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The New Flexible Economy: Shaping Regional and Local Institutions for Global Competition

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**The New Flexible Economy: Shaping Regional and
Local Institutions for Global Competition**

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Introduction

A major disappointment of the era of strong regional policies of the 1960s and 1970s was their failure to eliminate regional disparities, both economic and technological. The lack of success had at least two causes. First, the regional policies pursued at that time were

essentially top-down in nature. It was typical to have centrally-planned, concentrated industrial and infrastructure strategies, with implementation largely in the hands of large industrial enterprises and their subsidiaries. The strong conceptual base for regional planning was at all times the Keynesian welfare economics paradigm, which extended throughout the world. The major conceptual model of industrial decentralization took place in the form of the "growth pole" model, which was left much to be desired. In general, the growth pole model was based on the idea that growth typically did not grow in a decentralized manner, but rather in a concentrated manner (Hansen, 1987, pp. 12-13).

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Introduction

A major disappointment of the era of strong regional policies of the 1960s and 1970s was their failure to eliminate regional disparities, both economic and technological. The lack of success had at least two causes. First, the typical regional policy of that era was

essentially top-down in nature. It was based on large-scale, spatially-concentrated industrial and infrastructure investments, with decision-making largely in the hands of large industrial oligopolies and financial institutions. The prevailing conceptual base for regional planning was growth pole theory, whose influence eventually extended throughout the world. Although a considerable amount of industrial decentralization took place in this context, the quality of the decentralized jobs left much to be desired. In retrospect, it is apparent that externally-induced growth typically did not provide a solid basis for sustained regional or local development (Hansen, 1987, pp. 11-12).

The same was found virtually throughout the world, where branch plants provided some employment, but little long-term benefit. In addition, the unintended effects of other, non-regional policies, which often acted in the opposite direction, added to the failure of regional policies to have their desired effects (King and Clark, 1978; Rees, 1987).

A second cause was the changing relationship of technological innovation to the process of economic development. This complex relationship, still imperfectly understood, is especially difficult to place in the context of regional policies. The most common, mechanistic view of technological change — that new technologies begin and are adopted first in large cities, which then benefit from economic growth — ignores the more complex reality found empirically. R&D efforts and the generation of new innovations may be "growth-inducing", or not, depending on the structure of corporations and their allocation of activities (Pred, 1977). Technological change does not benefit all places equally. Process innovations, embodied in machinery, have become those least likely to advance the places where they are "adopted". Branch manufacturing plants are common locations of such new technology, and the benefits to their regions may be slight or even negative. Thwaites (1983) found employment losses were common in the locations of early process innovations. By contrast, product innovation, the endeavours found in corporate R&D facilities, is commonly associated with employment gains.

Development policies were at first largely oriented toward neoclassical economics, export-base theory, large-scale organizations, and formal institutions. Macroeconomic forces, such as the oil crises of the 1970s, in addition to political changes related to supply-side economics, also forced revision of regional development policies away from earlier

redistributive policies. In response to the failure of conventional theory and policies to generate regional growth in peripheral regions, some "bottom-up" strategies were proposed in order to make local development independent of global processes (Stöhr, 1981; Stöhr and Taylor, 1981). Thus, during the 1970s and 1980s development policies emerged to embrace a much greater orientation on local and informal mechanisms and on stimulating private investment and entrepreneurship (Marelli, 1985). A decentralization of policy initiatives also took place, sometimes spontaneously, resulting in what have been called bottom-up policies, now widespread among among the OECD countries (Hanson, 1983; Fox Przeworski, 1986; Hansen, 1987, OECD, 1987; Albrechts et al., 1989). The *indigenous potential* of a region and its technological capability emerged as major elements in regionally-based economic growth. This indigenous potential is largely embodied in innovative potential, local skills, and entrepreneurship (CURDS, 1979; Pajestka, 1979; Ewers and Wettmann, 1980; Sweeney, 1987).

From the point of view of regional policy, few other new initiatives have been submitted. Political sentiment in most countries has swung toward greater reliance on "the market" rather than on government or state action, a shift which has become the hallmark of the 1980s and 1990s. The prominent decentralization of policy initiatives to the local level, however, necessitated a greater understanding of the mechanisms of local, as opposed to national, economic development.

The combination of these two directions — bottom-up policies and a concern with technology — led to tremendous competition for high technology activities. Based on observations throughout the OECD countries, Brainard, Leedman, and Lumbers (1988, p. 30) have warned that

the intense competition between regions places the less developed ones at a considerable disadvantage in that they are often unable to provide conditions and incentives comparable to those offered by more developed regions for drawing research-based organisations to their areas. This can widen rather than narrow regional disparities.

Finally, the economic crisis of the late 1970s and 1980s had several effects. Growth rates of GNP, along with consumer demand and investment into new plants, dropped from earlier levels. Consequently the potential for mobile investment via branch plants was much lower than it had been in the 1960s and early 1970s (Klaassen and Molle, 1983). This decreased both confidence in the ability of top-down models and the ability of nations to afford continued attempts to decrease regional differentials. Perhaps most importantly, it

raised awareness that the gains during the preceding decades, in the convergence of regional economies, had been due primarily to the fact that widespread economic growth (which had raised the economic level of even many backward regions) was no longer happening. Thus, fewer branch plants were now available to locate in peripheral locations, and the lure of low wages was no longer sufficient.

Flexibility: The New Context for Policy

These trends were also complicated by the emergence of a new paradigm which had deeper effects. The move from the Fordist towards a post- (or neo-) Fordist paradigm began to affect firms in advanced economies (Harvey, 1989; Benko and Dunford; 1991; Storper and Scott, 1992). Consumer demand grew more differentiated, product cycles became shorter, and the pace of technological change quickened. This generally increased both the need for firms to gain flexibility in their operations and also the need for innovation. Small firms benefitted from this trend to a certain extent, as well as from the restructuring and the move of large firms towards "lean production", which prompted externalisation of certain processes and activities (Holmes, 1986; Scott, 1988). Overall, the stage was set for a paradigm shift in regional policy which took place in the form of bottom-up strategies since the early 1980s.

The new flexible economy, a new economic and technological context for economic activity, also has a major influence on the nature of policies — one that has only begun to be fully appreciated and addressed by policies. Its characteristics are complex, involving capital-intensive investment, labor flexibility (for both skilled and unskilled workers), and new ways of organizing production and interactions with suppliers and customers. The principal reason for flexibility is the speeding up of product cycles, which means that economies of scale and the large production volumes that are assumed no longer apply, and that a much greater amount of attention must be paid to product innovation in order to generate the succession of new product cycles.

The objective of regional policies must be what it has always been: to improve the economic and social condition of people in all regions. Increasingly, it is seen that this can be met best and in the most widespread manner by improving the competitiveness of firms — large and small — in all regions. The task of addressing the needs of small firms is the greatest, because of their numbers involved in most economies (Sengenberger and Pyke, 1990). The ability of small firms to succeed in export markets, one of the greatest challenges, provides some hints about the array of information that is often lacking among

such firms (Christensen, 1991). The small-firm focus, which was the essence of early calls for addressing endogenous innovation potential (CURDS, 1979; Ewers and Wettmann, 1980), is still easily ignored in the hurry to have visible effects. Large firms are simply more visible.

This bottom-up focus of policies to improve the competitive position of small firms also comes at a time when national policies regarding technology transfer and the flow of technological information are undergoing serious re-examination. In the USA, for example, where the top-down, trickle-down technology model has long operated, new proposals suggest that only a "trickle-up" strategy can have an effect on the many small firms which had been ignored, more or less completely, by the previous generation of policies (Chiang, 1991).

Information flows and contact networks have perhaps always been the basis of local economic success (Thorngren, 1970; Andersson, 1985; Johansson, 1987). However, the decentralized structure of information flows, and their sectoral and local specificity have always made them extremely difficult for policy to address. Branch plants imposed in their host regions an external focus for communication, and to some extent cut off local flows (Sweeney, 1987). Thus, differences among regions can be an important constraint on regional policies, again pointing toward the need for regionally-specific policy approaches.

Tödttling's (1992) research in Austria reinforces the importance of the regional setting for the innovativeness of firms. Five regional "types" showed markedly distinct variations in the degree and nature of innovation activity among firms in each area. Although other regional typologies are possible, these five provide sufficient clarity to illustrate that policy must also vary: (1) dynamic urban agglomerations with R&D, skilled labor, and service links, (2) newly industrialized (intermediate) areas, with actively innovative and competitive small and medium sized firms, (3) old industrial areas, where little product innovation takes place and where firms face considerable competition from both lower-priced and more sophisticated competitors elsewhere, (4) stagnant peripheral rural areas, dominated by branch plants and routine production, and (5) modern rural areas, characterized by modern machinery and a focus on niche markets. These regional types constrain the ability of any policy to be equally effective in all regions.

Bottom-up Strategies

The diffusion-oriented top-down approach described above, aiming at the attraction of external branch plants or subsidiaries to less developed regions, had shown some success in terms of job generation and "modernization" of less developed regions. In some of these regions a technological modernization through those branch plants took place (Glasmeier, 1988; Tödtling, 1990). The most famous example of this kind perhaps was Silicon Glen in Scotland (Haug, 1986), but there are also less spectacular cases in other countries and regions (Breheny and McQuaid, 1987). Still there were clearly limits to this approach in terms of the stimulation of entrepreneurship and the generation of endogenous innovation (Sweeney, 1987). Branch plants generally were not breeding grounds for potential entrepreneurs nor did they stimulate much technological upgrading in the rest of a regional economy (Malecki, 1991, Sutherland, 1993).

There is no single accepted definition of bottom-up strategies (for an overview see Stöhr and Taylor, 1981; Hahne, 1985; Bassand et al., 1986; Sweeney, 1987; Stöhr, 1990; Garofoli, 1992). However, there are certain common elements to be found. These are: 1) the central role of entrepreneurship and firm formation, 2) the process of technological innovation to enhance the competitiveness of existing firms, and 3) the presence of local and regional networks to support these processes.

Stimulation of entrepreneurship and firm formation

The central role of entrepreneurship in economic development had been emphasized by Schumpeter (1935), but it has long remained an exogenous factor in theory of economic development and considered as "manna from heaven." More recently, since the resurgence of small firms in the mid-1970s, the firm formation process has attracted more interest (Birch, 1979; Keeble and Wever, 1986; Sweeney, 1987). It now is seen as a product not just of personal characteristics of entrepreneurs but also of their social, economic and institutional "embedding" into the region. The central concern of regional policy thus shifted towards the local environment and the support of firm formation (Keeble and Wever, 1986; Sweeney, 1987; Aydalot and Keeble, 1988; Malecki, 1990; Garofoli, 1992).

The decline of Fordist production, although it did not take place in the same way in all industries, permits a greater role for entrepreneurship. Entrepreneurs, always a major force in finding new niches, were able to capitalize on the opportunities in new products and in small — even custom — production. From a regional point of view, however, it soon became clear that entrepreneurship also benefits from the characteristics found primarily in

large, dynamic urban regions. Indeed, a large amount of research, initiated in response to local, bottom-up policy concerns, all pointed toward the same set of conditions for regional "success" (Shapero, 1984; Andersson, 1985; Birch, 1987; Dubini, 1989).

The factors conducive for entrepreneurship and firm formation were, due to the complexity of the problem, rarely investigated systematically or comprehensively (Moyes and Westhead, 1990; Malecki, 1991). Nevertheless, we can identify a set of key factors relevant in the process (Keeble and Wever, 1986). The supply of potential entrepreneurs is seen as being dependent on the existence of role models (successful examples), the industrial structure (low entry barriers), the firm structure (small firms), the occupational profile (non-manual occupations) and educational achievements. The favourable development of start-ups, furthermore, is dependent on factors such as access to capital and markets, business services and favourable government policies (Healy and Ilbery, 1990; Malecki, 1991; Maier and Tödting, 1992). Also, soft and "invisible" factors such as the attitude towards small businesses and self-employment have been found relevant (Doeringer et al., 1987; Maillat, 1991).

Not all areas, therefore, are equally prone to success in new firm formation. It remains a process heavily biased toward areas where entrepreneurship had occurred previously, and it tends to reinforce the growth of places and regions where education and opportunity are greatest. Those urban regions where entrepreneurs can learn from other entrepreneurs, where information flows are commonplace, and where a range of labor skills is readily available are able to succeed most. It is not difficult to conclude that regional growth based on entrepreneurship could have the same concentrated pattern as those based on large-scale enterprises. Yet, "solutions" based on high technology and local innovation activity became widespread during the 1980s (Gibb, 1985; Malecki and Nijkamp, 1988; Luger and Goldstein, 1991). In short, "there seem to be no general 'success models' of regional development . . . particular local and regional conditions require uniquely devised strategies and models" (Bergman et al., 1991, p. 298).

Local and regional bottom-up policies in the 1980s have tried to stimulate the firm formation process through a variety of instruments and programs such as the establishment of incubators, training programs, advisory activities in the legal, management and technical fields and the provision of seed capital. There are few evaluations of such programs and few "hard" results, but a general finding is that, due to the complexity of the firm formation process, policies find it hard to change an environment adverse to entrepreneurial activities

into a favourable one (Dubini, 1989; Allen and Hayward, 1990). Policies run at the local level are clearly more successful in the already better-off regions or in "intermediate" regions (Garofoli, 1992), thereby increasing the distance to the regions at the bottom end. In peripheral regions or old industrial areas where several of these factors usually are lacking, policies to stimulate entrepreneurship only had little and slow success.

Stimulation of innovation in existing firms

The second main element and challenge of bottom-up strategies was the improvement of the innovative performance in already existing firms (particularly SMEs) in order to enhance their competitiveness. However, the process is seen nowadays more complex than it has been viewed in the classical diffusion approaches. The problem is not just one of adoption, in the sense of installing a "ready" technology bought on the market, but the change of product and process technologies in a more complex and continuous way.

Product innovation refers first of all to the introduction of truly "new" products (those which were not on the market before), but increasingly it also has to do with modifications and higher-quality versions of existing products. Frequently these modifications result from the embodiment of new generic technologies (such as electronic components, use of new materials) into existing products. Process innovation generally aims at productivity increases but increasingly as well at quality improvements of products as well as a higher flexibility of the processes. Process innovation also includes the organization of production and the supply and distribution linkages.

The result of this increased intensity of technological change is that, in contrast to the linear innovation model underlying e.g. product cycle theory, there is no longer a clear-cut differentiation and no clear sequence from research to development and to production and distribution. Instead, the innovation process is highly interdependent, and includes a variety of ways of learning and of generating new knowledge (Kline and Rosenberg, 1986; Malecki, 1991). For example, by learning from customers and from suppliers, by interacting with other firms, by searching for new technologies, and by taking advantage of spillovers from other industries, firms are able to enhance their technological capabilities (Bell, 1984; Lundvall, 1988; Malerba, 1992; David, 1993).

From existing research we know that both product innovations and process change depend on three sets of factors (Tödtling, 1990; Camagni, 1991; Malecki, 1991):

- factors internal to the firm (functions performed and the degree of their integration, human capital and skills, and the firm's strategic orientation;
- the local environment or "milieu"; as well as
- distant network relations with firms and institutions outside the local or regional milieu.

Existing innovation policies rarely take this more complex conception of the innovation process into account. Usually they provide information and financial support for the adoption of new production processes, or they simply give financial support for specific activities such as R&D or the introduction of product innovations (Ewers and Wettmann, 1980; Thwaites, 1982; Bassand et al., 1982). Additional instruments like education, enhancement of qualifications and human capital and provision of innovation-relevant infrastructure gave these policies in some cases a broader scope.

One set of policy mechanisms, generally called industrial extension, is considered to have perhaps the greatest likelihood of success at improving the innovative performance of existing firms. Simons (1993) lists several programs developed in the United States for industrial extension, some of them very firm-specific, others more general. The most likely to succeed are those which are able to affect the largest number of firms.

Small firms, the focus of bottom-up policies and the basis of regional economic success, are often late in adopting new technologies. While there are several reasons for this, the consequence is that their regional economies therefore lack competitiveness as well. Why is adoption frequently delayed? First, small firms operate at a smaller scale and cannot afford specialists or the free time for managers to think about strategic actions. Second, labor force skills may be lower among small firms than in larger ones. Third, SMEs have insufficient knowledge about markets and market trends — a major shortcoming in an age of flexible, market-oriented production (Rosenfeld et al., 1992).

Based on a recent examination of policies in the states of the USA, Rosenfeld et al (1992, pp. 22-35) suggest several characteristics of best-practice programs:

scale: A critical mass of resources is needed to have an impact on a sufficiently large number of firms.

comprehensiveness: Programs must address all industrial sectors and product lines, and provide services to address marketing, office modernization, industrial design, and management assistance.

accessibility: Programs must be available to firms in all communities. "Every modernization program ought to be assessed according to how well it addresses the needs of its most remote clients" (Rosenfeld et al., 1992, p. 24).

sustainability: Programs must have long-term funding, not live year-to-year.

demand and market focus: The best programs are linked to the marketplace and to customer requirements; new investments by firms will not be justified otherwise.

complementarity: Public programs should complement, not duplicate, private services.

SME and worker input: Small and medium-size firm owners and managers and their workers must be involved in the design and delivery of services.

Improving skills: Programs should aim toward a skilled, innovative workforce in order to remain competitive.

Return on investment: Programs should be concerned primarily with costs, intended and actual results, and relative value to firms and to the public.

State programs in the USA to modernize manufacturing use seven strategies: they provide brokering (middleman or gatekeeper) services, provide information (about suppliers, equipment, import and export opportunities, and training), assess firm needs and identify shortcomings, solve problems, demonstrate new technologies, provide support services, and offer incentives to firms to innovate, expand markets, and to modernize (Rosenfeld et al., 1992, pp. 35-52). Each of these strategies employs some mix of collective action, one-on-one assistance, general support services, information systems, and system and infrastructure.

Existing experiences show that overly narrow or partial approaches of innovation policy addressed to SME's in less developed regions frequently fail: Many technology extension programs neglect the fact that a lack of information on new technologies is just one and usually not the main barrier for a better innovative performance of those firms. The same critique applies to the mere financial support for R&D or product innovations, neglecting other barriers inside and outside the firm.

Stimulation of local and regional networks

An important third element of bottom-up strategies has been the stimulation of networks within the respective region. This refers to a variety of linkages, including vertical client/supplier links, service links, horizontal cooperative links as well as informal information flows (see Aydalot and Keeble, 1988; Maillat, 1991; Garofoli, 1992; Cooke and Morgan, 1993). While the earlier approaches of endogenous development saw among the main benefits of these links the reduction of various "leakages" (Stöhr and Tödting, 1977; Hahne, 1985; Bassand et al., 1986), the more recent literature on "innovative milieux" argues that these linkages provide coherence in a production system and as a consequence allow collective learning (Stöhr, 1986; Aydalot and Keeble, 1988; Camagni, 1991; Maillat, 1991; Hansen, 1992; Storper, 1992).

Local and regional networks have been stressed in particular by the "milieu approach," whereby the "milieu" is defined as the socio-economic environment of an area resulting from the interaction of firms, institutions and labor (Aydalot, 1986; Aydalot and Keeble, 1988; Maillat, 1991). This interaction leads to a common way of perceiving economic and technical problems and of finding respective solutions. The milieu fulfills the task of informal knowledge transfer through mobile labor, information links, supplier and customer links as well as through various forms of cooperation. Although large firms also are frequently engaged in networks, local networks are said to be most important for small firms, which are less able to maintain costly boundary-spanning functions (such as R&D) or distant cooperations (Camagni, 1991; Maillat, 1991). Education and training institutions play an important role, as do institutions engaged in firm formation and technology transfer such as incubators and innovation centers (Herrigel, 1989; Bergman et al., 1991; DeBresson and Walker, 1991; Garofoli, 1991; Storper and Harrison, 1991; Pyke and Sengenberger, 1992; Cooke and Morgan, 1993).

Based on the experiences of "success stories" of some high-tech regions (Silicon Valley, Route 128, M4 Corridor) as well as a number of other dynamic regions (Third Italy, Baden Württemberg, West Jutland) localised networks of small firm have been viewed as a model for the new flexible economy (Piore and Sabel, 1984; Pyke and Sengenberger, 1992; Zeitlin, 1992). These are producing a variety of customized products in small volumes, cooperating not only in production but also in distribution and in technological development (Garofoli, 1991).

Competitive advantages in such districts and in "new industrial spaces" (Scott, 1988) are achieved by high quality, know-how or design intensity as well as by flexibility and customization, instead of by scale economies and low cost. The network supports the innovation process by spreading risks, combining resources; and by sharing know-how and experience. Innovations are in fact regarded as a product of the local milieu since " ... it is often the local environment which is, in effect, the entrepreneur and innovator, rather than the firm ... " (Aydalot and Keeble, 1988). Spatial proximity and territorial agglomeration are considered as important preconditions for the creation and the functioning of such an innovative milieu (Stöhr, 1986; Camagni, 1991). This is because highly skilled personnel are interregionally not very mobile, direct personal and informal contacts are highly relevant, and synergy effects are expected from a common cultural, psychological and political background.

Networks of innovative small firms are to be found in various types of regions, leading to some hope that they might be a general model for regional economic development (Aydalot, 1986; Aydalot and Keeble, 1988; Pyke and Sengenberger, 1992; Cooke and Morgan, 1993). Some of them, particularly the high tech industries, cluster around large metropolitan areas (such as London, Milan, Paris, Madrid and Barcelona), others are in intermediate regions with more diffused industry (Third Italy: clothing, textiles, leather goods, ceramics, furniture; Baden Württemberg: machine-tool industry; West Jutland in Denmark: garment/knitting, furniture), and Andersdorp (Sweden): mechanical engineering. Finally there are also examples in "old industrialised" regions in the process of restructuring (Swiss Jura: watch industry).

The constitution of firm networks at the local and regional level is attributed not just to economic but also to socio-cultural factors resulting from the history of the region (Garofoli, 1991). Local and regional authorities as well as chambers of commerce and industry in recent years have set up institutions to stimulate such local and regional networks. However, as can be seen from "success regions" like Baden Württemberg, Third Italy and others, networking has to be supported by a variety of institutions and actors and, in general, cannot easily be arranged by one or two public agencies. In addition to local and regional authorities and chambers, firms, educational institutions, universities, business services have to take their part. As in the case of the environment for entrepreneurship described above, most of the "ingredients" have to be already there in order to make it work (Smilor and Feeser, 1991).

Globalization and the Limits of Networks

The Limits of the Local Network Model

It has been suggested that localised small firm networks might become a general model for regional development in the new flexible economy (Sabel, 1989; Maillat, 1990; Garofoli, 1991). However, this proposition has been challenged on a number of grounds. At the conceptual level, a clear-cut transition from Fordism towards a networked small-firm economy has been questioned (Sayer, 1989; Amin and Robins, 1990). Large firms are far from leaving the stage (Martinelli and Schoenberger, 1991), and distant and global networks as well as supranational institutions gained importance in the 1980s. Gertler (1993) recently suggested that even local networks themselves are insufficient for long-term competitiveness of firms unless the local area also contains machine producers to support the local manufacturers.

Empirically, the evidence up to now is also not convincing:

- There are rather few regions in Europe and the US which have been serving as standard examples of dynamic small firm networks ("success stories"). Other regions have also been cited (Zeitlin, 1992), but the differences seem to be larger than the similarities.
- A closer look in fact reveals that these regions are very heterogenous: they range from regions with family- and craft-based industries having sometimes very low levels of technology (many districts of "Third Italy") to sophisticated high-tech regions at the "frontier" of technological development. From about 60 industrial districts in "Third Italy" over 50 were specialised in fashionware (textiles, clothing, shoes and other leather goods) or wooden furniture (Amin and Robins, 1990, p. 17).
- Both the high-tech regions and the districts are subject to rapid organisational change. On the one hand, small firms under competitive pressure are forming large groups in order to stay competitive, others are rapidly internationalising their markets and networks. On the other hand, these regions also get penetrated and dominated by external large firms (Gordon and Dilts, 1988; Brusco, 1992; Zeitlin, 1992).
- Consequently, there are many more regions which are linked in one way or the other to large coordinating or leading firms, inside or outside the region (see Storper and Harrison, 1991; Schmitz, 1992) or which have no significant network links at all.

- The empirical evidence for the strength of linkages at the local/regional level stays often anecdotal rather than systematic. Frequently there is an implicit bias favouring the identification such localised networks.

From the standpoint of policy, there are several impediments to the successful implementation of a bottom-up strategy based on the industrial district model. Because there are many, typically small, users or recipients, each with specific needs, it is very difficult to bring policies to recipients. The diverse objectives also mean that there is no strong pressure group to ensure a continued flow of funding over a sufficient period of time. The results are visible only in the medium and long run, and in general are less visible (due to smaller firms and projects), also making it difficult to maintain funding levels. Finally, under adverse conditions (especially in regions at the bottom end), policies take even more time and effort, or fail to work at all because of a lack of endogenous potential.

Industrial technology extension policies are very labor-intensive and to find the right people for the job of extension agents is difficult. They require the personality and skills of a "gatekeeper," a term traditionally used in technological studies to refer to well-connected individual with the knowledge that can influence a large number of small businesses. Gatekeeping is largely an informal activity, and relies on a personal inclination to interact with others in social, personal, and business contact networks (Falemo, 1989). Further, within dynamic localities or communities, a key role is played by "community entrepreneurs" or "key individuals," who tend to have very large personal networks (Johannisson and Nilsson, 1989; Stöhr, 1990, p. 4).

The Persistent Significance of Large Firms

In addition to being embedd into local networks, large firms also are increasingly integrated into international and global R&D networks (Castells, 1989; Howells and Wood, 1992). This occurs both internally, through the location or acquisition of R&D units in several countries, and in the form of interfirm arrangements (through various forms of R&D cooperations and alliances). Major forces of this globalization of R&D are to be found in a changing macro research environment (Howells and Wood, 1992) such as the emergence of pervasive new technologies (information technologies, new materials and bio-technologies) breaking down traditional barriers between technological disciplines. Moreover, there is an increasing complexity of new technology, leading to increasing cost and time spans to develop new products while the life span of new products on the other hand has been

reduced. Firms are thus seeking to extend the market for new products as fast as possible, to build up a stronger research base through mergers and acquisitions and/or to externalise certain steps of the R&D process.

International and global R&D networks are interorganisational: Firms, particularly the large ones, are engaging into distant or global networks through carefully selected formal cooperations and strategic alliances (see Camagni, 1991; Freeman, 1991). Freeman (1991) defines the formal interfirm networks as joint ventures, research corporations, technology exchange agreements, minority holdings for technological reasons, licensing and second sourcing agreements, subcontracting, research associations, government sponsored joint R&D programs and computer networks for technical interchange (Freeman, 1991, p. 502). These allow them to organise complementary resources in the innovation process, reducing the development time of the new product, and/or to open up new markets more rapidly.

International R&D networks are also increasingly supported by supranational institutions and programs (Malecki, 1991; Charles and Howells, 1992). Within Europe there exist already a number of research and technology programs aiming at the international cooperation of firms and research institutions. At the European level such programs are COST (Cooperation on Scientific and Technological Research in Europe) (since 1971), EUREKA (European Research Coordinating Agency) (1985) and ESA (European Space Agency) (1987). Within the European Community particularly the second (1987-91) and third (1990-94) Framework Program for Research and Technology are supporting international R&D projects (Commission of the EC, 1991). It appears that from these programs mainly large firms have been benefitting. For SME's it is rather difficult to be fast enough in getting the necessary information, to organize the partner(s), and to go through the application procedure.

We may conclude that there is an increasing relevance not just of local networks (particularly for small firms) but, at the same time, of international and global networks. From several studies it appears that there are also relations between these different types of networks. International and global network-links are sometimes established in order to tap into the knowledge base of a specific local or regional milieu. In the case of the Silicon Valley, Gordon and Dilts (1988) have shown that a number of inward investments and cooperations from foreign firms to Silicon Valley firms had just this intention. On the other hand, Camagni (1991) has pointed to the fact that the local milieu also needs the link to international and global networks in order to stay innovative and avoid decline (an "entropic

death") in the long run. Linkages between the local milieu and global networks may exist in various ways, e.g. through large firm - small firm cooperations and subcontracting, through spin-offs from large firms or through mobile labor.

In general, localised networks based on dynamic small firms are the exception rather than the rule (Tödtling, 1992). Particularly in less developed areas most small firms are either of the "stagnant" type or satellites dependent on large firms outside the region (Taylor and Thrift, 1983). Despite some growth of small firms since the mid-1970s, overall the corporate sector is still keeping the lead. A regional policy which excludes large corporations and their location- and network strategies runs the risk of putting itself into a position of irrelevance (Amin, 1992).

Attracting Mobile Investment

The continued presence of global firms means that regions cannot focus exclusively on endogenous firms or local networks. They also must make themselves sufficiently attractive to large firms as the latter make investments in plants, offices, and laboratories far from their headquarters and traditional base. The location of mobile investment is no longer based simply on labor costs or any other "single overriding location factor", but on a more complex bundle of attributes that firms match to their specific requirements for a particular investment (Netherlands Economic Institute, 1993). Consequently, regions should examine their relative strengths and weaknesses against their competitor regions, and develop strategies to attract the particular sectors and activities which match this profile and which they stand a reasonable chance of securing. The resultant package of policy measures should then be related to the needs of firms in the chosen sectors (Netherlands Economic Institute, 1993).

Regional and Local Institutions and Development Potential

The multi-faceted nature of economic change suggests that there is no simple formula or recipe that regions and localities can use to attain development. Their institutions must shape themselves to their local circumstances, which vary to some extent according to the regional types used in this paper, in order to catch or maximize local or regional development potential. In general, those institutions should go beyond top-down and bottom-up and be concerned with the following tasks:

- (1) The stimulation of entrepreneurship as well as innovation in existing firms through local networks, thereby combining the separate approaches outlined above. Education and training have to address these needs, as do consulting and technology extension activities. The latter must reach a critical mass, and they have to be comprehensive and accessible to most of the firms in the region.
- (2) They should provide support for the internationalization of regional firms, in terms of both markets and inter-firm cooperations. This refers to brokerage activities as well as to advice concerning the management, financial, and legal problems concerning international links. They might also give support for international subcontracting relations, taking account of their changing nature (more selective, high-quality relations) and the new international quality standards.
- (3) Globalization implies that local institutions should be concerned with the attraction of foreign firms fitting into the regional profile. This implies a more focused approach to attract international investment, and includes the identification, shaping and marketing of regional strengths. Infrastructure policy (including education, training, research, transport and communication) support this profile in a comprehensive way. Those institutions, however, should be concerned not only with the attraction, but also the integration, of foreign firms into the regional economy. That is, they should stimulate links to regional firms and institutions in order to maximize regional benefits. These links certainly do not form automatically, as growth pole policies (and others) found. Moreover, links to regional firms and organizations are among the principal potential attractions of some places which other regions will be unable to "match".

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