate in additions to their knowledge that reduce information costs, both of which may improve profits (DEBRESSON and AMESSE, 1991, pp. 367–368). Alternatively, they may join a network to reduce their risk and uncertainty, switching costs, and sunk costs. As noted above, networks can be distinguished from the long-term supplier and customer relationships that have always existed (ODAGIRI, 1992; DORE and WHITTAKER, 1994).

Networks of firms may be established among firms in the same sector, among firms within a politically defined region or in an industrial district, among firms across national and international boundaries, and/or among firms and labourers, public agencies, or non-profit groups (DEBRESSON and AMESSE, 1991; HERRIGEL, 1992; LOCKE, 1995; SAXENIAN, 1994). To assist these networks, the US NIST established numerous manufacturing centres throughout the USA to aid firms in obtaining access to advanced technology, training, credit, etc. (SABEL, 1996).

Firms use networks as a way to expand their spatial and organizational boundaries. These are still basically economic considerations. Although a review of the numerous social, cultural and political factors is beyond the scope of this paper, these considerations may also influence the firm to form and/or join a network by taking part in collaborative or cooperative activities.

The use of networks may increase 'in periods of acute technological, institutional, and market turbulence' (DEBRESSON and AMESSE, 1991, p. 370), for economic, political or social reasons. Some networks of firms, such as that of Chicago metalworking firms, which has been formalized into a trade association, have been in place for years (MCCORMICK, 1996b). Others are being established for the first time, as partially indicated by an entire issue of the *Journal of Industry Studies* (1995) covering 'Innovation Networks: East Meets West'.

Japan is one country well known for its use of networks of firms, including the *keiretsu*, formed through relationships among managers and other officials in Japanese industrial firms and financial institutions. Many of these have existed since the 1950s. These networks form collaborations that are said to 'reduce costs and risk, facilitate communication, ensure trust and reliability, and provide insulation from outside competition' (LINCOLN *et al.*, 1992, p. 561). There are two types of *keiretsu* networks: those horizontally

organized among the large companies and those vertically organized between each large manufacturing firm and its suppliers and distributors. These networks are credited with having allowed Japanese firms in the past to undertake risky, low-profit-margin, high-growth ventures (NAKATANI, 1984).

Networks may disband and/or their scope of responsibility may be drastically reduced especially, but not exclusively, in cases where an industry or sector is in decline (KELLEY and ARORA, 1996, pp. 21–22; MCCORMICK, 1996b; SABEL, 1992) and/or in turbulence (GLASMEIER and FUELLHART, 1996) for, at least, the following three reasons.

First, networks are difficult to establish and maintain. They seem to be more difficult to establish than originally anticipated, and firms become discouraged or place severe restrictions on the types of information that can be exchanged. In Michigan, for example, Continuous Improvement User Groups (CIUG) have been established among firms using common-process technologies by the Michigan Manufacturing Technology Center, but the exchange of information is very limited (KELLEY and ARORA, 1996, p. 21). In addition, internal tensions can lead networks to disband or threaten to disband. In the 1940s, for example, in the network of Chicago's metalworking machinist union and shop owners, the two groups stopped cooperating with one another, and there was even a conflict among the metalworking shop owners as a group (MCCORMICK, 1996b, pp. 140–185).

Second, firms may change their production practices, which may result in breaking previous alliances or creating new ones. By instituting a captive shop, for example, a metalworking or an automotive firm breaks its alliance to machinists in contract shops. This occurred in the 1950s when the Chicago metalworking firms expanded their in-house captive tool rooms, transferring work from small, outside, custom-toolmaking contract shops that had made their production machinery and tools (MCCORMICK, 1996b, pp. 186–224).

Third, competition may adversely affect the network of firms. If industries are in decline and experiencing competitive pressures, attempts to cooperate among members of the network may fail when firms decide to conduct price-cutting practices. Price cuts adversely affected a network of automotive suppliers in Michigan, of apparel manufacturers in Pennsylvania, and of furniture makers in Mississippi (KELLEY and ARORA, 1996, p. 22). Also, the network of firms may disband because of some of the very reasons that make them attractive, namely, they may become overly specialized and/or entrenched in the use of new technologies or processes that soon become old and/or obsolete (GLASMEIER and FUELLHART, 1996, p. 19). Often, in these cases, it seems that competitive forces of one form or another lead to a break-up of the network and the collaboration or cooperation occurring.

One way to help prevent dissipation of the network is to develop measures of 'trust', because, as noted above, trust is a critical component of collective relationships (TEUBAL *et al.*, 1991; LORENZ, 1992; SABEL 1992). Through repeated encounters in the network, producers build up a judgement as to the participants who are trustworthy and those who are not. At times, this trust can be subverted, as shown by HERRIGEL (1990, pp. 403–408) for the industrial districts in Germany in the 1930s, and by SABEL and ZEITLIN (1985, pp. 158–159) for the Sheffield cutlery industry in the late 1800s, the Birmingham metalworking shops in the 1890s, and the Saint Etienne silk-ribbon industry in the 1930s. Producers' sense of trust in each other was eroded either through long periods of recession and violence (Germany and Saint Etienne) or in periods of rapidly rising expectations (Sheffield and Birmingham). Prevention of this erosion may be difficult.

In general, producers who collaborate or cooperate respect the property-rights' distributions implicitly or explicitly set out by 'norms of competition' and the sharing, behavioural and contractual obligations implied by 'norms of reciprocity' (LORENZ, 1992, p. 195). Reciprocity norms create a trust among firms that share information, labour and/or suppliers and customers; however, reciprocity requirements in a supplier/purchaser arrangement may reduce the accessibility to those firms outside a network (LINCOLN *et al.*, 1992, p. 577). The network of firms is a form of 'community', which has ways to retaliate through withdrawal of reciprocity and/or the imposition of sanctions. According to SABEL (1993, p. 46), 'Economic cooperation results in innovation and growth, therefore, [it occurs] only when networks are neither under- nor over-socialized'.

Overall, insufficient information is available concerning the benefits and costs associated with belonging to a network of firms, the causes for some networks to be transitional while others are permanent, and the factors causing networks to cross spatial, political and/or social boundaries. Both collaboration and cooperation, thus the formation of networks of firms, seem in opposition to some competitive instincts of the marketplace, but the present paper has shown ways in which they may be seen, in many cases, to be undertaken to enhance a firm's competitive advantage.

The relationship, which is termed here an uneasy 3C triangle, among the three modes of behaviour obviously requires more intensive theoretical and empirical study. The rudimentary features of the uneasy 3C triangle are evident in the restructuring literature, which are now examined in detail.

RESTRUCTURING DEBATE

In the 1980s, many analysts began to study how industrial restructuring was being implemented through changes in industrial organization. These changes came

to be known as 'flexible manufacturing'. PIORE and SABEL (1984) made this topic well known with their combined models of technological innovation and market stability. Others (e.g. AMIN and ROBBINS, 1990; GERTLER, 1988; HARRISON, 1992, 1994; HIRST and ZEITLIN, 1992; MARKUSEN, 1996) seriously questioned what the principal factors are behind this restructuring and/or if all manufacturing firms are using processes that help to enhance small, rather than large, firms, and/or what role certain regions play in the restructuring.

By using one of three models, the present paper will show how restructuring scholars analysed the boundaries among collaboration, cooperation and/or competition to create 'success' in the industrial organization of firms: (1) small firms that innovate, cooperate and form particular regions – the Italian model; (2) competitive firms that practice just-in-time (JIT) production, with collaboration between the large customer and the small supplier – the Japanese model; and (3) large, especially multinational, firms that practice collaborative behaviour globally – the Global model. Networks and spatial boundaries also begin to play a major role in some of the analyses. It will be explained how the three sets of analysts differ as to the relationship among competition, collaboration and cooperation, and in their emphasis on the role regions play in the relationships. It is concluded that no one model adequately portrayed the entire industrial/regional restructuring process, which probably contributed to the emergence of some of the later models of learning regions (LUNDVALL and JOHNSON, 1994; ARCHIBUGI and LUNDVALL, 2001).

How do the restructuring scholars deal with competition, collaboration, cooperation, networks, and changes in regional and organizational boundaries? The alternative views are summarized in Fig. 2 by portraying an uneasy triangle for each model. For analysts supporting the purely competitive model, collaborative and cooperative activities are usually not considered as part of the behaviour firms display. Thus, the lines for this triangle are just dots.

Success of small firms and cooperation: the Italian model

Some restructuring analysts focused on the success of small firms that cluster in particular regions and thrive in an innovative, cooperative environment. These analysts are referred to by the term 'Italian model' because many of the early studies were conducted in Italy. Why did these scholars identify this success with small firms with cooperative activities and with particular regions? Most firms they studied had the following characteristics. They were often small craft-based firms with flexible multi-use equipment, labour-intensive production processes, constant product and process innovations, and, of special importance for this study, they created specialized, cooperative, regional organizations to share production costs.

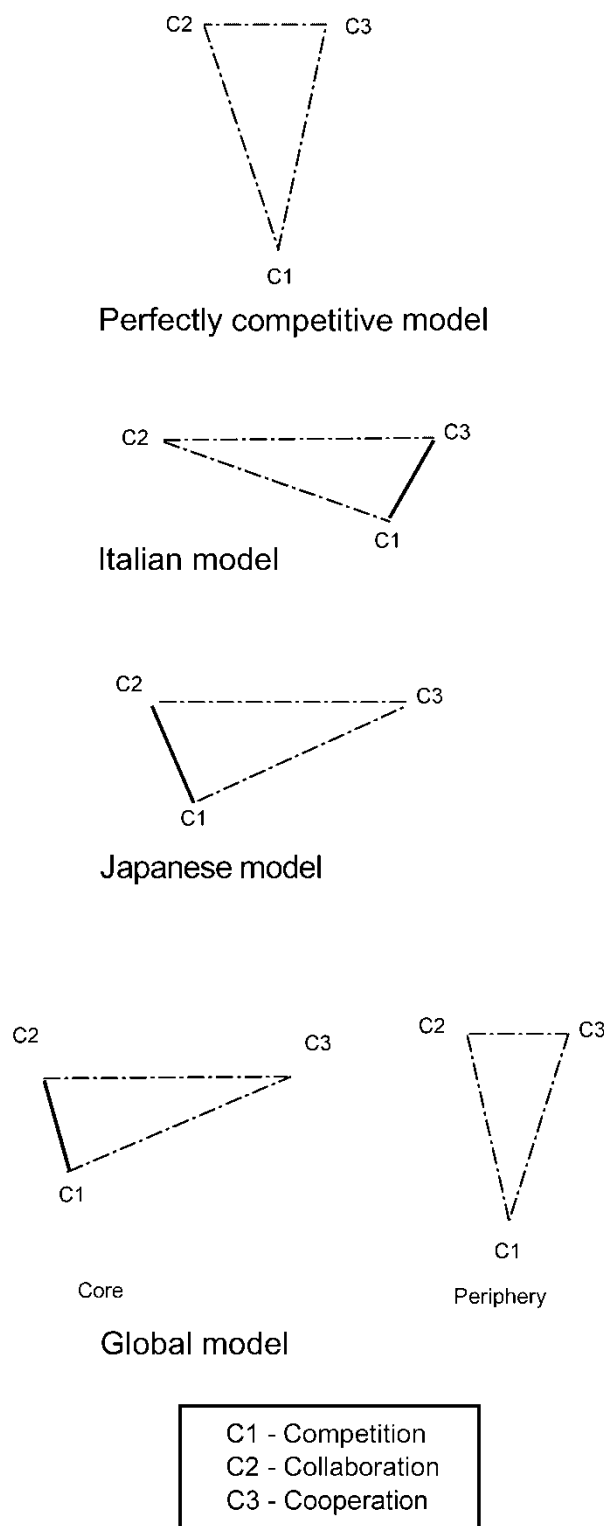


Fig. 2. Uneasy triangle of the 3Cs

Although this is an idealized description, the main attribute of a successful region in this model is a spatial network of firms that helps to foster and maintain an innovative and cooperative spirit within the geographical boundaries of an industrial district. In fact, Alfred Marshall is the first analyst to have used the term

'industrial district'. In the so-called 'Third Italy', a term used since the late 1970s to refer to the regions in the centre/north-east of the country, industries from the early 1960s were growing far faster than those in Piedmont and Lombardy in the North and than those in the South (BIANCHI, 1994; SABEL, 1989). Given that the North was the traditional industrial base in Italy, this finding was surprising to analysts. By the end of the 1980s, Italian scholars seemed to have agreed that the Third Italy was transforming itself (BIANCHI, 1994). Whether this leads to its demise or to a new invigorated region is yet to be seen.

The same type of clustering of small firms was found in the Silicon Valley in California, USA (SAXENIAN, 1991), although STORPER (1997) and a few other analysts dispute this portrayal by Saxenian of Silicon Valley firms. In addition, such clustering has been documented in areas in France, Germany, Spain and elsewhere (HERRIGEL, 1990, 1992; PYKE *et al.*, 1990), indicating that the industrial district is not an isolated phenomenon. Small firms seem to cluster and thrive in each environment. The industrial district becomes a region; thus, it has spatial boundaries, and it becomes an entity recognized in the economic world as much as a province or state is recognized as a region in the political world (SABEL, 1989).

What causes these firms to flourish? Some analysts (e.g. SAXENIAN, 1991, 1994; GERTLER, 1993, 1995) maintain that innovation is important and is partially responsible for the growth and survival of firms in these regions. SAXENIAN (1994) provides one example by comparing the innovative, cooperative aspects of firms in Silicon Valley with the hierarchical, centralized decision-making of the firms along Route 128 in Massachusetts. Firms in both regions started producing electronics: semiconductors (1960s) and chips (1970s) in Silicon Valley, and transistors and other solid-state devices (1960s) and microcomputers (late 1970s) on Route 128, but, according to SAXENIAN (1994), firms in Silicon Valley soon dominated the semiconductor field and also took a lead with small workstations and personal computers, partly as a result of the innovative, cooperative arrangements they established.

GERTLER (1993, 1995) provides another example by examining the restructuring of particular innovative sectors, such as advanced-technology machinery producers, to determine the causes of successful relationships between the producers and users of this machinery, maintaining that they are enhanced by the three types of proximity mentioned above. Gertler found that long and extended interactions between producers and users are very important for small enterprises and those that are domestically owned, single-plant establishments. He also found that a lack of any of the three first types of proximity reduced the effectiveness of the interaction. According to Gertler, even large enterprises feel the need for closeness, in terms not only of distance, but also organizationally

and culturally. More recently, FRITSCH (2001, p. 297), who examines a broad array of German manufacturing firms in three regions, concludes that spatial proximity enhances horizontal cooperation among firms and helps firms to obtain public funding for the research institutions.

Other scholars (e.g. DEBRESSON and AMESSE, 1991, p. 388) argue that a network of innovators is needed to ensure the success of these industrial districts. This network can help reduce transaction costs, foster collective learning, link the innovation to the market, overcome failures in market creation for technological services, establish social norms and standards for the new market, and generate trust (TEUBAL *et al.*, 1991; SABEL, 1992). Continuous innovation, timeliness and rapid product development in turn require cooperation among firms (SAXENIAN, 1994).

Innovation is only one part of the picture. To compete effectively, firms must cooperate to meet the market demands and because of the need for production specialization. Firms in Silicon Valley, for example, form a regional network where there is collective learning, dense social networks, open labour markets, with considerable horizontal communication among firm divisions, and with outside suppliers, trade associations and universities (SAXENIAN, 1994). These practices enable firms in Silicon Valley to capture economies of scale and scope simultaneously at the level of the district rather than within the individual firm. The present author supports SABEL's (1993) and SAXENIAN's (1994) view that a key feature is cooperation, because it allows firms to reduce transaction costs by sharing research and development and by gaining access to credit, training, etc.⁵ This sharing reduces production costs of each small firm, which otherwise would not have low-cost access to such services.

Fig. 2 shows the uneasy triangle for the Italian model. Because cooperation among the small firms is assumed to occur to enhance the competitive position of the firms, cooperation and competition have a short link. Collaborative arrangements might exist, but they have less influence on the competitive behaviour of the firms.

Success of competitive firms and collaboration: the Japanese model

The present paper calls the analysis by scholars of the success of JIT production and competitive firms the Japanese model. These scholars (e.g. AOKI, 1990; BEST, 1990; DORE, 1986; IMAI and KOMIYA, 1994; ODAGIRI, 1992) were aware of the major transition occurring in the industrial organization of the firm during the 1980s. From their studies, primarily of Japanese firms, they identify the following chief characteristics of industrial organization: large firms outsource to small firms through long-term contracts, which provides a collaborative mechanism for risk sharing.

These long-term relationships reduce adaptive and transaction costs and enhance the efficiency of transmitting information from the large to the small firms. Small firms cluster near large firms to allow for JIT production, and by taking larger risks because of their high degree of diversification and financing capability, the risk-taking firm gets a greater risk premium in the form of profits. In addition, there is relative control of labour by the owners, and the Japanese cultural influence is significant. These analysts deal with regions only implicitly in their analyses.

The establishment of quality circles or work teams is one of the early methods SABEL (1993, pp. 14–15) mentions as a means for Japanese firms to get workers to do their own industrial engineering and to organize their own means of collaborating with outside suppliers and coordinating other logistical functions.⁶ SABEL (1993, p. 26) also claims that in Japan, joint programmes are enhanced by the creation of enduring mutual interests and by building ways to encourage reciprocity.

The complexity of the Japanese production system has led some researchers to question whether it represents a capitalistic and competitive system. KOMIYA (1994) argues that because of the various collective support mechanisms, the prevailing industrial organization system in Japan cannot be referred to as 'capitalism'. Many cultural and social factors, such as the security afforded by long-term employment and a desire for social equality, add stability to the life of the workers, a factor not found in purely competitive environments (DORE, 1973),⁷ even though some of the job security is beginning to erode (ITO, 1992; ODAGIRI, 1992). Also, some scholars (e.g. GLASMEIER and FUELLHART, 1996) note that the dependency ties that develop between suppliers and customers, because of the joint equipment purchases, mutual design, etc., might work against selection of the best supplier.

Others argue that the system in Japan is 'capitalistic' and competitive. They base this on the view that competition prevails even on the shop floor (KOIKE, 1994), that extensive control exists between the providers of finance and the employees (AOKI 1990), that the traditional Japanese style of management is being dismantled (ITO 1992), and that there is an increase of purchases from non-contract, including foreign, suppliers (ODAGIRI 1992).

This new competition posed by the Japanese system results from many non-economic factors. These include shared cultural norms; relations of trust between managers and permanent employees; JIT technologies; process efficiency (measured by processing-time factors); the social embeddedness of technology (based upon the way in which technological and organizational learning are embedded in the machinery); and decentralized supplier networks, mostly comprised of small- and medium-sized firms (BEST, 1990, pp. 144–166). SCHOENBERGER (1994, 1997) maintains that control by the managers over time and space plays an

important role in formulating the new competition. Additional characteristics of the Japanese setting are an extensive amount of subcontracting between large and small manufacturing firms, formation of regional complexes, the important role of the state,⁸ and the social division of labour (GLASMEIER and SUGIURA, 1991). Finally, other Japanese transformation scholars (e.g. IMAI, 1989; SAMUELS, 1987) maintain that with the growing importance of information technology, alternatives to the markets and hierarchies posed by WILLIAMSON (1975) will be needed.

In Fig. 2, the Japanese model is almost a mirror image of the Italian model, with the closest link in the uneasy triangle being between collaboration and competition. Collaboration takes the form of long-term contractual agreements between large and small firms and between the firm and its employees. Whereas Italian model analysts emphasize the important role played by the industrial district as a region, spatial relationships are mainly neglected by the Japanese model analysts, although, in fact, the contracting parties may be in different regions.

Success of large transnational firms and collaboration: the Global model

The present paper refers to the third group of restructuring analysts by the term 'Global model' because, in their early work, the present authors studied the success of multinational corporations in the post-Fordist period (e.g. AMIN and ROBBINS, 1990; GEREFFI, 1994; HARRISON, 1994; HELPER, 1991; MARTINELLI and SCHOENBERGER, 1991; SCOTT, 1993). These authors agreed that restructuring is occurring and that flexibility is being incorporated into the production and distribution processes, but they maintain that many of the other restructuring analysts place too much emphasis on the role of small firms. In order for flexible specialization to thrive, the Global-model analysts argue that networks among all sizes of firms are critical (CASTELLS and HALL, 1994).

How do these scholars view restructuring within a global context? They argue that multinational firms are participating in an increased internationalization of capital, more effective corporate integration, increased control over markets and finance, pushing of risks and costs along the supply chain over spatial and organizational boundaries onto small suppliers, and that multinationals need support from both the public and private sectors to establish collaborative arrangements.

An important forerunner to this global perspective is the work by CHANDLER (1977) on the rise of large firms. These firms, states Chandler, were greatly assisted in developing their dominant competitive position by the creation of the hierarchical organization of the firm, the presence of managers who oversaw the entire supply chain from the raw-material supplier to the ultimate

consumer, and the resulting ability to use these attributes and scientific-management procedures to reap 'economies of time'.

What ways does the large firm use to adopt more flexible production techniques and flourish? HARRISON (1994, pp. 9–10) suggested four ways. First, they are downsizing both the number of activities and the number of employees, thus reducing costs. Second, they segment the remaining employees by keeping the core workers at the headquarters and getting them to collaborate in the production decisions, and by dispersing the others to the periphery. Third, they network both within their own corporation and with other corporations, thus obtaining up-to-date information. Finally, managers are using computers increasingly both for manufacturing and management information systems to help coordinate and monitor their activities and employees and to increase the flexibility of production and marketing.⁹

What role, if any, do regions play? Many of the Global-modal analysts deal with regions in terms of the way the corporations develop a network of supplier/customer firms across space and allocate core workers to the urban centres and peripheral workers to the suburbs. ETTLINGER (1992), for example, investigates the way in which large corporate organizations affect the regional geography by clustering in certain locations. Also, GEREFFI (1994) developed a global commodity-chain framework, specifically studying segments of the chain, from the core region, where the innovating firms locate, to the peripheral regions, where the low-cost firms locate and employ low-skilled workers. Rather than looking at networks of firms in a region, Gereffi studied the network of large transnational firms and their customers across political, hence

regional, boundaries. These large producers, states Gereffi, control the supply chain.

Thus, most of the global analysts did not dispute the adoption of flexible manufacturing techniques among the small producers, but they maintained that large transnationals also determine ways to become flexible. The large firms dominate many of these small firms, with collaboration occurring only among managers and workers in the core. Workers on the periphery are not brought within this collaboration network, but are controlled by the firm in the core.

In Fig. 2, the Global model has two uneasy triangles. The first is like that of the Japanese model, with a close collaboration-competition link, in this case representing the arrangement between the managers and the employees in the core region. The second triangle for the Global model represents the behaviour for the part of the firm located in the peripheral regions. It resembles that of the competitive model, in which neither collaboration nor cooperation occur to any significant extent. Thus, Italian, Japanese and Global-model analysts tend to view regions, the 3Cs (competition, collaboration and cooperation) and networks in different ways (Table 1).

The Italian restructuring scholars state that small firms cluster to benefit from localization and social economies, forming industrial districts, hence regions. The firms in this region establish a network and cooperate with other firms within the cluster, developing trust relationships; in the process, they create both new internal organization boundaries within the district and new spatial boundaries. For these analysts, the region and the network are defined by the industrial district, which is comprised of small, often craft-based,

Table 1. Alternative industrial/regional restructuring models

Attribute	Success of small firms, Italian model	Success of competitive firms, Japanese model	Success of large multinational firms, Global model
Competition	Downplayed in favour of cooperation	Prevails even on shop floor Only some contracts are long term Control over time and space; very competitive in a global marketplace	Driving force of the global firm Oversee (control) entire supply chain of large and small suppliers
Collaboration	Joint work on project limited, but can occur	Long-term contracts between large and small firms	After downsizing, in core, employer-employees collaborate
Cooperation	Prevalent form of behaviour Constant product-process innovation Regional organizations: credit unions, research and development training, and information dispersion	Limited forms may exist	Limited forms may exist
Networks	Occur for small firms in an industrial district	Not stressed, but exist Small firms 'cluster' near large firms to achieve Just-in-Time and information sharing	Important for firms of all sizes
Regional	Industrial district as a region is as important as politically determined regions Network operates within this 'region' Strong regional identity	Small and large firms cluster Government influential in location decisions, but no specific role for the region	Core region has innovators and collaborators Peripheral region has low-cost firms that employ low-wage and low-skilled workers Networks cross spatial boundaries

firms that use various forms of cooperative behaviour to create effective competition.

In contrast, the Japanese restructuring scholars stress the competition among the firms and the contractual arrangements of large and small firms, regardless of location. These arrangements can be considered forms of collaboration. The small firms must be able to deliver supplies JIT. For the Japanese analysts, spatial boundaries do not seem to be seriously considered, while the organizational boundary goes beyond the internal structure of the large firm to incorporate contracts with small firms. The network of collaborating supplier–customer firms might cross regional boundaries, but the analysts do not deal with this fact explicitly.

For the global-restructuring scholars, the core and the periphery become the regional form. They view the large firms as conducting competitive behaviour from dispersed core locations around the world and having control over the small firms. Networks occur within the large corporation, among the large firms, and among the large corporation(s) and the small firms, mostly through supply chains, which cross spatial boundaries as they are extended globally. Collaboration is done by the managers and workers in the core, but it is not usually done with the periphery. The organizational boundary extends along the supply chain, with the large producer controlling the market.

Thus, each of the three sets of restructuring analysts stress different interrelationships (Fig. 2) among competitiveness, collaborative and/or cooperative behaviour. In addition, the role of regions varies among the three sets of analysts. Regions play a major role for the Italian analysts in that the industrial district helps to define the region. At the other extreme, the region in which the firm is located does not seem to matter for the Japanese analyst. For the global analyst, regions are the core and the periphery, which form the beginning and the end of the supply chain. The uneasy triangular relationship changes for each industrial/regional restructuring perspective, and, for each, it changes over time.

CONCLUSIONS

The paper stresses throughout that the interrelationships among the 3Cs can change from sector to sector, and over time, space and organizational entity, including among different types of networks. For the three restructuring models, it is concluded that no one model ever becomes sufficiently general to cover all the industrial and regional restructuring issues. By distinguishing between collaborative and cooperative relationships, it is illustrated how industrial and regional analysts use both types of behaviour to enhance the third type of behaviour, i.e. competition.

In today's global world, policy-makers who understand the distinction between these three types of behaviour should be able to design relevant industrial and regional policies to help firms compete in the

global marketplace. These policies may be ones that help firms overcome the constraints imposed by competition by making it easier for firms to establish rules of reciprocity for the exchange of information, to change production practices and adopt new technologies and/or to develop cooperative or collaborative relationships across spatial, organizational and labour boundaries. It has been indicated that if a firm undertakes collaborative or cooperative activities, it might be able to reap internal or external economies of scale and enhance its competitive position, but that the lowering of costs might not be the prime reason why a firm enters into such relationships. Instead, it might be to enhance its market access and market control or to maintain its regional connections.

Work on the present paper was started towards the end of the restructuring era in the mid-1990s as a way to understand the restructuring models, but the present author now (in 2003) views the paper not only as a reflection on the past, but also as a way to look into the future. Today, analysts are no longer emphasizing restructuring, but are looking into the future and discussing the role that LUNDVALL and JOHNSON'S (1994) learning regions or networks and other types of new relationships might play in industrial and regional development. AMSDEN (2001) maintains that the countries she examined had an unorthodox economic model governed by an innovative control mechanism. AMSDEN (2001, p. 11) states that the main reason for these countries is that they got the control mechanism 'right' rather than getting the prices 'right'.¹⁰ Although Amsden does not explicitly mention collaborative or cooperative relationships, it can be that as with the Third Italy, Silicon Valley and other successful regions, the establishment of such relationships in the country or among the countries helped them to compete successfully.

Empirical testing of the ideas presented here would be possible, but it is beyond the scope of the study. In addition to empirical tests, considerably more theoretical work is needed to understand the basic economic, political, social and psychological forces creating the 3C modes of behaviour and their interactions within and outside of the network of firms and regions. The restructuring process as it was known in the 1990s has changed. How will the competitive, collaborative and/or cooperative relationships be affected in the future? There are as yet no definitive answers. Firms and regions may find potential policies to enhance the interrelationships among competition, collaboration and cooperation, thus stabilizing the uneasy triangle of the 3Cs.

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NOTES

1. Industrial and regional restructuring is defined as the deliberate, sometimes planned, process by which the economic, social, cultural and/or political organization (structure) and boundaries of an industry or region are significantly altered. The industry usually does not move from its current location.
2. The last one is cited by FINE *et al.* (1995, p. 5), and ZELLER (2002) adds other types of proximity, such as institutional and relational.
3. One reviewer disagrees, but the author thinks it is because of the difference in interpretation of what is collaboration and what is cooperation and what is meant by trust. Analysts seem to indicate that a formal contract required for collaboration will not be signed unless the two or more parties signing the agreement 'trust' each other.
4. It will be shown below how the 3Cs are viewed by restructuring analysts to help develop networks.

5. One reviewer disagrees with the author's interpretation of the role of cooperation and collaboration in the Italian model. The author thinks this disagreement might be related to the interchanging by many authors of the terms 'collaboration' and 'cooperation' without distinguishing the differences in the types of behaviour. Another reason for the difference of opinion might be that each of the 'models' presented herein is undergoing transition; collaborative relationships are emerging in these industrial districts in Italy, but, as indicated above, the present interpretation is idealized and based on work by many analysts, including Saxenian and Sable.
6. SABEL (1993), at times, seems to confuse cooperation and collaboration. The present paper will take the liberty throughout of reinterpreting Sabel's terms to fit with the definitions used herein.
7. Consistent throughout Dore's writing is a healthy scepticism that the Japanese companies will become more like their Western counterparts, or that the two forms of industrial organization will ever converge (e.g. DORE and WHITTAKER, 1994, pp. 1–15; DORE, 1986).
8. AMSDEN (1989) maintains that in Korea, the state encouraged, and even forced, firms to collaborate.
9. Even in Japan, the large corporation is flourishing as it enters into the global marketplace. ITOH (1992) maintains, however, that as these large firms increase in importance, instability and income stagnation also increase for most Japanese workers, partially because of the lack of trade unions and limited state welfare policies.
10. According to ANTHONY and GOVARINDARAJAN (1995), the four control mechanisms are a sensor, an assessor, an effector and a communication network.

REFERENCES

- AMIN A. and ROBBINS K. (1990) Industrial districts and regional development: limits and possibilities, in PYKE F, BECATTINI, G. and SENGENBERGER, W. (Eds) *Industrial Districts and Inter-Firm Cooperation in Italy*, pp. 185–237. International Labour Organization, Geneva.
- AMSDEN A. H. (1989) *Asia's Next Giant: South Korea and Late Industrialization*. Oxford University Press, New York.
- AMSDEN A. H. (2001) *The Rise of 'the Rest': Challenges to the West from Late-Industrializing Economies*. Oxford University Press, Oxford.
- ANGEL D. P. (2002) Inter-firm collaboration and technology development partnerships within U.S. manufacturing industries, *Regional Studies* **36**, 333–344.
- ANTHONY R. N. and GOVARINDARAJAN V. (1995) *Management Control Systems*. Irwin, Chicago.
- AOKI M. (1990) Toward an economic model of the Japanese firm, *Journal of Economic Literature* **33**, 1–27.
- ARCHIBUGI D. and LUNDVALL B.-Å. (2001) *The Globalizing Learning Economy*. Oxford University Press, Oxford.
- ASHEIM B. T. (1996) Industrial districts as 'learning regions': a conduction for prosperity, *European Planning Studies* **4**, 379–400.
- ASHEIM B. T. (1998) Learning regions as development coalitions: partnerships as governance in European workfare states? Paper presented at the Second European Urban and Regional Studies Conference on 'Culture, Place, and Space in Contemporary Europe', University of Durham, UK, 17–20 September.
- ASHEIM B. T. and ISAKSEN A. (2002) Regional innovation systems: the integration of local 'sticky' and global 'ubiquitous' knowledge, *Journal of Technology Transfer* **27**, 77–86.
- AXELROD R. (1984) *The Evolution of Cooperation*. Basic Books, New York.
- BEST M. H. (1990) *The New Competition: Institutions of Industrial Restructuring*. Harvard University Press, Cambridge, MA.
- BIANCHI G. (1994) Requiem for the Third Italy? Spatial systems of small firms and multi-regional differentiation of the Italian development. Paper presented at the 34th European Regional Science Congress, Gröningen, Sweden, 23–26 August.
- CASTELLS M. and HALL P. (1994) *Technopoles of the World: The Making of 21st Century Industrial Complexes*. Routledge, London.
- CHANDLER A. D., JR (1977) *The Visible Hand*. Harvard University Press, Cambridge, MA.
- CHEW W. B., LEONARD-BARTON D. and BOHN R. E. (1991) Beating Murphy's law, *Sloan Management Review* **32**, 5–16.
- DEBRESSON C. and AMESSE F. (1991) Networks of innovators: a review and introduction to the issue, *Regional Policy* **20**, 363–379.
- DONER R. F. and SCHNEIDER B. R. (2000) Business associations and economic development: why some associations contribute more than others, *Business and politics* **2**, 261–288.

- DORE R. (1973) *British Factory–Japanese Factory: The Origins of National Diversity in Industrial Relations*. University of California Press, Berkeley.
- DORE R. (1986) *Flexible Rigidities: Industrial Policy and Structural Adjustment in the Japanese Economy 1970–80*. Stanford University Press, Stanford.
- DORE R. and WHITTAKER H. (1994) Introduction, in IMAI K. and KOMIYA R. (Eds) *Business Enterprise in Japan: Views of Leading Japanese Economists*, pp. 1–15. MIT Press, Cambridge, MA.
- ETTLINGER N. (1992) Modes of corporate organization and the geography of development, *Papers in Regional Science* **71**, 107–126.
- FINE C., GILBOY G., OYE K. and PARKER G. (1995) *The Role of Proximity in Automotive Technology Supply-Chain Development: An Introductory Essay*. MIT Press, Cambridge, MA.
- FRIEDLAND R. and ALFORD R. R. (1991) Bringing society back in: symbols, practices and institutional contradictions, in POWELL W. W. and DIMAGGIO P. J. (Eds) in *The New Institutionalism in Organizational Analysis*, pp. 232–263. University of Chicago Press, Chicago.
- FRITSCH M. (2001) Cooperation in regional innovation systems, *Regional Studies* **35**, 297–307.
- GEREFFI G. (1994) The organization of buyer-driven commodity chains: how U.S. retailers shapes overseas production networks, in GEREFFI G. and KORZENIEWICZ M. (Eds) *Commodity Chains and Global Capitalism*, pp. 95–122. Praeger, Westport.
- GERTLER M. S. (1988) The limits to flexibility: comments on the Post-Fordist vision of production and its geography, *Transactions: Institute of British Geographers*, **13**, 419–432.
- GERTLER M. S. (1993) Implementing advanced manufacturing technologies in mature industrial regions: towards a social model of technology production, *Regional Studies* **27**, 665–680.
- GERTLER M. S. (1995) 'Being There': proximity, organization, and culture in the development and adoption of advanced manufacturing technologies, *Economic Geography* **71**, 1–26.
- GLASMEIER A. and FUELLHART K. (1996) *What Do We Know About How Firms Learn?* Department of Geography, Pennsylvania State University, University Park.
- GLASMEIER A. and SUGIURA N. (1991) Japan's manufacturing system: small business, subcontracting, and regional complex formation, *International Journal of Urban and Regional Research*, **15**, 395–414.
- GRANOVETTER M. (1985) Economic action and social structure: the problem of embeddedness, *American Journal of Sociology* **91**, 481–510.
- HAGE J. and ALTER C. (1997) A typology of interorganizational relationships and networks, in ROGERS HOLLINGSWORTH J. and BOYER R. (Eds) *Contemporary Capitalism: The Embeddedness of Institutions*, pp. 94–126. Cambridge University Press, New York.
- HARRISON B. (1992) Industrial districts: old wine in new bottles?, *Regional Studies* **26**, 469–483.
- HARRISON B. (1994) *Lean and Mean: The Changing Landscape of Corporate Power in the Age of Flexibility*. Basic Books, New York.
- HELPER S. (1991) Strategy and irreversibility in supplier relations: the case of the U.S. automobile industry, *Business History Review* **65**, 781–824.
- HERRIGEL G. (1990) Industrial organization and the politics of industry centralized and decentralized production. PhD dissertation, Massachusetts Institute of Technology, Cambridge, MA.
- HERRIGEL G. (1992) Industry as a form of order: a comparison of the historical development of the machine tool industries in the United States and Germany, in STREEK W., SCHMITTER P. and ROGERS HOLLINGSWORTH J. (Eds) *Comparing Capitalist Economies: Variation in the Governance of Sectors*, pp. 97–128. Oxford University Press, New York.
- HIRST P. and ZEITLIN J. (1992) Flexible specialization versus Post-Fordism: theory, evidence, and policy implication, in STORPER M. and SCOTT A. J. (Eds) *Pathways to Industrialization and Regional Development*, pp. 70–115. Routledge, London.
- IMAI K. (1989) Evolution of Japan's corporate and industrial networks, in CARLSSON B. (Ed.) *Industrial Dynamics*, pp. 123–155. Kluwer, Dordrecht.
- IMAI K. and KOMIYA R. (Eds) (1994) *Business Enterprise in Japan: Views of Leading Japanese Economists*. MIT Press, Cambridge, MA.
- ITOH M. (1992) The Japanese model of Post-Fordism, in STORPER M. and SCOTT A. J. (Eds) *Pathways to Industrialization and Regional Development*, pp. 116–134. Routledge, London.
- KELLEY M. R. and ARORA A. (1996) The role of institution-building in U.S. industrial modernization programs, *Research Policy* **25**, 265–279.
- KELLEY M. R. and BROOKS H. (1992) Diffusion of NC and CNC machine-tool technologies in large and small firms, in AYRES R. U., HAYWOOD W. and TCHIJOV I. (Eds) *Computer-Integrated Manufacturing*, Vol. III: *Models, Case Studies, and Forecasts of Diffusion*, pp. 117–135. Chapman & Hall, New York.
- KOIKE K. (1994) Intellectual skills and long-term competition, in IMAI K. and KOMIYA R. (Eds) *Business Enterprise in Japan: Views of Leading Japanese Economists*, pp. 261–274. MIT Press, Cambridge, MA.
- KOMIYA R. (1994) The life insurance company as a business enterprise, in IMAI K. and KOMIYA R. (Eds) *Business Enterprise in Japan: Views of Leading Japanese Economists*, pp. 365–386. MIT Press, Cambridge, MA.
- LAZONICK W. (1993) Industry cluster versus global webs: organizational capabilities in the American economy, *Industrial and Corporate Change* **2**, 1–24.
- LINCOLN J. R., GERLACH M. L. and TAKAHASHI P. (1992) Keiretsu networks in the Japanese economy: a dyad analysis of intercorporate ties, *American Sociological Review* **57**, 561–585.
- LOCKE R. M. (1995) *Remaking the Italian Economy*. Cornell University Press, Ithaca.

- LORENZ E. H. (1992) Trust, community, and cooperation: toward a theory of industrial districts, in STORPER M. and SCOTT A. J. (Eds) *Pathways to Industrialization and Regional Development*, pp. 195–204. Routledge, New York.
- LUNDVALL B. Å. and JOHNSON B. (1994) The learning economy, *Journal of Industry Studies* **1**, 22–42.
- MARCEAU J. (1995) A networked nation or a complex issue? Reshaping industry analysis, *Journal of Industry Studies* **2**, 19–34.
- MARKUSEN A. (1996) Sticky places in slippery space: a typology of industrial districts, *Economic Geography* **72**, 293–313.
- MARSHALL A. (1920) *Industry and Trade*. Macmillan, London.
- MARTINELLI F. and SCHOENBERGER E. (1991) Oligopoly is alive and well. Notes for a broader discussion on flexible accumulation, in BENKO G. and DUNFORD M. (Eds) *Industrial Change and Regional Development*, pp. 117–133. Belhaven, London.
- MATHEWS J. (1995) Introduction to the Special Issue: Innovation networks, East meets West, *Journal of Industry Studies* **2**, 1–18.
- MCCORMICK L. E. (1996a) Clustering and the future of Chicago's metalworking sector. Paper presented at the 43rd Annual Meetings of the North American Regional Science Association, Washington, DC, USA, 14–17 November.
- MCCORMICK L. E. (1996b) A life-cycle model of manufacturing networks and Chicago's metalworking industry. PhD dissertation, Department of Urban Studies and Planning, Massachusetts Institute of Technology, Cambridge, MA.
- MCCORMICK L. E. (1998) *Are They 'Rent-seekers' or Innovators: Assessing the Capacity of Interfirm Networks*. Hunter College, New York.
- MYTELKA L. K. (2001) Mergers, acquisitions, and inter-firm technology agreements in the global learning economy, in ARCHIBUGI D. and LUNDVALL B.-A. (Eds) *The Globalizing Learning Economy*, pp. 127–144. Oxford University Press, Oxford.
- NAKATANI I. (1984) The economic role of financial corporate groupings, in AOKI M. (Ed.) *The Economic Analysis of the Japanese Firm*, pp. 227–258. Elsevier, Amsterdam.
- NORTH D. C. (1981) *Structure and Change in Economic History*. W. W. Norton, New York.
- NORTH D. C. (1990) *Institutions, Institutional Change and Economic Performance*. Cambridge University Press, Cambridge.
- ODAGIRI H. (1992) *Growth Through Competition: Competition Through Growth*. *Strategic Management and the Economy in Japan*. Clarendon, Oxford.
- PIORE M. J. and SABEL C. F. (1984) *The Second Industrial Divide*. Basic Books, New York.
- POLENSKE K. R. (2001) Taking advantage of a region's competitive assets: an asset-based regional economic-development strategy, in *Entrepreneurship, Firm Growth, and Regional Development in the New Economic Geography*. Proceedings of the Uddevalla Symposium, Trollhättan, Sweden, 15–17 June 2000, pp. 527–544.
- POLENSKE K. R., MCCORMICK L. E., PEREIRA A. E. and ROCKLER N. O. (1996) *Industrial Restructuring, Infrastructure Investment, and Transportation in the Midwest*. Department of Urban Studies and Planning for the Joyce Foundation, Chicago Manufacturing Center, and National Institute for Science and Technology, Cambridge, MA.
- PORTER M. E. (1990) *The Competitive Advantage of Nations*. Free Press, New York.
- PYKE F., BECATTINI G. and SENGENBERGER W. (Eds) (1990) *Industrial Districts, Interfirm Cooperation in Italy*. International Labour Organisation, International Institute for Labour Studies, Geneva.
- SABEL C. and ZEITLIN J. (1985) Historical alternatives to mass production: politics, markets, and technology in nineteenth century industrialization, *Past and Present* **108**, 131–176.
- SABEL C. F. (1989) Flexible specialization and the re-emergence of regional economics, in HIRST P. and ZEITLIN J. (Eds) *Reversing Industrial Decline*, pp. 17–70. Berg, Oxford.
- SABEL C. F. (1991) Moebius-strip organizations and open labor markets: some consequences of the reintegration of conception and execution in a volatile economy, in BOURDIEU P. and COLEMAN J. S. (Eds) *Social Theory for a Changing Society*, p. 23–63. Westview, Boulder.
- SABEL C. F. (1992) Studied trust: building new forms of co-operation in a volatile economy, in PYKE F. and SENGENBERGER W. (Eds) *Industrial Districts and Local Economic Regeneration*, pp. 215–249. International Institute for Labour Studies, Geneva.
- SABEL C. F. (1996) A measure of federalism: assessing manufacturing technology centers, *Regional Policy* **25**, 281–307.
- SAMUELS R. (1987) *The Business of the Japanese State*. Cornell University Press, Ithaca.
- SAXENIAN A. (1991) The origins and dynamics of production networks in Silicon Valley, *Regional Policy* **20**, 423–438.
- SAXENIAN A. (1994) *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*. Harvard University Press, Cambridge, MA.
- SCHMITZ H. (1996) *From Ascribed to Earned Trust in Exporting Clusters*. Institute of Development Studies, University of Sussex, Falmer.
- SCHOENBERGER E. (1994) Competition, time and space in industrial change, in GEREFFI G. and KORZENIEWICZ M. (Eds) *Commodity Chains and Global Capitalism*, pp. 51–66. Praeger, Westport.
- SCHOENBERGER E. (1997) *The Cultural Crisis of the Firm*. Blackwell, Cambridge, MA.
- SCOTT A. J. (1993) *Technopolis: High-Technology Industry and Regional Development in Southern California*. University of California Press, Berkeley.
- STORPER M. (1997) *The Regional World: Territorial Development in a Global Economy*. Guilford Press, Oxford.
- TEUBAL M., YINNON T. and ZUSCOVITCH E. (1991) Networks and market creation, *Regional Policy* **20**, 381–392.
- WILLIAMSON O. E. (1975) *Markets and Hierarchies: Analysis and Industry*. Free Press, New York.
- ZELLER C. (2002) Project teams as means of restructuring and development in the pharmaceutical industry, *Regional Studies* **36**, 275–289.