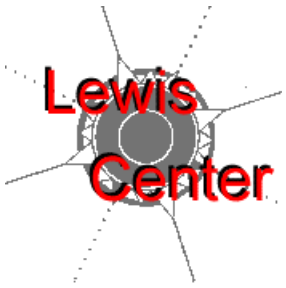

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Flexible Manufacturing Networks and the Welfare of Workers

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Part I. Introduction

A crisis of competitiveness assaulted large, vertically integrated, mass-production firms in many industrialized countries in the 1960s and 1970s; in response, firms created and continue to reshape both their internal structure and their relationships with other firms (Piore and Sabel 1984, Harrison and Bluestone 1988, Harrison 1994, Storper and Scott 1992). Scholars and policy-makers alike have studied the multiple forms of industrial organization that have emerged in the ensuing twenty years, analyzing both their viability and social desirability. One such form of industrial organization comprises small and medium-sized enterprises who cooperate with one another in informal and fluid production networks to quickly respond to changing market opportunities. These “flexible manufacturing networks” (FMNs) are currently celebrated as a way to increase technological dynamism and flexibility and thereby to arrest manufacturing decline and to increase regional competitiveness (Piore and Sabel 1984, Saxenian 1994, Hatch 1991, Bianchi 1993). Citing the now almost sacred example of the Emilia-Romagna region of Italy, many scholars and policy makers extoll the virtues of FMNs, associating this new industrial organization with a "high-road" path to development in which innovation and high skills are rewarded and suggesting that such networks can be created through policy (Bianchi 1992, 1993 .

The creation and support of FMNs has become a tool in the belt of regional policy makers in both Europe and the U.S. Although policies supportive of industrial networks have long been present in industrial districts in Europe—and more rarely in the U.S.—these have generally provided only industrial extension services, such as the promotion and dissemination of applied industrial research or the development of marketing capacity. Not until recently have the formation of manufacturing networks and the promotion of interfirm cooperation been seen an explicit strategy for promoting industrial upgrading. State and local governments, trade associations, community development agencies, universities, and vocational colleges have all undertaken efforts to promote networking among firms.

In practice, the promotion of FMNs involves bringing groups of manufacturers to cooperate on specific, concrete problems they all face, such as training employees or finding new markets. Involvement in collective projects, proponents suggest, breeds trust or "social capital". Social capital can then generate a longer-term capacity to promote learning, build collective know-how, form inter-firm alliances, and develop the capacity to respond to new challenges. Through the construction of multiple FMNs, network proponents hope to replicate the industrial districts in Europe (Hatch 1991, Indergaard 1996).

Implicit in proponents' promotion of FMNs is the belief that these networks do in fact represent the best chance for high-wage countries to retain manufacturing jobs and at the same time to improve job quality and wages. In discussion, proponents tend to equate the increased competitiveness resulting from network formation with job retention and improvement (Hatch 1991). We argue that such an assumption is a leap of faith, based on a false association of a particular form of industrial organization with a particular type of industrial relations. In reality,

flexible production systems can be combined with any number of arrangements governing industrial relations, some that benefit workers and some that hurt them (Christopherson and Storper 1986, Salais 1992). Clearer analysis on this issue is crucial: the assumption that network benefits translate automatically into worker benefits has inhibited a search for mechanisms that can be combined with flexible manufacturing in order to assure that benefits are in fact distributed to workers. We highlight several mechanisms that can be combined with networking to assure spread of benefits at the end of the paper, and call for further exploration by network theorists and practitioners in this area.

As we will show, the theoretical literature does, to a limited extent, address some ways in which flexible manufacturing systems are associated with particular outcomes for workers. This question is almost never addressed, however, in the empirical literature that examines actual experiences of FMNs in specific contexts—particularly experiences in the U.S. Moreover, there has not to our knowledge been an attempt to identify either the existing conditions under which FMNs can help workers or ways to shape network-promotion policy to assure that the benefits of networks are distributed to workers. These are the tasks we have set ourselves in this paper.

Part II: The Theorization and Creation of FMNs

Over the last twenty years, scholars have developed a general consensus recognizing the decline of Fordism from its position as the dominant system of economic governance in the industrialized countries. In the post-WWII Fordist system ruled by the welfare state and Keynesian economic policies, growth was driven by large, vertically integrated, mass-production firms that were characterized by relatively stable industrial relations (Piore and Sabel 1984, Harrison and Bluestone1991, Harrison 1994, Storper and Scott 1992,). Since the 70s, this system has faced a crisis of competitiveness that authors have variously ascribed to an international underconsumption crisis, the waning of U.S. political and economic world dominance, political conflicts in industrialized countries, the rise of the information age, and other major structural transformations of capitalism in the late twentieth century (Piore and Sabel 1984, Harrison and Bluestone 1988, Harvey, 1989; Lipietz, 1989). This crisis of competitiveness has resulted in a dramatic transformation of the organization of intra- and inter-firm relations in manufacturing. The large vertically-integrated producers have been joined or supplanted by a variety of new forms of industrial organization: in the midst of great variety, one common feature of the new forms is flexibility as expressed by the presence of rich and varied subcontracting relationships. Rather than conjoin all stages of the production process under one firm's Fordist roof, multiple firms establish a web of subcontracting arrangements such that the final output cannot be said to be the product of any one firm.

Scholars have focused attention on the new forms of intra-firm and inter-firm relations for several reasons. First, more flexible froms of industrial organization seem to be a key to competitiveness in the global economy. Second, certain forms of industrial organization were thought to go hand-in-hand with specific labor-management relations and distributive outcomes. Piore and Sabel described the decline of relatively stable unionized work as part and parcel of the

decline of mass production but asserted that flexible manufacturing networks could lead to new favorable forms of industrial relations that distributed the benefits of regional competitiveness. Third, scholars recognized that we were seeing an unusual diversity of industrial organization, technological trajectories, and industrial relations, all at the same historical moment, all jostling to replace Fordist mass production. The possibility of shaping these configurations through policy led scholars and practicioners alike to explore the dynamics and replicability of the most attractive of the emerging systems.

The examples most often cited were the industrial districts of Emilia-Romagna and other regions of the "Third Italy". There, networks of small producers in such industries as textiles and machine tools had emerged after mass producers had purposely decentralized production as a way of breaking out of seemingly intractable labor-management conflicts. Initially, small firms served as a pool of subcontractors dependent on the large firms and were characterized by rudimentary technologies, evasion of taxes and labor laws, and other features of low-productivity sweatshops. These isolated, "low-road" subcontractors evolved, however, into regional agglomerations of small firms engaged in technologically sophisticated and innovative craft production. They quickly developed high degrees of social trust and information exchange, based on the social and familial relations already existing in these localities. These in turn allowed fluid subcontracting relationships and constant innovation that proved crucial in responding to new market demands or opportunities (Bianchi 1993). These much acclaimed FMNs have been a key component of a "high-road" regional economic-development path in Northern Italy that not only produced high rates of economic growth but distributed that growth in the form of rapidly increasing wages and decreasing unemployment. We will use the example of Emilia-Romagna as a touchstone throughout this discussion.

The Competitive Strengths of FMNs: What Is to Be Replicated?

The emergence of industrial districts of flexible manufacturers has led policy-makers to attempt to create FMNs where they are not present. As part of this project, scholars have tried to dissect the specific mechanisms that help networked firms become more competitive. Two overlapping perspectives on the competitive benefits of networks have developed.

Flexibility and Innovation

The first perspective emerges directly from the theoretical analysis alluded to above and addresses the dynamics of innovation and increases in productivity within particular industrial systems. The literature promoting networks claims that, in comparison to vertically integrated companies engaged in mass production, small firms embedded in various overlapping networks are particularly well suited for the on-going flexibility and learning necessary to respond to rapidly changing markets and technologies (Bianchi 1993, Indergaard 1996). In fact, says this viewpoint, it is the fluidity of the relationships possible with small, diverse production units that distinguishes them from more vertically integrated firms: at their best, these networks of small units make up an “information and relationship rich” form of organization that contains

“dramatic degrees of diversity because they have no rigid boundaries or no notion of membership” (ACEnet 1993). In addition, the specialization of firms in specific aspects of an industry as well as the accumulation of individual and collective know-how concerning the organization of a particular production cycle leads to external economies and creates the basis for on-going technological dynamism.

The literature identifies the concept of flexibility with two distinct sets of capabilities, and the distinction is crucial. Christopherson and Storper break flexibility into flexibility within firms and flexibility within the production system as a whole—what we can call intrafirm flexibility and interfirm flexibility.

Intrafirm flexibility means that the individual firms within a region can, on one hand, scan the market continually to identify rapid changes in demand or the sudden appearance of niche opportunities and, on the other hand, adjust production processes to take advantage of these market changes as quickly as they arise. Manufacturers achieve internal flexibility by using more general-purpose machines, broadly skilled workers, and close links between conception and execution (Christopherson and Storper 1986). In general this kind of flexibility is called "post-Fordist" in order to contrast it to earlier, rigid line-flow and continuous-flow production processes. The Holy Grail of such production flexibility is the one-unit run with fixed costs no greater than those of a million-unit run. The market corollary is a product customized to meet the needs of each individual customer. Although the flexing is essentially internal to the firm, networks can support production flexibility by allowing timely exchanges of information about processes and management tactics.

Interfirm flexibility is the ability of FMNs to allow a regional production system as a whole to respond quickly to changing markets and competitive contexts. Such flexibility is a question of building rich subcontracting relationships between vertically disintegrated specialist producers and either other such producers or larger firms within the system (Christopherson and Storper 1986). Flexibility in the network is augmented through frequent rearrangement of the contracting agreements to meet changing final product demands. In contrast to a vertically integrated firm with in-house suppliers who have fixed capital, a network can adjust to achieve optimal scales of production by adding or subtracting firms. When the system is built on social trust and fluid flows of information, the added costs due to interfirm transactions are low and more than offset by the gains due to adjusting the scale and content of output (Storper 1994, Christopherson and Storper 1986).

Fluid rearrangements of subcontracting agreements can also encourage innovation. Saxenian suggests that in Europe's industrial districts, the "spontaneous regrouping of skill, technology and capital" enables the pursuit of new technical and market opportunities, such that "the region, if not all the firms in the region, is organized to innovate continuously," (Saxenian 1994, p. 9). In describing the Silicon Valley, she shows how the open labor markets and dense social networks

of highly skilled workers promote innovation by facilitating information exchanges and allowing collaboration across firm boundaries.

Other authors emphasize the importance of a set of more intangible assets that are created when there are relationships of trust among competitors in a region. Bianchi speaks of the collective knowledge embodied in networked sectors of the Emilia-Romagna region, knowledge not only about the production process itself but about the various actors involved in it. The latter knowledge allows for very flexible and non-hierarchical subcontracting arrangements that use the skills in the region in the most productive arrangements. Storper describes the "untraded interdependencies" inherent in a "learning economy" and the particular importance of proximity in industries in which the exchange of uncodified knowledge across firms is necessary for dynamic technological innovation (Storper 1994).

Whereas a manufacturing network can be helpful in supporting intrafirm flexibility, its pivotal importance is in supporting the construction of interfirm relationships. Indeed, the diverse and shifting relationships among buyers, suppliers, and peers are, from the manufacturers' points of view, the bones and flesh of an FMN. The underlying message of much of this literature is that there are limits to what an individual firm can do to continue to push the envelope of flexibility and innovation. John Cleveland, former director of Michigan's Modernization Service, sums this up when he says, "The locus of global competition has shifted from the firm to the system in which the firm operates," (Friedman 1991).

Market failures and the disadvantages of smallness

Practitioners offer a second perspective on the competitive benefits of networks, stepping down from high theory to examine the mechanisms of networks from a pragmatic angle. Generally, these authors have focussed on the ways in which networks help small firms overcome the disadvantage of their size. According to these authors, many of whom are directly involved in promoting networks, networks do two main things: they help small firms overcome certain sub-optimal outcomes or market failures (Helper 1992) and they provide a conduit for efficient, effective delivery of services from the public sector ("Flex Appeal").

Sub-optimal outcomes most frequently arise from economies of scale or scope that are not capturable by individual small firms. There are examples of various sorts: the collection and analysis of high-quality market information (Helper 1992) and the development of new technologies can both be prohibitively expensive endeavors; the provision of extensive training, by contrast, is often affordable for a firm, but because employees don't necessarily stay put a firm cannot ensure that it will reap the benefits of its investment in training. Helper asserts that from a policy perspective the type of network initiative that is appropriate haseverything to do with the type of market failure that exists. Where a market failure is on-going, as with training or technology expenses, on-going public support will likely be necessary. In cases where start-up

costs are the problem, such as setting up a large joint-marketing or market-information effort, a one-time "catalyst" approach may be sufficient (ibid).

Networks can also increase the efficient and effective delivery of public services, both by lowering the per-company cost of service delivery and by creating a constituency for public services that can more clearly define and articulate firms' needs. Often in the past government agencies have pursued initiatives in technology assistance or financing with individual firms, a strategy that is more expensive than pursuing the same initiative with an already-organized consortium of firms (ibid). More important, most such government initiatives have been narrow in scope—that is, they focus on technology transfer, technical assistance, training, or financing alone—and so have failed as modernization or industrial development strategies. By contrast, networks can create demand for all of these services and can "integrate fundamental realignments of business practices into a cohesive whole," (Friedman 1991).

FMNs and the Welfare of Workers

Despite the striking success of various craft industries comprising SMEs in the Emilia-Romagna region, and despite their position as the pre-eminent examples of the potential of FMNs, they clearly are not the only form of industrial organization that has achieved great degrees of flexibility and rapid and on-going innovation. Harrison and others have shown ways in which large manufacturing firms also learned the lessons of flexibility and openness. They have built networks with other large firms and with their subcontractors that are just as innovative—and thus just as competitive—as the networks of small and medium-sized craft-based firms. In fact, some of the clearest benefits of networks of peers are mirrored in networks of subcontractors cultivated by larger firms. Japanese firms, for example, frequently create a controlled adversarial-yet-cooperative relationship between competing subcontractors wherein each subcontractor must work hard to remain innovative yet can also depend on eventually having information about the innovations of other subcontractors shared with them.

Perhaps the most visible success story of a U.S. networked regional economy is that of the Silicon Valley in California. Saxenian argues that the open information flows and the fluid definition of what is inside and outside the firm present in the high-tech industry there have facilitated the technological dynamism and flexibility characterizing the region. She contrasts the vitality and adaptability of the Silicon Valley with the stagnation of the high-tech corridor of Route 128 in Massachusetts, showing how the rigid vertical integration and lack of networking and outsourcing that characterize the Massachusetts firms left them unable to adapt to changing markets (Saxenian 1994).

The Silicon Valley clearly demonstrates that FMNs are not necessarily combined with positive distributive outcomes. While the Silicon Valley certainly creates a demand for highly skilled workers, it continues to depend on low-wage labor even in its own region. The bifurcated labor market that exists in Silicon Valley suggests that firms find flexibility under many guises,

sometimes helping workers, sometimes hurting them. On the one hand, labor flexibility for high skilled workers is associated with visions of a new work place, one characterized by team-based production, worker empowerment, and employee-management cooperation. The argument is that the benefits of innovation need to be shared with workers in order to create a community of interest that will keep the innovation flowing. In the Silicon Valley and elsewhere, this argument seems, in the minds of managers at least, to apply only to a certain segment of the workforce. By increasing part-time and contingent work forces, often hired through "temp" agencies, firms are increasingly "outsourcing" their labor force, much in the same way that they outsource their inputs (Harrison 1994). For this reason, some researchers have claimed that the new forms of production are themselves a major cause of the increasing bifurcation of the industrial world's labor markets (Moody 1996, Bluestone and Harrison 1988).

The Role of Institutional Context and Public Policy

Forms of industrial organization with high degrees of networking and flexibility clearly do not always increase the welfare of workers. In fact, the Emilia-Romagna region is noteworthy precisely because of its unique combination of competitiveness and an egalitarian distribution of income (do we have any data on this?). What are the unique characteristics of the FMNs in Emilia Romagna that lead to positive distributive outcomes?

First, one difference in the Italian FMNs is the presence networks comprised of small and medium-sized enterprises, in which contractor and subcontractor often change roles from one year to the next. In contrast to networks dominated by large firms, the relatively symmetric power relations within small firms seems to be an important factor in explaining positive distributive outcomes, since profits and risks are distributed more broadly across firms.

Second, the model FMNs in Italy targeted quickly changing, high-quality niche markets for craft-based products which placed a high value on skilled workers. Cook notes how small and medium-sized Italian textile firms were more successful than mass producers in meeting the competitive challenges posed by imports from lower-wage countries in the 60s. They did so by abandoning imitative, commodity areas of apparel and positioning themselves in more upscale markets, niche markets that demanded non-standard production methods and high-quality, ever-changing products. The small and medium-sized enterprises quickly developed the flexibility that allowed them to respond to changes in fashion (Cook 1994). Part of this flexibility was the interfirm flexibility discussed earlier, what Charbit *et al.* call the "deverticalization" of the industry—a series of organizational innovations that brought increasing flexibility and economic and social cohesion to Pratto textiles. But another central part was the multivalent skills of workers in these small firms. The crucial point here is that in serving such niche markets the textile firms increasingly employed "skilled workers using flexible machinery" (Charbit *et al.* 1991). That is, the source of value added to a product was increasingly the skill and knowledge of workers rather than routines and speed embedded in rationalized, technologically rigid production lines. Thus a particular market strategy made possible by the formation of small-firm networks ended up shifting worker skill to the center of production.

Underneath this marketing and organizational strategy, there are also social and institutional factors that shaped the development of the Emilia Romagna networks. Among the social factors present in the Italian case are active and diverse social networks among manufacturers and some limit on entry into the network to preserve trust and the value of collective goods. This social context also facilitated the negotiation of consensual arrangements to spread the costs of economic restructuring. Couralt and Romani assert that flexibility was in fact the" reward" for this smooth regulation of economic, social, and political elements in the face of market uncertainty and change (1992:205).

Public policy also has played an important role. In Emilia-Romagna, supportive municipal and regional governments were key in providing the context that allowed the small-firm federations to flourish. They provided investments in infrastructure designed for small firms, such as vocational schools, industrial parks with common dining areas, and sometimes research centers tied to industrial extension services, similar to those in Japan (Piore and Sabel 1984). Local and regional governments also passed and enforced strict labor laws, essentially closing out "low-road" strategies for regional firms. Removing wages and labor conditions from competition is said to be necessary both to create a community of interest among workers and employers, thus fostering a climate of innovation, and, by cutting off the option of pursuing strategies that require low-cost labor, to encourage cost savings or productivity gains from technological and managerial improvements (Piore and Sabel 1984, p. 272). This was central to Emilia-Romagna's dual success of stellar economic growth and rising wages and employment.

In general, the literature suggests that the manufacturing model idealized in the Italian case can arise only under specific circumstances that have as much to do with the institutional context as with the flexibility inherent in vertically disintegrated production systems. This institutional context includes both government policy and much more intangible assets such as social trust, deep and diverse social networks among manufacturers and skilled workers, deep historical knowledge of craft industries, and other assets which are not easily replicated through public policy.

It is also important to note that not all observers are convinced of the long-term competitive viability of the model FMNs. Bianchi, Harrison, and others suggest that flexible manufacturing districts in many contexts have a competitive advantage over the old-fashioned vertically integrated mass producers, but that they are not so competitive with respect to the modernized large firm that outsources extensively and that develops strategic partnerships. Large firms even have some advantages in their abilities to stabilize markets with trademarks and advertising, to hedge against fluctuations in market prices and exchange rates, to invest their extensive resources in research and development, and to remain free of the rich but potentially intractable and unresponsive social networks on which small firms depend (Bianchi 1993). Harrison goes further and asserts that it is unlikely that FMNs of small firms will be able to maintain competitiveness over time. In some of his examples, the network is taken over by a large core

firm—whether an invader from outside or the winner of the local competition—which imposes a hierarchy on the network. In other cases the network goes into decline and reverts to a set of fragmented, uncompetitive subcontractors dependent on low-road strategies of low wages or self-exploitation (Harrison 1994, Chapter 4). The viability of networks aside, Harrison additionally suggests that the "new economy" is only a partial coating on the old, that Fordist product standardization is alive and well, and therefore that networks in general are being oversold as a competitive solution

Network Promotion Efforts in the United States

The crucial and extensive public support of networks in Italy and other parts of Europe has been absent here in the U.S. , where efforts to promote networks have been much more modest. The U.S. government has embodied its commitment to FMNs in the creation of NIST, the National Institute for Standards and Technology, which has provided funding for a variety of small network-promotion efforts.

Network efforts are generally poverty-reduction measures that hope to stave off the decline of small firms in a region and an industry and, less frequently, to help small firms move toward a high-road competitive strategy. Often initiated within local or state government agencies, trade associations, or non-profit community development organizations, network promotion efforts usually seek to encourage small firms within a particular industry to develop relationships of trust with one another. In order to build this social trust, network promoters or brokers begin by offering some service which gives them a role as conveners of a group of manufacturers. The service can be educational forums, financial or organizational support for a joint training, marketing, or other business-upgrading project, or something else. Thus, while network brokers promote collective projects that they perceive as valuable, the projects are also means to an end. Promoters' longer-term objective is to build relationships between manufacturers that are self-sustaining, that form the basis of formal or informal organizations, and that can be called upon into the future to address common problems, to engage in new business collaborations, or to respond to new opportunities in a more cooperative and coordinated manner.

Networks that have undertaken the provision of services include the mold-making apprenticeship program of the Berkshire Plastics Network (Renzi 1995), the loan consortium built by the Pennsylvania Foundryman's Association (Helper 1992), the on-line marketing database created by the Needle Trade Action Project in Massachusetts (op. cit.), and scores of other similar efforts. Less common are collaborative production activities which rely on the kinds of subcontracting seen in the Third Italy, but these exist as well—for example, the joint bidding for production sharing by the Louisiana Furniture Industry Association and the joint marketing, market research, and exporting by the Greater Syracuse Metalworking Industry (op. cit.).

The Silicon Valley has been portrayed as the closest U.S. counterpart to Europe's industrial districts. It provides an interesting view of the role of institutional context in shaping regional

agglomerations of FMNs. As Saxenian portrays this example, it was neither an "organic" outgrowth of culture and history nor a network constructed through public policy. It was however the result of the efforts of Stanford University and one man, Frederick Terman, to create a collegial industrial atmosphere which encouraged a high degree of exchange, both formal and informal, of information and people among firms. As mentioned above, Saxenian attributes Silicon Valley's competitiveness—particularly its flexibility and its technological dynamism—to this collegiality or lack of rigid or insular structures. Nevertheless Saxenian makes the point that, despite the Valley's success, the individualistic culture and the lack of recognition of the crucial value of cooperation has led Silicon Valley firms to endanger their own long-term dynamism by failing to build cooperative institutions. Thus her policy recommendations include, on the one hand, the provision of a range of "collective services that spread risk and pool technological expertise" and, on the other, explicit support for network building as an end in and of itself (Saxenian 1994, p. 167). The recent creation of Joint Venture: Silicon Valley may change this; it is a non-profit with several initiatives promoting cooperative regional business planning.

In sum, none of the U. S. efforts are full-fledged regional development strategies that include a broad array of institutional or infrastructural supports: there is little building of supportive public institutions to carry out and disseminate applied research, little raising or enforcing labor standards to take labor costs out of competition, and little direct building of new and stronger relationships among manufacturers. The literature describing attempts at creating networks is essentially a chronicle of small gains devoid of a larger context of regional industrial strategy. It seems to be this lack of a larger policy context that has doomed U.S. networks if not to failure then at least to limited competitive gains. With the exception of the Silicon Valley example (which was an initiative originating in a private university) network promotion efforts have been able to make marginal contributions to the competitiveness of specific sectors but not to generate the region-wide benefits seen in Europe. As Lichtenstein concluded from his survey of twenty-seven U.S. networks for NIST, nowhere in the U.S. "has a network initiative emerged that is truly transforming—capable of changing general business culture and practice in a few years," (Lichtenstein 1992). Most importantly for our purposes, network promotion efforts have seldom helped workers in any tangible or direct way.

Part III: When Can Networks Benefit Workers?

The proponents of FMNs claim as their primary goal the increase of regional or national competitiveness or productivity. In many cases these proponents assume implicitly that networks will result in more and better jobs. Serious evaluation of the actual effects of networks on workers, however, has been minimal.

The few theoreticians who explicitly address the distributive outcomes of FMNs conclude that the institutional context in which the network is embedded is the key determinant of the degree to which competitive gains will be shared with workers. Christopherson and Storper thus show how the movie industry in Los Angeles, while clearly characterized by networks, open labor markets, regional agglomeration, and other features of flexible production, has not led to the

more egalitarian industrial relations of Europe's industrial districts (1984). Storper and Scott, in one of the few attempts to integrate analysis of labor relations with the study of flexible manufacturing systems, link a variety of forms of flexible production with corresponding systems of labor-management relations, and again conclude that only in specific institutional contexts where wages are taken out of competition and networks are not rigidly hierarchical does flexible production lead to positive outcomes for workers (1990). Salais also analyzes the links between flexibility and industrial relations, developing a typology of conventions or rules governing labor relations that have evolved in response to different kinds of products and the different kinds of labor used to produce them (1992).

A number of theorists reverse the equation, insisting that building a collective order that maintains high standards for the quality of life within a region is a *prerequisite* for a climate favoring the building of trust and community necessary to the "learning economy" (Storper and Scott 1995, Scott and Rigby 1996, Couralt and Romani 1992). That is, manufacturers must be forced to limit competition on the basis of low wages. Good wages therefore are not a result but a precondition of flexible and innovative production networks.

This presents a contradiction that usually remains unquestioned in the literature. From one perspective, theoreticians argue that the formation of an economy characterized by FMNs can occur only if wages are already taken out of competition. From a second perspective, proponents of FMNs propose them as solutions to deficiencies in regional competitiveness, deficiencies which in turn have caused low wages or high rates of unemployment. In the first view the sharing of benefits is a requirement for success of the competitiveness strategy; in the second view the sharing of benefits is a socially desirable outcome of the competitiveness strategy.

The first view is as likely to be a normative one as to be a generalizable description of what is: there is substantial evidence that regions can embark on high-growth paths characterized by highly flexible and innovative networked firms and by a competitive strategy that is substantially based on low-wage work. Silicon Valley stands as a clear example: while a segment of the workforce clearly is embedded in a learning economy based on social networks, free flows of information, and a community of common interests with entrepreneurs, another segment, the low-wage workers essential to the vigor of the first, remains outside such a socially desirable context.

The lesson that emerges is that to assure positive distributive outcomes, network promotion must be accompanied by the development of an appropriate institutional support system that encourages or forces the distribution of competitive gains. While this is best done within a full-fledged regional development strategy, there are nonetheless ways to shape even the kind of modest network promotion efforts that we are seeing in the U.S.

The following are four ways in which the modest network-promotion strategy currently in vogue in the United States can be made to benefit workers. We offer these not as any sort of comprehensive taxonomy of policies but as the beginning of a cataloging of strategies for using this area of industrial policy to benefit workers, or at least to protect them from the worst effects of industrial restructuring.

1. When Networks Serve Unmet Training Needs: OPEC

The first situation we describe in which manufacturers' networks can have a beneficial effect on workers occurs when the networks specifically address the industry's training needs. Benefits to workers include promotion opportunities within the same firm and the acquisition of skills that may be marketable.

Training programs are a frequent activity of manufacturing networks. Out of twenty-seven manufacturing networks reviewed by the National Institute for Standards and Technology, ten are working on training issues (Lichtenstein 1992). Manufacturers often choose to tackle training as their first project both because it is one of the most common shared needs and because state and local governments are frequently very responsive to manufacturers' training concerns and are often able to provide some resources. In addition, a joint project on training by-passes the fears many manufacturers have about other collective efforts, which often require much greater levels of trust. Joint marketing efforts, for example, may require the sharing of perceived trade secrets.

In choosing to train workers, networks can help overcome a common market failure: the underinvestment by individual firms in upgrading skills. This market failure results from the uncertain returns firms face when they invest in training (Becker 1975). Government intervention is often seen as the necessary solution to underinvestment in training, but manufacturing networks offer another form of collective action that can both encourage training and make it more effective. In practice, rather than substituting for the government, manufacturing networks involved in training usually work *with* government agencies and with public educational institutions. The involvement of a network of manufacturers helps government training programs be more effective by creating better links between the entities that do the training and the industries that use it; the lack of such links is a traditional weakness of U.S. training programs. Manufacturers can help design curriculum that meet the specific requirements of their industry and can help ease transition from training to employment.

In the case of FMNs and training as in others, however, the benefits accruing to the industry are not automatically distributed to workers. Instead, improving conditions for workers depends on a particular set of connections between networks, the content of training, and the labor market. While training increases the skills of workers, if firms make the entire investment in training they may find ways to avoid rewarding higher skills with higher pay. In our review of training

programs initiated by manufacturers, workers in general both have been required to share the costs of training, usually by devoting some time for which they are not paid, and have reaped some benefits, usually through opportunities for promotion.

The Oregon Plastics Education Consortium (OPEC) provides an example of a training program initiated by a manufacturing network with state support. The Oregon Economic Development Department (OEDD), a state government agency, developed a state business plan called "Oregon Shines" that included fourteen key industries. Plastics manufacturers had come together informally and successfully lobbied for inclusion in this plan. The state encouraged the formation of networks in these industries by offering matching funds for a wide array of collaborative upgrading strategies, including training. The OEDD staff played an initial catalytic role and continued to provide organizational support, but the network was quickly adopted by the manufacturers' themselves.

The network that formed consisted of a group of about ten injection molding manufacturers, including the largest firm in the area, whose CEO took a leadership role. Its first project was to create a training program for technicians in the plastics industry in cooperation with Portland Community College. Manufacturers perceived the need for a larger pool of skilled lower-level technicians, since the scarcity of such workers inhibited plant expansion in a number of companies. In fact, one of the incidents that gave momentum to the formation of the network came when a large manufacturer had pirated a skilled employee from a competitor as he was expanding his factory, only to discover that the competitor had in turn pirated the first manufacturer's employee with the same position. This manufacturer became the network "champion" and worked closely with other manufacturers, the state agency, and the community college to develop the plastics training program.

The training program is a year-long night-school program in Portland Community College and has now been in place for five years. Manufacturers designed the curriculum, teach the class, and have equipped the college lab with machinery donated by machinery distributors. According to participating firms, the training program has a number of benefits beyond increasing the pool of skilled workers. First, it motivates employees by providing them opportunities to climb a career ladder in the plastics industry. Second, participation in the program has become a marketing tool signaling quality—one that customers ask about when they choose who will supply their plastics components. Customers also have taken the class, and this improves communication between suppliers. Third, according to members of the network, the program helps the region by building a reputation for quality injection molding, which helps to attract customers to Oregon.

This training program has also had a positive impact on participating workers. OPEC conducted a survey of firms with employees that have completed the training program, and there is clear evidence that most of these employees have been promoted and are earning about 15% more than they did before they were trained. Firms paid the regular community-college fees and workers

attended classes one night a week on their off-hours, for one year. Thus both employers and employees (as well as the state) invested in training, and both reaped the benefits.

It should be underscored that although the manufacturers' training initiative helped workers move up a job ladder it did *not* raise wage levels in general in the industry. To the extent that the training program facilitates the industry's expansion, it may help create entry-level jobs, but it probably won't affect the wage levels in those jobs. In other words, individual workers' bargaining power increased, but workers' collective bargaining power remained unchanged. This is perhaps not surprising, given that the network was initiated by a business-government collaboration with no representation of workers.

2. When They Seek Market Niches Requiring a Highly Skilled Workforce: Organic Networks in Italy

A second way in which networks can function to the benefit of workers is when they successfully act to serve new markets that require a more highly skilled workforce. This is essentially a "pull" corollary of the "push" of training. The motivation of the firms involved in the network is to find more *profitable* markets, but when they choose to seek that profitability in markets defined by quality and service (rather than in low-cost markets) then they create conditions in which the abilities of their workforce may be more highly valued. When a network expands beyond its traditional local markets, existing worker skills can often command a higher price. Alternatively, a network may choose to train workers to give them the skills required to make the strategic shift. In either case, the workers' skills are literally more marketable.

For the sake of simplicity we ignore for the moment the argument that we have been making that the regional institutional context can be pivotal in determining whether such marketability translates into higher wages. We will assume in this example that there are circumstances wherein workers already have sufficient bargaining power that an increased value of their skills in production can command increased compensation in the labor market.

We have been using the example of Emilia-Romagna as an archetype. It will serve well here too. As the story of the Third Italy is usually told, the focus is on the structural characteristics of regional industries and the relationships between firms. Small and medium-sized firms within the region developed a large degree of trust and information exchange among themselves, were supported by the government through an infrastructure of technical and commercial services (Sengenberger 1993), and developed individual areas of expertise. What is often cited as a result is the increase in exports, but these increased exports—and their particular character of targeting quickly changing, high-quality niche markets—have themselves been part of the structural cause of success.

These particular markets demanded highly skilled craft production workers who could use general purpose machinery to quickly change designs and reconfigure production. That is, the source of value added to a product was increasingly the skill and knowledge of workers rather than routines and speed embedded in rationalized, technologically rigid production lines. Thus a particular market strategy made possible by the formation of small-firm networks ended up shifting worker skill to the center of production.

In promoting FMNs in the U.S., some policy makers have intentionally attempted to replicate this effect. The network-promotion efforts of RLA (now called L.A.Prosper Partners) are an example of this. RLA is an agency created in Los Angeles in the wake of the 1992 riots and dedicated to reducing poverty in targeted areas. In one of the projects brokered by RLA—a network in the furniture industry—the agency is helping small producers improve their designs so that they can target higher-end markets. In the process, RLA and the furniture manufacturers hope to transform the industry into a more design-intensive one and thereby to increase the importance of workers skills in generating the value added to the product. Again, in this case as in most others, the link between moving up the quality curve in product design on one hand and increasing the value and demand for skilled workers on the other does not stay easily at the top of the list of goals, nor is the existence of such a link always maintained in practice. As is typical, no in-depth evaluation of these networks has been carried out, partly since they have only formed in the last two years. The RLA networks are ones to be examined in the future.

3. When Unions Are Involved and Enforce the Sharing of Benefits: GIDC

Another way that networks can be structured to benefit workers is to involve entities that directly represent the interests of employees, particularly unions. When such representation is inherent to a network, decisions are more likely to be in the long-term interests of the workers and the company. A union, depending on how central its role in the network is, can do everything from bending programs so that they are more responsive to workers' needs to defining the overall strategic purpose of the network. The ILGWU (now UNITE!) has affected the Garment Industry Development Corporation (GIDC) in New York in both of these ways.

New York's garment industry was and remains fertile ground for a networking strategy because of the preponderance of atomized and fragmented subcontracting relationships. Similar to the Los Angeles garment industry, competition on cost is so relentless that wages and all other costs are continually driven downwards. This severely limits the ability of contractors to upgrade their machinery or add newer technology. The problem is only made worse by the lack of stable, much less strategic, relationships between subcontractors and larger manufacturers. The result is an industry caught in a downward spiral of competing on cost rather than quality and services.

GIDC is a union-led initiative started in 1984 to support New York's declining garment industry and poorly paid garment workers. It is directed by a tripartite board of representatives from

garment trade associations, the ILGWU, and the City of New York. Day to day, most decisions are forged by the GIDC staff, the president of the ILGWU, and the executive director of the New York Skirt and Sportswear Association. The role of the City is primarily that of funder. This broad representation and participation has been an important factor in GIDC's ability to gather public resources and to effectively carry out its program (Garland 1994, p. 94). Still, GIDC remains a union-initiated and union-led strategy—in part because the union does a good job of forging consensus and in part because the City does a lot of gorilla-like looming to promote that consensus (Garland 1994, p. 82). The ILGWU's own political clout has been important in securing the City's continued cooperation (Garland 1994, p. 85).

GIDC's primary activities are:

> Training and job placement for workers. (These services are seldom provided by firms. GIDC's own programs in this area are sometimes on-site and sometimes employer-specific.)
>
> Assistance to firms in organizing production more efficiently. (The goals here are usually to increase flexibility and to reduce turnaround time.)
>
> Fostering closer production links among retailers, manufacturers, and contractors.
>
> Helping small firms access lucrative export markets.

Our concern so far has been whether a business network can be structured to act for the benefit of workers. In the case of GIDC, and necessarily in the case of any union-initiated network, the question is actually the reverse: can a structure created to benefit workers offer enough to employers and the industry in general that a real partnership can be formed? The case of GIDC suggests that the answer is yes.

The original task of GIDC was limited: stabilizing real-estate costs in Chinatown, where most New York garment manufacturers reside. This was a benefit to workers only in the narrow sense that it would help manufacturers survive and be profitable. Under the guidance of the ILGWU, that mandate has evolved: GIDC now has the stated intention of shifting the industry's strategy from one of simply lowering costs, including labor costs, to one of competing on the basis of quality and responsiveness. Inasmuch as this new strategy requires higher levels of skill, stability, and participation on the part of workers, GIDC has explicitly linked industry competitiveness with the welfare of workers.

The specific area in which GIDC has been most active is training—a good example of how the interests of workers and firms have been conjoined. In one case, training allowed a reorganization of production that both raised wages and increased the viability of the firm. One example is Mademoiselle Knitwear, which had filed for Chapter 11 bankruptcy before the training. Afterward it became profitable and, because of improved wages and increased pride

(workers made an entire garment, not just a pleat) turnover dropped significantly (Garland 1994, p. 55). This example points to GIDC's larger role of acting as a forward-thinking leader in an otherwise short-sighted industry, a role that has historically been played by the union, the regional industry's largest and most stable institution. As Garland puts it:

> ...In an industry characterized by an acute lack of vision, the ILGWU represents the one entity that has traditionally promoted progressive change on concerns that extend beyond work rules and wage setting to encompass issues in the long-term interest of both labor and management. Through its industrial-engineering department, for example, the union historically provided technical assistance and shop floor lay-out assistance to garment firms.... (Garland 1994, p. 86.)

The presence of the ILGWU in the network has affected not just this high-level strategic focus but also smaller though equally important decisions. For instance, when GIDC commissioned a 1985 study of the largest clusters of garment firms outside of Manhattan, the union made sure that the study focused on those outer boroughs where there was already a critical mass of organized firms. As organized Manhattan firms wanted to move away from high real-estate prices, the ILGWU had the information to make sure that relocation did not cause geographic fragmentation, a real impediment to conducting union business and to further organizing (Garland 1994, p. 47). In the late 80s, GIDC itself expanded geographically from Chinatown to include all of New York City. The ILGWU made sure that this expanded membership still included only unionized firms. More recently, GIDC and the ILGWU jointly established JobNet, a centralized job referral service. Finally, the union's close involvement with the training programs has made those programs more successful not just because their expertise has made the training worthwhile (which it crucially has) but also because they have referred unemployed workers to the programs and have even helped tailor training to specific job openings (Garland 1994, p. 69).

Despite GIDC's genuine accomplishments and ambitious goals, success in promoting high-road production and marketing strategy has been limited. Garland notes that some degree of resignation to restricted impact is a sensible attitude: the industry is fragmented enough that there is unlikely to be a mass adoption of new strategic and production forms (Garland 1994, p. 70). Garland also wonders whether the exclusion of non-union firms (not that they'd want to join!) leaves out a number of workers who might benefit.

These caveats aside, GIDC seems to have helped both the workers and the industry at large. The ILGWU's central role is what made possible not just this dual benefit but any benefit at all: it acted not just as an enforcer to assure the distribution of gains but as a broker who made possible the creation of the gains in the first place.

4. When Networks Are Financed by Public Money on Condition that Benefits Be Shared: L.A. Apparel Roundtable

Our fourth example involves the negotiated linking of government economic incentives to distributive outcomes. As in the case of GIDC, this example depends on structuring projects for the mutual benefit of business and workers by directly involving non-business interests. In GIDC this was achieved by creating a tri-partite network composed of companies, the garment workers' union, and the New York City government. The union's political influence with the City government allowed GIDC to be created with public funds, funds that were used to entice garment companies into participating, but the union retained a central role.

A similar strategy is to condition government aid to business on guarantees that benefits be shared with workers. In this case the network is not composed of worker representatives or government agencies, but government subsidies or other aid which might help the member businesses are available only when certain conditions are met.

Most public policies to condition business aid have developed in the wake of business-attraction efforts. Increasingly in the 80s and 90s, state and local governments have used financial incentives to encourage businesses to locate in their areas (Leroy 1994). These incentives—essentially subsidies based on the expectation that recipient businesses will create jobs—include a variety of grants, loans, and tax abatements. In response to a number of cases of "subsidy abuse", in which companies who received subsidies did not create the number or quality of jobs that they had promised, numerous citizen groups, unions, and other community organizations have successfully passed city and state legislation to enforce *quid pro quo* agreements between companies receiving subsidies and the communities in which they locate.

Thus far, agreements to demand accountability from companies receiving government aid have been negotiated on a firm-by-firm basis. To the extent, however, that state and local governments are increasing aid to groups of manufacturers who are working together on specific projects that require some form of government funding—particularly aid that encourages the formation of business networks—the opportunity arises to condition such aid on specific distributive outcomes. The following example of efforts to upgrade the Los Angeles apparel industry illustrates this point.

The apparel industry is of growing importance in the Los Angeles region, currently employing over 100,000 workers. Unlike New York, almost no firms are under union contract. Even more than New York, it is an industry, however, that has been plagued by widespread abuses of basic labor laws and standards, abuses that include rampant health and safety violations, sub-minimum wages, the existence of home work, and even an infamous case of slavery. These problems are the direct result of the structure and organization of the industry, which is composed of literally thousands of small factories whose owners compete for contracts from retailers or manufacturers,

who hold the real market power in this sector. Contractors have unstable, short-term arrangements with their buyers and compete on the basis of short-term cost reduction. The climate of uncertainty and cut-throat competition has inhibited potentially productivity-enhancing investments on the part of subcontractors, who use relatively low-end technology.

A major Los Angeles utility company, the Southern California Edison Corporation, has taken an active role in efforts to upgrade the apparel industry[1]. In 1993—with the model of GIDC in mind—Southern California Edison initiated the Apparel Roundtable. Their goal was to focus the attention of the industry on the benefits of industry-wide cooperation. While at first garment firms paid little attention to this initiative, this changed when a group of Thai workers were found living in slave-like conditions in a garment subcontractor's shop. In response to this scandal, leaders of various components of the local apparel industry became much more open to a variety of new initiatives to promote labor law compliance and upgrade the industry.

The Apparel Roundtable has attempted to promote industry upgrading as a strategy to overcome the perrenial problems of labor law violations. It is attempting to forge more stable contractor-manufacturer relations and to improve both the business skills and the technological resources of contractors. A number of contractors' associations, including the Garment Contractors Association, the Korean Contractors Association, and the Asian Contractors Association, as well as a number of individual firms, including Guess?, Rampage, and Karen Kane, are now active participants.

Since the beginning of 1996, the Roundtable has focused on finding mechanisms to encourage investment in improved technologies, which has ranged from inexpensive, basic upgrades to advanced, complex equipment for contractors. For these investments to be effective, new technology must be tied to the adoption of new production methods that incorporate production flow information systems that allow quick response to changing consumer demands and help reduce inventory costs. Such methods necessitate greater cooperation between contractors and their customers, requiring them to develop longer-term and more stable relationships.

This investment requires new institutional arrangements to help contractors gain access to credit not currently available from commercial banks, who see contractors as high risk borrowers. Some of the investments are actually to be undertaken jointly by contractors and manufacturers, posing significant challenges for traditional lending institutions that wish to secure the loans with simple forms of collateral. Because the effort promises to be a model for significant sectoral upgrading, however, several governmental development banks are interested in providing loans. The Apparel Roundtable is currently helping a group of contractors and manufacturers prepare a

[1] This section is adapted from an interim report prepared by Goetz Wolff, an economic development specialist who has been one of the key participants in the Roundtable.

loan application for credit from public financial sources, including the Los Angeles Community Development Bank, the SBA, and the North American Development Bank (NADBank).[2]

For our purposes, this example is interesting because there has been discussion about making compliance with labor laws an explicit requirement that contractors have to meet and sustain as part of their credit agreement. While this does not guarantee high-wage jobs by any stretch of the imagination, in the context of the Los Angeles garment industry it provides an important floor on wages and signals contractors that options other than competing on wages exist. Thus it is an example in which upgrading solutions are tied to negotiated agreements which benefits to workers as well as manufacturers.

Conclusion

A variety of governmental and non-governmental economic-development agencies are promoting FMNs as a strategy to increase the competitiveness of manufacturing industries in the U.S. The assumption behind these efforts is that networks can help industries and regions embark on a high road to development in which they would compete by increasing quality and innovation rather than by cutting costs and lowering wages. Proponents thus tend to equate the increased competitiveness resulting from network formation with the retention and improvement of jobs. This article has reviewed the theoretical and empirical bases of this assumption and has specifically addressed the distributive impacts of FMNs.

Our review of both the theoretical literature and the existing case studies suggests that FMNs are no panacea for eliminating low wages, even when they are successful at increasing regional competitiveness. The particular brand of FMNs embodied in the Emilia Romagna case are notable exceptions that constitute a unique form of networking among firms. In general, flexible manufacturing can be combined with any number of arrangements governing labor relations, and there are only a few examples of such systems world-wide in which we can say that workers have clearly benefited. In these positive examples, the benefits to workers seem to have been caused not by the networks alone, but rather by an institutional context that encourages or forces the distribution of competitive gains.

If our goal is to forge a set of policies that will encourage a regional economic development that both generates wealth and distributes income equitably, an integral part of those policies must be the shaping of what Scott and Rigby call “the collective order” (1996). This collective order includes infrastructure, skills, social networks, regulation, and even intangibles like solidarity and participation, and these must, in aggregate, form embedded distributive mechanisms. In the context of a broad strategy to build such a collective order to govern a regional manufacturing

[2] The NADBank is a lending agency set up as part of NAFTA to help businesses and/or communities invest to mitigate the negative effects of NAFTA.

economy, networks can help promote a high road to regional development. Without such a strategy, networks are just a tactic to increase competitiveness.

Practitioners acting on the literature, and in many cases the literature itself, have obscured the need for building a new collective order: they have glossed over a fundamental disagreement in favor of a tautological *detente*. On one side are those who say that social and worker benefits are prerequisites for the success of networks. Storper and Scott clearly argue that "improving the business climate" by relaxing workers' rights, lowering the minimum wage, weakening environmental standards, and taking other measures that reduce short-run production costs are, at least in advanced industrialized nations, a prescription for long-run competitive disaster. Instead, a collective order that maintains high standards for the quality of life within a region is a requirement for building the trust and community so necessary to durable regional competitiveness based on flexibility and innovation. Also in this camp are the management theorists who fueled the explosion in the 80s of ideas linking competitiveness with worker-friendly policies like employee participation, quality of work life, job enrichment, and open-book management. On the other side are those who say, or at least imply, that FMNs increase competitiveness and change companies in ways that *generate* distributive and social benefits. This seems to be the operative assumption of most practitioners or network "brokers"—though in most cases we can only infer that there is an underlying concern with workers and the broader community.

Obviously the two positions are not wholly incompatible. Storper has also argued that the "bundling" of manufacturer interests can lead to bundled labor interests. Bundled labor interests, in turn, can lead to higher levels of union density, a clear benefit to workers (Storper 1995). Nevertheless, the two viewpoints need to be distinguished.

On the ground, as evidenced by most U.S. manufacturing networks in existence, the marriage of these logical opposites has meant the disappearance of social and distributive concerns altogether. For the first position, networks cannot be the answer to the problem of low wages because the formation of socially desirable networks can occur only if wages are already taken out of competition and if there is already a community of trust between workers and managers. Their networks are a strategy for competitiveness based on a pre-existing favorable social context. For the second position, networks have the capability of raising wages and creating and improving jobs in their very nature. They assume that networks alone automatically generate positive distributive consequences. What has happened in practice is that FMNs simply are built: inasmuch as a coherent "positive social context" is a rarity in the U.S., the hopes of the first group rest on the opportunity to stuff social and distributive benefits in around the edges of wobbly networks that must be shored up; the hopes of the second group reside in a distant future, when increased information flows and deepened relationships will change market strategies and jobs for the better and wages will, like boats, rise. In the meantime, workers work and the collective disorder tumbles along.

The muddying of theory in application aside, the theoretical claims of either of these sides that the social gains of FMNs in Italy can be replicated through policy or private strategy in the U.S. are difficult to substantiate. We tend to take our policy cues from Storper and Scott: we believe that a network strategy is most likely to succeed in competitive terms when it includes a high level of training, improves workers' quality of life, and protects the broader social and environmental context in which the network is supposed to survive. Thus, although building the interconnected, innovating manufacturing economy is not a guarantee that workers will benefit, recognition that the benefits to workers are a condition of the success of the manufacturing economy may provide a way to frontload industrial policy with social policy. But the belief itself that such a socially desirable context is necessary is insufficiently verifiable with current experience and evaluation.

Full-blown regional strategies that change the collective order as they build manufacturing networks have not been attempted in the U.S. In this country, promotion efforts are usually limited to linking a group of firms around one or two common problems. That is, no effort to promote networks in the U.S. has tried to replicate the rich, region-wide network of not just inter-firm but inter-institution and inter-sector links that have made the model cases of networks in Italy and elsewhere in Europe successful. Nevertheless, the growing interest among state and local policy makers in networks may portend both the dedication of more resources to the limited network promotion seen thus far in the U.S. and the eventual conjoining of network promotion and institutional development into more full-fledged regional development strategies.

However policy evolves, one task is paramount: making more explicit the links (or lacks of links) between flexible manufacturing networks as a competitive strategy and their potential generation of worker benefits. The first step is to develop a rigorous evaluative framework to guide practitioners. Thus far, the evaluative criteria generally used are process variables rather than outcomes—number of firms participating rather than number of skilled jobs created, changes in interfirm cooperation rather than increases in sales, etc. These criteria that describe process only poorly evaluate competitive outcomes, much less distributive gains. There are real methodological difficulties that make such proxy measures more available, but at this point in the discussion the proxies are not enough. The evaluative framework must include measures of worker welfare as well as increased competitiveness, and it must take into account that the benefits of networks to businesses do not translate automatically into benefits for workers.

We also need to further develop mechanisms that can be combined with flexible manufacturing in order to assure that distributive outcomes are positive. The alternative is the continued ascendence of a lean production that is, as per Harrison, relentlessly mean. We have shown that there are mechanisms even in the modest networks that have been constructed in the U.S. that cause competitive gains to be shared with workers. One set of mechanisms involves the particular strategy that networks use to achieve competitiveness, such as joint worker-training programs or niche marketing for products with high skill content. Another set involves the participation of the public sector or unions and relies on the leverage that these non-business

interests can apply in negotiating positive distributive outcomes. Other mechanisms can certainly be uncovered or invented.

FMNs may be the latest tactical brick in the edifice of global market competitiveness, but there is not yet clear evidence that they bring anything new to the more fundamental challenges of poverty and income inequality. They may address the competitive challenge, but not the distributive crisis.

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