

## **INSTITUTIONS OF THE LEARNING ECONOMY<sup>1</sup>**

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## I. DEFINING AN ECONOMIC POLICY PROBLEM

The classical dilemmas of economic policy are still with us. In market economies, the interests of owners in earning a decent rate of return on their investments have somehow to be reconciled with satisfactory levels of demand, and political demands for an acceptable distribution of income. The problem, in most of the advanced democratic-market countries, is that elites resist using non-market means to redistribute income; it costs them money and becomes a disincentive to investment. They prefer distribution of income to be achieved through employment, and employment to be submitted to competitive forces, not mandated by non-market agencies such as the state. The current state of ideology (as well as the cost of living), moreover, even in social democratic countries, is such that most people prefer good employment to the most generous dole. Even those countries that might be politically inclined to resolve the problem through expansion of the social welfare apparatus find themselves blocked by strong resistance from their own populations, if they want to tax, and from financial markets, if they want to expand deficits.

Yet most of the market economies of the advanced world have failed in the employment area in recent years. In the western European countries, unemployment rates have been too high for much of the post-1970 period. In the USA, where many jobs have been created, average wages have stagnated in many sectors and declined in manufacturing. In all these countries, there is a troubling growth of low-wage employment and unsatisfactory growth of mid- to high-wage employment. The problem of policy, in consequence, has come to be that of employment: how to generate enough of it with decent income levels in a way that is compatible with profitability and growth. Each nation's problem is a variation on this basic theme.

The Marxian formula of balancing productivity gains and wage gains no longer provides the key to resolving the employment problem. Modern management and technology, as well as existing income smoothing institutions, have made the overall rate of growth somewhat independent of workers' incomes; even if wage changes were matched to productivity gains in the national territory, producers would still be able to reduce their wage costs via relocation on a global scale.<sup>1</sup> The Keynesian formula of pumping up expectations is often effective as a means to generating investment and growth, but not full employment. For owners and investors, profitability (especially if we include appreciation of assets) has become possible, except for short recessionary periods, without generating full employment and is no longer dependent on rates of growth that could generate full employment.<sup>2</sup> Even though it might be socially desirable if Marxian or Keynesian policy formulas were followed on a global scale (i.e. equitable global reflation), there are no institutional structures capable of bringing it about, and any nation that attempts it alone will be severely sanctioned by financial markets.

The policy problem is, then, to sustain competitiveness under such conditions, and to do so in a way that deals with the employment problem simultaneously. Competitiveness will refer here to the

ability of an economy to maintain stable or increasing market shares in an activity while maintaining stable or increasing standards of living for those who participate in it. It must maintain or increase employment and do so in a qualitatively satisfactory way, which for those who are employed means income.<sup>3</sup>

The conditions of competitiveness and employment creation vary considerably among the major kinds of economic activities today. In any given economy, there are three basic employment trends: creation of high-wage, high-skill jobs, usually in value-intensive industries or activities; creation of low-wage, low-skill jobs; and job loss. The loci of these different trends (for the medium- and high-wage economies) can be described, *grosso modo*, in the following way. Employment losses are concentrated in manufacturing industries producing standardized outputs which are amenable to mechanization and automation. Employment with lower wages is heavily concentrated in the consumer and retail services sector, which is the biggest sector of the whole economy; the exception is management activities in those sectors. Growth in high-wage employment is located in certain occupations, mostly those relying on intellectual labor, found in many sectors, but particularly in advanced producer and financial services, technology-intensive or design-intensive manufacturing, and consumer services with a highly customized output.

Location is a key dimension of these employment dynamics. The first and third of our categories have a high proportion of tradeable outputs, with a highly uneven national and global locational pattern; the second category, retail and consumer services, has tradeable management and input functions, but untradeable final output functions; delivery must be close to the customer, thus following the geographical distribution of population and income. For standardized manufactures, the overall downward trend in employment intensity is complicated by the increasing possibility of locational change, i.e. relocation, whether to peripheral low-wage regions of advanced countries, or to developing countries. Employment growth in these activities is occurring in a number of developing countries, most spectacularly in East and SE Asia. This has to do with the technological content and transactional structure of the production systems for standardized manufactures, which permit easy technological transfer and long-distance linkages to core fabrication and management activities, still located mostly in the rich countries. Not only is employment trending downward in these sectors in the advanced economies, but so are wages, due to locational competition with low-wage areas. World market prices are now dictated by the combination of advanced technology and wages in low-wage areas.

For consumer and retail services, employment is rising as a proportion of the total in most places, but this employment has not proved capable of raising overall real incomes. At the same time that productivity improvements are applied, via increasing automation and computerization, they intersect with the same dynamics that affect standardized, routinized manufacturing activity: the

increasing possibility of locational substitution due to the information and telecommunications revolution (e.g. the second wave of back-offices in retail services).

In contrast to these activities, the employment which could serve as a motor of real-incomes is engaged in the production of non-standardized, non-routinized goods and services, especially tradeables. Such activities, as we have seen, are not easy to come by in this world, where a central logic of competition is precisely to standardize the output and routinize the production process.

## II. COMPETITIVENESS AND THE LEARNING ECONOMY

Theories of competitiveness abound today, as do descriptive monikers for the new economy: post-industrialism, the informational economy, the knowledge-based economy, flexible specialization, post-Fordism. Though each of these labels helps in understanding some dimensions of contemporary economic activity, the logic of the most advanced forms of economic competition -- those capable of generating high-wage employment -- can best be described as that of learning. Those firms, sectors, regions and nations that can learn faster or better (higher quality or cheaper for a given quality) become competitive because their knowledge is scarce and therefore cannot be immediately imitated by new entrants or transferred, via codified and formal channels, to competitor firms, regions, or nations. The price-cost margin of such activities can rise, while market shares increase; the resulting rents can alleviate downward wage pressure. In this respect, such activities are promising for high wage areas. But the key defining condition of this happy picture is that these activities are only temporarily immune to relocation or to substitution by competitors. Economies must therefore be equipped to keep outrunning the powerful forces of standardization and imitation in the world economy. Once they are imitated or their outputs standardized, then there are downward wage and employment pressures. They must become moving targets by continuing to learn.

The appellation "learning" economy has considerable and important differences with other concepts applied to the "new economy" of the post-1970 period. Its central emphasis is on *time* in sustaining a desirable form of imperfect competition, characterized by ongoing product-based learning. It generates temporary non-substitutability (scarcity) of key inputs, especially labor and human relations. It should be stressed that the term learning as used henceforth refers specifically to product-based technological learning (PBTl). This definition stresses the usefulness of technological change in adapting the product, which is the principal vector of competition. Learning may enhance product differentiation at any given moment, or it may take the principal form of constantly adapting the configuration of products and processes so as to *anticipate* the competition. Such product adaptation may involve many upstream forms of technological change, but in and of themselves, un-systematic forms of

technological change will not be adequate to generate competitiveness. PBTL is quite different -- analytically speaking -- from technological imitation in production processes (such modernization being the main subject of management literatures, even those that now use fashionable terms such as "learning," "knowledge" or "innovative").

It is important to note that the notion of a learning economy rejects the central arguments of post-industrialism: learning concerns manufacturing, which continues to matter, as well as services. Learning can concern low-technology industries, which can generate high wage jobs, as well as high-technology sectors. Still, it should be acknowledged that PBTL activities, while central to the direct objective of generating high-wage, high-skill "knowledge-intensive" employment, are never going to account for the majority of output or employment in any given economy. Other kinds of activities (locally-serving activities, scale-based production, etc) will continue to embody high proportions of employment. But PBTL has propulsive effects on economies in a number of ways: technological spillover effects can widen and lengthen the wealth-producing properties of learning (both upstream and downstream, and horizontally into technologically complementary activities), while the quasi-rents earned from imperfect competition can be channeled through the producing economy in the form of wages, investment and cumulative advantage.

Contemporary economic development strategies must therefore be geared toward installing and sustain activities embodying this propulsive dynamic. In certain cases, they will become strategic, export-oriented, trade specialization sectors for an economy, the source of foreign-exchange earnings and key to market invasion, much in the way affirmed by the new trade theory.<sup>4</sup> But the learning economy is not merely an offensive strategy; in the presence of increasingly open markets, local production can be defended in certain sectors by upgrading it continuously (adopting productivity and design improvements which are found in potential invader-competitors), as well as by attempting to differentiate the local industry through endogenous forms of learning for differentiation.

To say that the learning economy is necessary to high-wage employment generation is not to claim that it represents a complete economic strategy. All the traditional tasks also remain necessary: balancing production and consumption; finding the right mix between export-oriented and locally-serving activity; ongoing productivity improvements; and balanced reallocation of labor. But these traditional tasks of long-term economic management are by themselves no longer sufficient to generate adequate quantities of high quality employment. That is the role of the learning economy.

### **III. THE ORGANIZATION OF THE LEARNING ECONOMY: CONVENTIONS**

## Coordination as the Key Problem of Economic Life and Convention as a Key Form of Coordination

Coordination among persons is the central problem of economic life. All productive activity depends on reciprocal, coherently matched actions by others which, if not forthcoming, will render our own actions inefficient or unproductive. Yet virtually all such situations of action are beset by uncertainty -- each of us faces uncertainty in deciding what we should do with respect to a given set of circumstances. Part of this uncertainty is "secondary," i.e. it comes from the fact that others upon whom we depend also face uncertainty on their side, so they do not know, with assurance, what they will do; part of it comes from imperfect knowledge or communication of their intentions. All this is another way of saying that productive activity is, of necessity, a form of collective action founded on the paradox of individual actions. The question is how actors manage to get themselves into successfully coordinated forms of collective action.

The perspective which has been developed over recent years known as the "social science of conventions" holds that coordination is achieved when actors develop appropriate conventions for doing so. The latter may be defined to include taken-for-granted mutually coherent expectations and practices, which are sometimes manifested as formal institutions and rules, often not. There are many different conventions in productive activity, for two principal reasons: because uncertainty, though pervasive, takes different forms according to the many and varied products of the economy, in light of the production technologies, markets, and resources associated with different kinds of products; and because historically-constituted and geographically-differentiated groups of actors bring to bear different rationalities to the uncertain situations of action they encounter.

Learning-based production systems are particular cases of conventional economies. They tend to involve particularly intense conventional underpinnings owing to the existence of rather "non-cosmopolitan" forms of knowledge. These are the cognitive foundations of learning and their effects on economic transactions. In addition, high rates of learning occur only when there are high levels of overall coherence of the many and varied conventions involved in a production system. Each of these will now be discussed in turn.

## Transactions and Cognition, Relations and Conventions

Transactions between firms and the external environment -- labor markets and information-rich institutions, such as universities, trade associations and other institutions -- are particularly important to learning. It is to the substantive content of transactions and their "governance" or "regulation" that we must look in order to penetrate deeper into the learning process itself. Yet transactions inherently

involve uncertainty. Market systems are said to compensate uncertainty via the law of large numbers (with highly substitutable products or factors),<sup>5</sup> but this only really works when competition is perfect. In the case of learning-oriented production systems, the relations which compose the system cannot be of such large numbers and so substitutable that they function like true markets. Unlike transactions of standardized and substitutable goods, factor inputs, and information, transactions associated with the kind of learning analyzed here involve the development and -- perhaps even more important -- the mutually consistent interpretation of information which is not fully codified, hence not fully capable of being transmitted, understood, and utilized independently of the actual agents who are developing and using it. Stated another way, when the knowledge or skills involved have cognitive dimensions which are non-cosmopolitan (i.e. non-universalist, particularistic), the transaction becomes a concrete, real relation and has dimensions which cannot be abstracted and thus divorced from its existence as a relation.

The circumstances in which this condition of "interpretative interdependence" between agents exists are many and varied.<sup>6</sup> The obvious cases are those which involve unforeseen contingencies such as highly uncertain markets in traditional industries or movement along a technological frontier in high technology sectors. In the case of non-traditional technology-intensive or science-based industries,

"In early design processes within unfamiliar domains, we may expect intuitive, 'private' mental technical models to predominate. Although there is no doubt a link to existing cosmopolitan cognitive representations, this is seldom explicit; as a consequence 'meta-modeling' does not yet appear as a distinct activity."<sup>7</sup>

Moreover, beyond such tension between non-cosmopolitan technical models and meta-modeling, every kind of production system has to cope with some form of fluctuations in markets, product design, available technology, and prices, which make difficult the full cognitive routinization of relations between firms, their environments, and employees. Many such fluctuations, if they are to be dealt with in such a way that efficiency losses or conflicts are to be avoided, involve less-than-bureaucratic procedures and adjustment mechanisms, which are highly embedded in informal or partially-formal rules and practices.

There are two levels of this relational quality of transactions. In the first, personal contacts, knowledge of the other, and reputation are the basis of the relation.<sup>8</sup> In many other cases, however, transactions are not so completely idiosyncratic; they do have dimensions which can be reproduced or imitated by other agents. Most conventions are a kind of half-way house between fully personalized and idiosyncratic relations and fully depersonalized, easy to imitate relations (although even the latter do have conventional foundations, not natural or behaviorally universal foundations).

Conventional or relational transactions (henceforth C-R) affect many dimensions of production systems, but the nature and functions of such conventions differs from industry to industry, according to the nature of the product, the economic fluctuations associated with its markets and production

processes, and the type of learning which is possible.<sup>9</sup> C-R transactions may be found in at least five principal domains: (a) inter-firm "hard" transactions, as in buyer-seller relations that involve market imperfections; (b) inter-firm "soft" transactions, as in the diffusion of non-traded information about the environment or about learning, e.g. through circulation of personnel through the same external labor market or through contact between producers; (c) in hard and soft intra-firm relations, as the bases for the functioning of large-firms which are "internally externalized" in the way we noted above; (d) in factor markets, especially labor markets, which involve skills that are not entirely substitutable on an inter-industry or inter-regional basis, i.e. where there are industry- or region-specific dimensions to workers skills; and (e) in economy-formal institution relationships, where universities, governments, industry associations and firms are only able to communicate and coordinate their interactions by using channels with a strong relational-conventional content.

Note that in this analysis, the learning economy and its conventional-relational foundations is not based on a stark contrast between internal ownership and externalization of production systems, or on hierarchies versus markets or external-embedded networks, but rather on the notion that all advanced, learning-based forms of economic activity involve complex transactional structures which in turn have a high conventional-relational content. Indeed, in many respects,<sup>10</sup> the big firm is a set of relations and that it is such relations, as much as the physical or financial capital the firm commands, which allow it to compete and survive.

### Learning Economies as Coherent Systems: Worlds of Production

For any given set of products-technologies-markets, and any given set of actors, the various conventions and relations have to fit together; they must be internally coherent. What does internal coherence imply? Certainly not that only those sets of CR transactions that lead to an optimal a priori equilibrium resource allocation are viable. There are many different mixes of performance that can be stable, at different levels of wages, profits, growth, adeptness at adjustment, and so on. The existence of multiple equilibria means that there is no single universal criterion of internal coherence (i.e. no single possible practice).<sup>11</sup> Internal coherence means that for any given learning-based production system, the ensemble of C-R involved defines a common context of interpretation for those actors, which permits them to coordinate coherently with other actors in that context, under the specific conditions of uncertainty (attached to the product or economic-technological space) they must confront. These common contexts operate across systems which can be called "worlds" of production, in that they are frameworks of action for the economic agents involved.<sup>12</sup>



The unit of accounting of coherence is, ultimately, the product -- whether it be intermediate or final -- for the product must pass the external test. There are several organizational subdivisions of the economy which correspond to products.<sup>13</sup> Some are "smaller" than, i.e. upstream of, the final output sector, such as capital goods industries; others are "bigger" than final output sectors, in that they are essential to a number of such sectors but have wide competencies: these are Perrouxian technological spaces. These different organizational subdivisions of the modern economy which define systems in which sets of conventions and relations must be mutually coherent for economically-viable learning to take place.

But in addition, at any given moment, there are external tests to which a given set of conventions is subject. In the current case, we are arguing that this test is one of competitiveness -- such that market share and employment levels with high wages are maintained or increased -- which in turn is consequent upon learning. Where either internal or external dimensions of coherence are not present, a production system will find itself without successful evolutionary tendencies, blocked in its capacity to generate growth, employment and income. Within a world of production, to get from blocked evolution to successful learning implies the development of an ensemble of conventions which make up the coherent common context of that world. This context cannot be divided into discrete factors: it comes as a package.<sup>14</sup>

#### Four Worlds of Production

What follows is a heuristic typology of four kinds of product, based on the kinds of interactions each involves around the tasks of technology or knowledge development. Here it can be seen in greater detail that learning concerns much more than high-technology or science-based production and that there is not one problem of innovation, but many. The choice of four worlds is the result of abstraction from observed cases, not a claim that only four such worlds of production are possible.

The Interpersonal World. The first kind of product grows out of artisanal industry, and consists often of nondurable consumer goods heavily affected by fashion and design. It faces markets which are highly uncertain, due to ongoing product redesign and differentiation, resulting in a low scale of production. Innovation itself consists of applying specialized talent or knowledge to ongoing product differentiation. Critical here is the existence of a community of specialists who redesign the product, on very short time horizons, by deploying their tacit and customary knowledge of the product's qualities and possible dimensions. This is a highly "interpersonal" community of knowledge developers, based on traditional acquired skills, where constant communication between members of the community is necessary to carry out this kind of technology development. One major communicative process essential to innovation is interaction between the producers and the users of technologies: an example of

this is the equipment maker who adapts for the final product producer in order to accommodate the rapidly evolving final output. Typically, such communities are concentrated in particular geographical areas where informal processes of communication are central to their successful operation, as in the celebrated cases of Italian and German industrial districts. But there are also blocked versions of these industries, where low-wage employment and declining competitiveness are present, as in the cases of low-wage subcontracting networks in the Los Angeles and New York garment industries. As we shall see, though, they are not organized by the interpersonal conventions, but by the conventions of the Market World.

The Intellectual World. A modern-day version of this interpersonal community of innovators can be found in parts of the high-technology industries. Typically, high technology industries are based on the organized application of R&D and scientific knowledge to technological change. Their products often involve large-scale technological systems which require a great deal of planning. This is a much more formal process than in the "interpersonal" worlds referred to above. These formal processes rely on forms of communication that can be stretched over large distances, because they are carried out at regular intervals in a planned fashion (through meetings, congresses and private sector projects with long planning horizons, where communication involves highly codified and hence standardized, non-culture-dependent, cosmopolitan scientific language). This corresponds to oligopolistic firms in high technology today. But often overlooked is that these oligopolists are tied, for some of their key cutting-edge technology inputs, into precisely the kinds of interpersonal communities alluded to above. Many of the core components of their large-scale research and development projects cannot be planned; there is technological uncertainty. This uncertainty requires scientific and technical personnel to be able to interact informally, in unplanned and uncodifiable ways. The large-scale technology based industries thus often have, at their cores, geographically-concentrated interpersonal communities of innovators such as Silicon Valley or the *Cité Scientifique Sud* of the Ile de France, even though their other innovative activities are highly planned and not highly localized. They are generators of high wage, high skill employment in tradeable outputs.

The Industrial World. A third kind of product corresponds to our image of mass production. Where economies of scale and long production runs dominate, as in many consumer durables industries, products are typically made by large oligopolistic firms. Such firms are capable of operating production systems at national and international scale, distributing parts and components and assembly plants across the landscape and coordinating the whole, as in the car industry. In their direct production activities in the high-wage market economies, there are downward employment trends, due to automation and relocation, and in many high-wage countries their wages have stagnated. These outcomes are, to a large degree, inscribed in the internally coherent conventions associated with standardization of the product, which makes it economically and locationally substitutable.

Nonetheless, even in these industries competitive learning occurs which can have dramatic positive effects on employment. Japanese, German, and American automobile companies, for example, have historically drawn heavily from the results of public and private national R&D strengths in their respective countries and at different moments have succeeded in raising their market shares while raising employment and wages. Most recently, Japanese and German industries have succeeded in mixing standardization and rapid product differentiation, as well as quality-based production strategies. The conventions associated with their systems differ importantly from those of classical mass production. The Japanese system, as is well known, usually relies on some kind of just-in-time system for parts delivery and quality control. Just-in-time is not just a way to deliver inputs, however; it is also a way to structure information flows that help producers incrementally alter and refine their products.<sup>15</sup> Moreover, their big firms have access to localized contexts characterized by dense information flows, including many flows which are internal to the firm but dependent on the system of relations among these units, and between them and their external environments, which have been built up over long periods of time.

The Market World. Closely related to the above is the fourth kind of industry, which is that part of large-scale production which has been transformed into "market-led" industry in recent years. Certain industries and firms have chosen to meet the challenge of contemporary conditions via a sort of radical flexibilization. They attempt to combine the cost control associated with scale and long production runs with the capacity to have a wide mix of products and frequent change in products. They do so by relying on external upstream and downstream subcontractors. Here, there are also employment-generating and wage-sustaining versions, as well as simple "hollowing out." This is where we find low-wage, super-flexible subcontracting relations in traditional industries, such as the Los Angeles clothing-textile sector: the common context is now one of spot market flexibility, not of durable interpersonal relations.

#### **IV. GLOBALIZATION AND LOCALIZATION OF THE LEARNING ECONOMY**

It has been a commonplace in development economics for several decades that technologically-advanced activities are concentrated in advanced economies due to the superior scientific and knowledge "infrastructures" of those countries. Yet some of the classical conditions cited by development analysts in the 1950s have changed, notably the more rapid worldwide diffusion of technologies and certain kinds of knowledge. Major firms have gone global in many ways, and one would think that this would promote a more even distribution of production in major technology- and

knowledge-intensive goods and services. Yet this is not the case: the core technology- and knowledge-intensive outputs of the world economy continue to be produced in relatively few places on the globe, and they are traded. The wealthy countries manifest increasing specializations in spite of their similar income levels.<sup>16</sup> Specialization is apparent in both final outputs and in intra-industry trade. Moreover, trade specialization goods and services are often produced at just a few specialized sites within their countries of origins. Employment-intensive activities can remain in high-wage countries because they can outrun the narrow margins of price-cost competitiveness, notably factor price competition.<sup>17</sup> That such activities also actually do remain in high-wage, high-cost places, requires additional explanation, as it is a central variable in policy making for such places.

It was noted earlier that in many industries there are non-cosmopolitan cognitive representations of what is being done, i.e. no easily reproducible meta-models of the activity, and that under these circumstances, relational transactions are particularly important. Some of these relations may be embedded in large organizations and carried out at great distances. But many, in fact, are highly localized, including those which are internal to large firms. Even in the case of "semi-cosmopolitan" cognitive representations (e.g. use of meta-models to solve specific problems), actual coordination of actors may be rooted in highly localized and specific conventions. In other words, under some circumstances, the forces that lead to creation of CR technological spaces also localize them in geographical space. In the extreme, the link between place-specific conventional-relational interdependencies and product quality or velocity of learning is so strong that all other competitors are eliminated in world markets.

There appears in any case to be a central paradox of territorialization within today's global economy: C-R transactions are by definition highly "endogenous" forms of economic coordination. They are generated through rounds of action and interaction among economic agents, leading to taken-for-granted regularities in what they expect from each other and what they do. Much social science tends to view such phenomena as mere "residue" of the past, destined to disappear in the face of modern, universal logics of development, convergence toward singular, optimal best practices, and so on. This narrow way of viewing the sources of economic development (which has both neoclassical and Marxist variants) has come under strong empirical and theoretical criticism in recent years, and for good reason.<sup>18</sup> The leading edges of contemporary economic development are in many ways highly dependent on these historically-created and geographically-differentiated conventions, customs and institutions. Indeed, the core areas of the world economy have become cores because they embody forms of economic efficiency which are in many ways territorially-rooted and territorially-specific. And, in locational terms, geographically-bounded untraded interdependencies appear to outlive geographically-constrained input-output linkages.

Nexuses of both indirect traded linkages and untraded interdependencies in production are not territorially concentrated in all industries or at all times. We may imagine a complex set of territorialities -- i.e. at different geographical scales, from local to national to world-regional and global -- for different types of indirect and untraded interdependencies. Some will be highly localized, as in the case of extremely uncodified information or interpretative dimensions of skills. Others may be national in scope, as in the cases of industrial coordination conventions which are established in a national territory through successive rounds of national economic integration and diffusion of behavioral precedents and rules-of-thumb, embodied usually in non-technical, culturally embedded national linguistic tropes. Some may be established through formal national institutions, such as professional associations or standardized national curricula (the subjects of the recent national systems of innovation literature). Still others will be international in scale, often embodied in internationally-recognized multinational corporate practice.

There are always two active forces tugging in different directions on the geography of interdependencies. One is the bureaucratization of capitalist enterprise, with its tendency to diffuse an internationally-recognized matrix of rules to people, especially managers and professionals. For specific technologies, there is the tendency to evolve cosmopolitan -- abstract, codified and reproducible -- cognitive representations. These are the equivalents, for untraded and indirect interdependencies, of the force of standardization and substitutable components in hardware. The other is the ongoing development -- unplanned and unforeseeable at the outset -- of new forms of knowledge and the means to interpret and communicate it, on the one hand, and new nexuses of highly context-specific human relations, on the other. The former is related directly to technological and organizational evolution. The latter, more complex to grasp, occurs because local groups of people are constantly redifferentiating their practices and relations at the same time that rounds of bureaucratic "standardization" sweep over them. Major global corporations are places where management increasingly speaks an inter-industry, global language of management (a cosmopolitan meta-model), easily recognized from one firm to another and across the continents; but paradoxically, each major multinational has its own culture, including international but firm-specific human relations, many times achieved by relocating managers from the country or region of origin, so important is this form of asset specificity to the workings of the corporate bureaucracy. Thus certain highly complex, relational interdependencies are imbricated in large corporate networks and even in scientific-professional associations, through intensive human contact and sustained investments in networks of human relations. These evolutionary tendencies are in constant combat with one another, making geographical outcomes a two-way street between localization and diffusion, not a one-way highway to dispersion.

Note that there is thus no automatic correspondence between internationalization of markets and deterritorialization of productive activity. World trade is territorially specialized because those activities with the highest skill, knowledge or technology contents are increasingly located in particular

places. They are also increasingly inserted into networks of relationships with other territorialized cores and with the deterritorialized (routine production) activities of their production and marketing systems, giving rise to globalized-localized systems of production (sometimes now called "glocalized" in contrast to the incorrect image of placelessness associated with the term "globalization"). One principal dimension of this territorialization is the behavior of the major technology-based multinational enterprises, who tend to keep their most important technological activities in their home countries.<sup>19</sup> Studies also show that the foreign direct investments of these companies are attracted to the technology core regions of other countries; they tend to be territorial followers, not territorial leaders.

The learning economy, in other words, remains locationally concentrated, mostly in the rich countries, and locationally differentiated among them and between regions within these countries. There are exceptions, i.e. developing countries that have made the transition from price-cost competitiveness to learning-based competitiveness, and they merit especial attention precisely for this reason. There are also cases of the erosion or weakening of learning economies in developed countries.

## **V. INSTITUTIONS, POLICIES, COLLECTIVE ACTION**

### World Making: Policy's Dual Task

The task for policy in a learning economy now becomes clear: ideally it would support the development of packages of conventions and relations in coherent product-based subdivisions of the economy; because these conventions and relations must be developed according to such subdivisions, policy must have strategic content; because such conventions and relations must be mutually coherent, generating what we have defined as a common context, policy's task is to support the development of worlds of production. Both these tasks are dynamic ones. The object of policy for technological spaces is not simply to install hardware, but to set the economy on a trajectory of technological learning, so as to outstrip the imitator-competitor economies. Moreover, just as technological learning is the outcome of conventions as well as hardware, the national or regional economy must achieve and keep re-achieving conventional and relational coordination of the agents involved in learning. The challenge to policy is thus to establish and maintain not one, but two economic dynamics: the technological trajectory, i.e. the mastery of specific spaces in the economy characterized by technological spillovers and complementarities, and the trajectory of conventions, which link and re-link agents to each other in a coordinated fashion.

### Learning Economies as Institutions: the Problem of Circularity

In democratic societies, policies are implemented by formal, public institutions whose vocations are defined according to the values which that society projects as its universals. "Universal" in this context refers to the set of a priori rules or criteria which define the legitimate as procedurally non-arbitrary and in the substantive common interest of the people. Overt, *de jure* particularism is not legitimate because it does not refer to the common interest and may involve procedural arbitrariness.

All institutions are not public, however, and many are not coterminous with formal organizations.

Institutions consist of "persistent and connected sets of rules, formal and informal, that prescribe behavioral roles, constrain activity, and shape expectations"<sup>20</sup> and overlap with conventions. For this reason, institutions cannot be reduced to specific organizations, although the latter may be important in the generation of expectations, preferences and rules.<sup>21</sup> Common to both public and non-public institutions, to formal and non-formal institutions, is that they have to give order to expectations and allow actors to coordinate under conditions of uncertainty. In terms of a production system, they have to do this so that coordination is economically successful.

If we accept that enduring structures and patterns of interaction and rule are important, then individual behavior is not necessarily the result of exogenous, classically self-interested preferences, as most economists would assume (methodological individualism, universal rational interest-based calculus). Rather, the conventions by which people define their interests, form expectations of others, and hence calculate their interactions with others, are extremely varied, according to time, place, and the situation of action, and the basis of calculus is as much a result of such highly differentiated conventions as the other way around. In the specific case at hand, they may vary according to the "possible world" of productive activity (product), and the version of that world found in a particular place (a real, concrete world).

This means that there is a circular relation between convention and institutions. Institutions have a strong effect, by generating regularity and precedent, in the formation of conventions that people employ to cope with the persistent and pervasive uncertainty of their interactions with other people in the economy. But by the same token, formal, organized institutions can only function successfully if the rules, procedures, incentives, and sanctions they establish are integrated into the conventions that guide people's behavior. Even coercion is ultimately a convention, in that if people do not take sanctions seriously, it is unlikely that the institution will be able to coerce for long. More commonly, who cannot think of ways in which the common, taken-for-granted ("conventional") wisdom of a large segment of the population causes it to interact in ways that render formal rules inefficacious, from the informal economy to paradoxical and unanticipated effects of economic regulation in land, capital, and industrial markets? In these cases, we can say that formal institutions are not fully consistent with the conventions of the populations they are meant to affect. Successful formal institutions, then, have a hard organizational side, and a "soft" conventional foundation.

Policies intended to create or sustain the learning economy would involve a relationship between public, formal institutions and conventions and relations which are neither fully public nor fully formal. There is a double circularity here: formal public institutions, in creating or sustaining worlds of learning, must in effect create or sustain the conventions and relations of the latter. In turn, those formal public institutions can only assist in world-making if the people in both institutions -- the learning production system and the formal public institution -- are coordinated by conventions coherent with that project. This kind of endless circularity cannot be gotten around by any traditional notion such as incentive, compulsion, or formal rule, or even "system of innovation." A successful incentive system is itself a convention, which coordinates expectations of performance and reward under conditions of extreme uncertainty. Even the largest, most financially powerful companies and governments have regularly failed with major technological projects, not for lack of intelligence or resources. This is our first major problem: the endless and unavoidable circularity of founding the conventions and relations of which both learning systems are built, and of which the public institutions meant to generate them are built.

#### Learning Economies as Institutions: the Problem of Indivisibilities

The second major problem has to do with some of the difficulties of collective action identified by the modern political economy of institutions.<sup>22</sup> Institutions, as defined by such political economists, exist in cases where decision making is unavoidably interdependent. Unlike markets, there is no possibility of fully dividing decisions. In terms of learning economies, this refers to cases of concrete relations, which in essence are forms of mutually specific assets, hence indivisible, as well as more classical cases of real, mutually specific assets in technology or capital; it could also refer to temporally interdependent decision making under conditions of uncertainty, a condition we have argued is pervasive in the learning economy. Indivisibilities, to different degrees and at different levels, are thus defining conditions of institutions, including learning systems.

But indivisibilities create all kinds of problems for actors, whether this be individuals or groups which are smaller than the whole.<sup>23</sup> In the terminology of neoclassical economics, indivisibilities in institutions make it difficult for agents to reveal their preferences in the standard way, through immediate entry and exit from a relation. If a relationship necessarily involves some minimal duration, interaction, or commitment, it may only be intact because it provides minuscule net benefits, or it may be intact because it provides colossal benefits. In any case, the standard measuring rod (revealed preference through price), is not applicable.<sup>24</sup> The implication for the establishment of institutions is very important. Major institutional changes usually require not only that new relationships be established, but that some existing ones be broken up, disrupted. Long-standing relationships are usually not measured in income statistics (or any other welfare statistic) because they fall beyond the measuring rod of money. One of



the paradoxes of modern life, i.e. that what would appear to benefit the majority on average often meets with huge resistance from surprisingly high numbers of people and groups, seems less mysterious in light of this. To the extent that establishing or strengthening one set of institutions sacrifices other relationships, we can expect it to be very difficult, even if it appears to be clearly beneficial, "as a whole."

A second implication of indivisibilities is that they make it impossible to run traditional experiments, i.e. those which yield clear information on cause-and-effect relationships, when things come in packages, such as the conventions, relations, and rules we have called worlds. One kind of indivisibility is particularly relevant to the problem of institutionalization. Nonexclusive public goods exist when non-purchasers cannot be excluded; so the "good" is collectively consumed, at least by the relevant population. This is "shared indivisibility." The other, more traditional case is akin to economies of scale, or what we might call "lumpy indivisibility." When a public good, such as a set of conventions, is non-exclusive and shared over the whole group that receives the good, any experiment must involve the whole group and is therefore quite costly. For the same reason, it is not divisible into units that can be counted or straightforwardly measured, and so its value is unknown. And shared indivisibility means, in effect, that there is only one collective "supplier" of the good (the government in the case of the formal institution, the whole social group in the case of the learning production system), and it is impossible to know whether there is an alternative supply which could be better.<sup>25</sup> This does not mean that we abandon analysis to description, but simply that in policy for such systems, it is impossible to know in a scientifically convincing way that what is proposed is reliable.

The problems, very considerable, come in trying to build or change such indivisible systems, i.e. in getting people to establish such systems or change them when they are locked-in to dysfunctional webs of relations. Moreover, soft public goods -- webs of relations and conventions, whether externalized or organizational -- are inherently harder to bring into being than hard public goods such as infrastructure, because the technical state of knowledge of them leads to uncertainty as to whether they will have any positive function at all. Bridges, airports, and schools are at least observable, contained (non-scant set) technological or bureaucratic systems. Learning economies, worlds of production, are not.

In this regard, indivisibilities mean that the "selection" environments in which evolution of technological and organizational systems takes place, may operate in perverse ways. What appear to be small parts of a system can have big effects on the whole, especially the possibility of blocking realization of a whole, where the other elements appear to be in place. Indivisibilities are frightening for policy.

## VI. BUILDING RELATIONS: PRECEDENT, TALK AND CONFIDENCE

Relations and conventions are recursive outcomes of precedents which act as guides on action, and are reinterpreted and reevaluated for their efficacy, and reproduced as conventions when they work to coordinate action under conditions of uncertainty. The problem is that if such precedents do not exist or are not adequate to the kind of learning system which is to be created, deliberate institutions to create them suffer from the circularity identified above. And a learning system is a complex organizational structure with many different actors and transactions between them, hence many different conventions and types of relations, built on precedents which are effectively indivisible, if the learning system is to work. It is probably no accident that considerable recent research reveals the cardinal importance of "soft" factors such as "civic culture,"<sup>26</sup> in the performance of democratic institutions, but that few venture any policy-oriented recommendations on how the lack of such a culture could be redressed. Very unorthodox policy strategies are needed in order to break out of these labyrinthine prisons. Two of these may be labeled, respectively, "talk" and "confidence."

The circular relation between public institutions and the institutionalized learning economy requires that the parties to public institutions somehow be convinced of the utility of having a public institution help in supporting the conventions and relations which make up the institutionalized learning economy. That is, they must share a convention of the utility of the public institution in some specific domain, before it can even get started. Talk between the parties may be one approach. Much has been said about the difference between institutions that function via a combination of loyalty and voice, versus those that rely on exit for adjustment and structure.<sup>27</sup> Talk is upstream of voice, in that there is no institution yet existing in which the channels for voice among loyal parties are already established.

Talk refers to communicative interaction, designed not simply to transmit information and relay preferences, but to achieve mutual understanding.<sup>28</sup> In the case of prospective learning, information from other experiences where learning has worked (on evolutions in product markets, on suggested potentials for the parties at hand, given their current resources and skills) can be valuable as a stimulus, even though it cannot be represented as "experimental," i.e. as automatically useful or valid in other circumstances. Such information can, however, be used as the valid pretext for talk.

It can immediately be objected that if there is no tradition of communication or, worse, if there is distrust or antipathy, what is the possible basis for talk? The objection is important: it is probably difficult to stimulate talk, precisely because talk is not free: it takes time and effort, and payoffs are not evident, especially if the history of relations is bad, or relations are satisfactory for those already in them.<sup>29</sup> On the other hand, talk is cheap: it is not that costly and the risks are relatively low. Public institutions thus certainly have a possibility of getting low-cost talk going. Talk alone, however, is unlikely to be sufficient if such fears exist; but rather than bribing the parties with incentives (or at least

doing so in more than a temporary way), it would be better to offer them some sort of reinsurance<sup>30</sup>, a safety net (at least partial) for failure, forcing them to reveal the efficacy of talk and their propensity to have confidence. Finally, talk of the sort referred to here means intensive communicative interaction. Shallow contact will not do. Thus, such talk is more likely to get going if carried out in low-cost ways where depth is also possible (more on this shortly).

Precedents which underpin conventions or relations inherently involve confidence, without which single events would be just that, and would have no impact on future expectations. Insofar as conventions and relations involve expectations about how others will interact with you in situations which involve some uncertainty, such confidence involves a measure of vulnerability: it is necessary for interacting agents to place themselves in a position where, should the other not follow precedent, they will suffer a real loss.<sup>31</sup> To have confidence in what others will do is, in this sense, to trust them; not in the metaphysical sense, but in the analytical sense of making oneself vulnerable, on the basis of confidence in the precedent. But how to establish such confidence so as to bring into being precedent, relation and convention, where it does not exist or worse, where there are histories of mistrust, broken promises, antagonisms?

Talk may involve the parties in getting the ball rolling on a learning project, but it does not establish confidence in the specific sense that generates precedent and convention. Bribery through special material incentives (subsidies, etc) provided by a public institution to private actors is likely to work only as long as the incentives last; if all actors calculate that the other actors only do what they do because of special incentives, then a convention based on incentives is established and with it, the possibility of lock-in to subsidy. Therefore, if the intention of a policy is to establish learning conventions that are not dependent on permanent subsidies, other approaches will have to be tried, or early incentives will have to be slowly replaced with precedents in other, non-subsidized forms of making oneself vulnerable.

One method of creating confidence in a sea of non-confidence is, of course, bureaucracy (hierarchy).<sup>32</sup> It has been found, in economic policy making, that certain projects are amenable to isolation from the overall economic culture, by internalizing them within hierarchical bureaucracies. The military is the model. Defense procurement in the USA, or major indivisible high technology projects such as the French TGV, are carried out by quasi-military bureaucracies with strong financial incentives and command-and-control authority. But internalization is not a solution for much of the learning economy, precisely because of the open-endedness and high degree of risk of much learning, which nobody in society wants to pay to internalize, and where the technological character of the product does not permit near-monopoly (scale economies, extreme indivisibilities, as in the case of the TGV).<sup>33</sup> Some other method of building confidence must be used.

Small, repeated, experimental interactions may be useful for this purpose. Experiments, as a policy device, means actually setting the parties to work in limited relations which facilitate learning and attempting to build up in complexity. It does not mean trying to prove the utility of any general, abstract solution. Most importantly, such experiments must proceed "as if" confidence existed. Small experiments build on the communicative understanding that comes from talk, asking the parties to interact by suspending their fears and doubts. The likelihood of getting the parties to act *as if* confidence existed, as the first step toward establishing real precedents, should logically rise with the degree of knowledge they have about each other. Depth is one dimension: the more I know about you in a specific domain; but breadth is another: the more I know about you in general, through collateral forms of information, the more I will be willing to enter into deep contact. These include risks of collective sanctions for violating the terms of a relation; reputation effects due to rich information flows; cultural proximity, behavioral norms which shape the anticipations of agents; frequency of contacts in and outside of the particular business context.<sup>34</sup> Attention has also been called to "institutional thickness" -- multiple, partially overlapping, and partially redundant institutions -- as a basis for breadth.<sup>35</sup>

Depth has a complicated geography, in that professional interactions, in some cases, have channels involving strong specific long-distance relations and weak local ones, above all in specialized or highly formalized (cosmopolitan) professions. Still, even in such circles, local relations often involve forms of depth not achieved in long-distance, infrequent contacts. Breadth has a more uniformly localist dimension: we are more likely to have information on someone's reputation, and to be able to validate it by interpreting it against a context with which we are intimately familiar, in a local context.<sup>36</sup> There is thus some relationship between localness and the mutual knowledge that should allow parties to act as if confidence existed, as a first step toward generating precedent. Talk and confidence -- depth aided by confidence due to breadth -- while not the province of the locality, are in some cases (certain products, certain worlds of production) more likely to succeed when they are geographically localized. This is not a hard and fast rule, of course, and much more theory and evidence, is needed before these relationships can be understood in a policy-relevant fashion.

## **VII. THE NEW HETERODOX POLICY FRAMEWORK**

There are many intricate dimensions of talk and confidence-building as the vehicles for creating precedent, relation, and convention. Who should talk? What they should talk about? What techniques should be used to facilitate such talk? What small relations should be attempted first? What kind of encouragements should be offered to get the parties to suspend skepticism? The answers will

vary not only according to the kind of world which talk is intended to get started, but also according to the starting point of the parties. Some very modest beginnings will be attempted in this section.

#### Starting Points: strategic assessment.

It has long been standard practice in industrial policies to carry out strategic assessments of local, regional, or national possibilities (depending on the policy's target). The idea is to eliminate unreasonable goals by assessing the existing state of such factors as technological level, the labor market, infrastructure, market structure, and so on. Such analyses, in practice, vary greatly in quality, and unfortunately there is a high propensity for error, especially excessive optimism (since the assessments are usually paid for by agencies with a vested interest in being in the policy business). Critics of industrial policy claim that this is inherent to such policies, but such skepticism is unwarranted, since there are also examples of excellent strategic assessments having led to wise decisions [examples include French high speed trains; numerical controls developed by the U.S. Army; the Japanese semiconductor industry as guided by MITI's strategic plan].<sup>37</sup>

Simplifying, we can say that in the 1960s, it was possible for many European countries to carry out strategic assessment based on a standard factor input-cost method. The question to be answered was: what factor inputs do we need to create, so as to be combined into an industry at something close to world best practice, how much will it cost in the national context? In the context of rapid world, and especially European, economic expansion, the main consideration for efficiency was simply to assess whether the industry could find a market enabling it to enjoy optimal scale economies, and in that context, to implement state-of-the-art production technology. Oftentimes, *filière* (commodity chain) analysis was applied to maximize the "local content" of the target industry in the national or regional space.<sup>38</sup>

The demands placed on strategic assessment in the context of the learning economy have become vastly more complex than in the 1960s, but the techniques of assessment have not caught up. It would no longer be possible, for example, to use the same method the French employed to plan Fos-sur-Mer today, because world capacity in virtually every major sector is much closer to saturation, and there is no comfortable time lag during which policy can simply copy the best of what is being done elsewhere. The Brazilians learned this with their market protection law for computers; though it has had some considerable positive effects, it has absolutely failed to encourage competitive computer making in that country, leaving them generations behind the state of the art.<sup>39</sup> Any strategic assessment carried out today must use the existing starting point for the economy in question, but the goal of the policy has to be somehow to catch up to a moving target, a target which will move during the period in which the policy is getting started.

## The Product as the Central Unit of Reasoning

Strategic assessment has characteristically been organized around the concept of sector: can we build a computer industry or a shipbuilding industry? The advent of the learning economy means that standard sectoral-filière assessments are no longer adequate to the task. Competition via learning takes place around real products and products do not correspond necessarily to industries-filières. The majority of output of our economies is intermediate goods, and social and spatial divisions of labor create all manner of organizational clusters in the economy which do not correspond to final output sectors, or even to the grand (and now crude) distinctions between consumer and producer goods. Some of the most significant such clusters have to do with cognate intermediate products that go to very different final output sectors; they also have to do with products which have little concrete resemblance but have parallel or convergent technological trajectories, or technological complementarities.

The upshot is that the principal unit of assessment has to be the product or a technological space of products (the latter defined by spillovers, complementarities and evolutionary dynamics). This does not mean that traditional sectoral analysis is ignored. Success in a given product generally depends on the existence of a production system which extends upstream and downstream of that product in a filière, or spills over to complementary technological spaces; but this is, from an industrial policy perspective, a tactic appropriate in some cases, not an a universal goal.<sup>40</sup>

Strategic assessment has to include assessment of the worlds of action which are to be brought about, to which talk and confidence-building as means to establish precedent, are to be applied. The assessment, while depending on expertise, however, cannot be left entirely to the experts. By definition, the talk to which we refer in the previous section can have no hope of setting conventions and relations into motion if it is a mere pretext for ratifying judgements already made by technocrats. Not only is it likely that talk will reveal information to which technocrats otherwise have no access, but it is key to avoiding the circularity problem, where those who talk know that they are talking about something that has already been decided.

## Developmental Starting Points

Countries and regions have different starting points: the size of the market; the current technological and infra structural and knowledge endowments of the society and economy; the generic image of the country or region; underlying relationships between groups and especially between organized interests; the existing stock of firms and inter-linkages between them; and the nature and effectiveness of public administration. Three standard approaches to starting points can be viewed with extreme caution in light of the analysis advanced here.

The first is to reason in terms of grand categories of starting points, the principal ones of which are: big wealthy technologically-endowed regions/countries; small, wealthy, technologically-endowed places; big less developed or latecomer countries; small, less developed or latecomer ("less favored" in the current EU jargon) countries; and, underdeveloped/poor countries, regions. These categories have some descriptive utility, but they do not lead anywhere in particular with respect to strategies for product-based technological learning. Their principal categories -- size and technology endowments -- are most relevant to big, capital- and technology-intensive industries, but even there, many small rich countries have apparently broken the size rule (Holland with Philips, Sweden with Ericsson) and many big countries have failed in spite of it (France with Thomson and Bull). They are instructive, but only up to a point.

The second, and preferable, approach is to reason in terms of broad categories of products. For products with low barriers to entry -- mostly certain products in the Interpersonal or Market Worlds -- the experiences of Italy and Germany may be guides. In the Italian cases, traditional skills were deployed in interpersonal industries, to serve a national market in the 1950s and early 1960s. That market was big and relatively fragmented.<sup>41</sup> Smaller countries do not have such big markets, however, and virtually all countries are more open to import competition today than was Italy in the early 1950s. The lesson is that such industries are likely to flourish only where (a) skills are good enough or highly focused enough that they can contribute something unique to the world market; (b) they can serve a local or national market which is unsatisfied by imports or can do so in a way which passes the indifference test: higher local prices are compensated by better tailoring to local demand (but with open markets and media, the knife-edge problem is sharper and sharper); or (c) where innovative institutional arrangements, such as specification subcontracting,<sup>42</sup> are used to link local producers to order-givers in a way that builds their skills and responsibilities.

For industries with high barriers to entry, whether because of traditional scale concerns or because of high investment in technology, the choice is a very stark one: either go all the way with a major technology policy designed to cover a technological space (e.g. Airbus, the Japanese semiconductor policy, US military procurement), or target particular subsectors but still with potential for developing spillovers. It is likely that, in any country, big multinational partners will be necessary and substantial commitments of local resources over long time periods will be required. The only strategies likely to succeed are in the latter case are those where technological branching points (e.g. which model of high-definition television? which system for transmitting mobile telephone calls?) are at hand, and where the risk is taken to develop along one branch rather than another. The optimistic note for this strategic assessment process is that there is rarely a single best world practice for any group of products.<sup>43</sup> Entrants can define products and practices, and they can trace out developmental pathways that continue to redefine such products and practices.

The third approach to strategic assessment is to reason in terms of norms for countries, points toward which we want to move, away from the starting point. This leads to a developmental recipe, in terms of such things as capital institutions, technological infrastructure, political and administrative institutions, entrepreneurship, and so on, which -- it is said -- will bring about developmental results. This is quite wrong in two respects. One is that among the successful, rich countries and regions, a great diversity of products, and hence worlds of production and accompanying economic practices and institutions exists. They do not all follow the same rules with respect to the provision of capital, skilling of the workforce, public administration, entrepreneurship, and so on.<sup>44</sup> Even within given sectors, there is a plurality of successful but different models. It is a gross oversimplification, except at the most abstract level (e.g. honest versus corrupt public administration; schooling versus no schooling) to try to reduce the development process to a single set of general goals with respect to different starting points. The ending points will be different, too, according to the specialization of the learning economy to be created, and the worlds of production they embody.<sup>45</sup>

Those ending points are defined by assessing what kind of worlds are to be created, i.e. the identities and capacities for action and coordination among the participants in the production system. A critical part of the strategic assessment of what is possible in a given time and place is, of course, talk. Technocrats may be able to offer the talking parties suggestions based on the entry conditions we mentioned above, but they cannot substitute for talk among the parties who ultimately will have to "become" the collective actor of the world of production to be developed.

### The New Heterodox Policy Framework

In recent years, the analysis of the economic performance of certain successful industrial systems has prompted inquiry into policies and institutions that could be used to institute such systems. A new heterodox policy framework has emerged. This framework, while having many branches, shares a number of features, favoring policies that are: context sensitive, i.e. interested in the embeddedness of industrial practices in specific contexts and regions, hence "bottom-up."<sup>46</sup> It is production systems-oriented rather than firm-oriented in its focus. It has a non-Cartesian element, one that accepts the diversity of underlying technological and institutional situations of different economies. In many ways, it appears well positioned with respect to the foregoing analysis. Key words include: networks, flexibility, decentralization, cooperation, research and development, human capital, technopoles, training.

The policies are heterodox because of the kinds of public goods they would provide. In standard public goods theory, "market failures" sometimes occur and when they do, public goods can be provided to rectify them. Such public goods must have economy-wide application, i.e. they must be as *generic* as possible. The new theory also calls for policy to produce public goods, but allows that



these goods may be *specific* to technological spaces: it is their developmental properties (evolution along trajectories through learning) that ultimately generalize (via spillovers and complementarities) their benefits to the wider economy and society.<sup>47</sup>

We may now summarize the varying ingredients of this cocktail in more detail.<sup>48</sup>

Networking. The most widely shared element of new deal economic policies is to promote networking among firms. It is held that new forms of economic competition involve high levels of vertical disintegration and that there are extensive market failures in information exchange between firms. It follows that inter-establishment and inter-firm relations and networks need to be supported to enhance their efficiency. Networking concerns both big and small firms and relations between them.

Promoting Technology Transfer. It is widely accepted that the rates at which technologies are absorbed by firms vary widely from place to place, especially when the economic base is composed mostly of small- and medium-sized firms. As a result, publicly-funded innovation and technology transfer centers are becoming favored as means to enhance the uptake of new technologies, as well as to stimulate convergence in user-producer relations, so that incremental innovation can proceed more rapidly.

Local Labor Markets: Training and Focusing Institutions. In industries with high levels of industry- or region-specific skills, but also with high levels of local labor market flexibility, there can be strong negative externalities: producers will not want to invest in adequate levels of labor training for fear of losing workers once they are trained. Moreover, in the face of rapid change in labor skills, no single employer will have the wherewithal to effect the change in skill supply and lack of coordination may lead to a downward competitive spiral. Under these conditions, public institutions that provide for industry- or region-specific labor training, for strategic changes in the direction of training, and that help workers to secure jobs in the face of flexibility in specific, regionally-concentrated sectors, can attenuate the effects of market failure.

Infant Industry and Getting a Start: pre-competitive R&D and stimulating markets. Infant industries are based on new and experimental kinds of products. The probability of generating new products is high, but product configurations have not yet settled onto an identifiable technological trajectory. High levels of risk and uncertainty exist for producers in these nascent sectors. The collective effect of waiting, however, may create a vicious circle, where everyone waits for everyone else, and the overall rate of development is thereby retarded. By the same token, nations or regions that could successfully develop a new industry may find that a delayed start (especially when another region has moved ahead of them) locks them permanently out of a promising niche in the new industry. There are potential benefits to getting an early start, in contrast to this common free rider problem. Industries, firms, regions and nations that get ahead early often retain a leading position for quite some time, and in the early years there can be significant superprofits to new products. As a result, industry

specific pre-competitive R&D policies, and other policies to stimulate regional or national (often public) markets for risky new technology products, may be called for, in addition to networking and technology transfer centers.

Entrepreneurship, especially for small firms. Another element of the emerging consensus in the heterodox framework is that good ideas only become reality when potential entrepreneurs enjoy the conditions that permit them to start-up firms and survive. The conditions favoring firm formation include such traditional hard factors as access to capital markets and some soft factors as cultural images of the entrepreneur and sanctions to failure. They also include such conditions as access to information, locational sites, rules on hiring and firing labor, and access to potential customers in other firms. Entrepreneurship policies are designed to help potential entrepreneurs overcome these difficulties, although in practice the majority of them consist of loan programs for small firms.

Service Centers. In the many successful Italian industrial districts, the practice of assisting existing firms in a series of concrete ways has emerged as a key method for public support of those communities of producers. Industry service centers are particularly devoted to spreading the costs for certain kinds of resources that single firms cannot afford for themselves alone, including systematic market research, foreign marketing, technology research and, in some cases, technology sharing, and on-line electronic networking facilities. In Italian regions, especially Modena, major industrial estates for small firms have been created, where state-of-the-art flexible configurations of space are made available to firms at below-market cost, not only permitting them to modernize their facilities, but also permitting them to remain together, thus enhancing communication and networking.<sup>49</sup> Service centers have also been involved in the promotion of regional brand names (something like *appellation controlée* for wine, but now applied to the market identities of other kinds of products), so as to enhance their non-substitutability on national and international markets.

### The Heterodox Framework versus Other Policy Approaches

There is hardly consensus about this sort of policy framework. Opposed to it are those whose point of departure is the rapid global transfer and diffusion of certain forms of technology and knowledge (but see our analysis above of the hyperbole involved in many such claims), and the increasing costs (hence entry barriers) of carrying out cutting-edge innovation projects. Their vision is of global technology-based oligopolies in competition where any national policy would have to reinforce the status of the nation's oligopolistic actors. For the USA, for example, this would mean weakening anti-trust laws (which are deemed to have outlived their purpose), either in a soft version to promote collaboration (à la Sematech) or in a hard version, to promote concentration. Complementing this, some argue for neo-mercantilist trade policies. There may, in some cases, be a role for some such policies, a

subject into which it is impossible to enter here. But there is little reason to believe that alone they would generate competitive technological learning and performance: the failures of concentration policy are well documented. Such failures often have to do with the absence of links between the resulting giant firms upstream to an effective national system of innovation and downstream to an effective production community. At the most, such strategies can play a limited role in the learning economy; and in some cases they may be harmful. The heterodox policy approach is quite the opposite in that it accepts as a given the openness of the trading system, the insufficiency of size alone, and in some cases, the disadvantages of concentration for competitive learning.

Another approach to policy is that of strengthening systems of innovation (SI).<sup>50</sup> SI is also a heterodox neo-institutionalist approach to technological innovation. There are many different versions of SI extant at the present time. Almost all (except that of Lundvall<sup>51</sup>) share an emphasis on formal institutions, on scientific-engineering skills, and on the national level of formal institution-building. The major non-public institutions are firms and research laboratories; the major public ones are universities, government laboratories and procurement programs, and technical education. The heterodox approach differs in emphasis, although it is not in contradiction. The emphasis here is on: the plurality of worlds of production and innovation (science and engineering is only a part of the problem); "small" processes of coordination via convention and relations; the circularity of conventions, relations and institutions; and hence the necessity for a significant meso-economic dimension to policy as well as a systematic national level.

## **VIII. THE DANGERS OF ORTHODOXY**

The policy approach described above, like any set of measures that attempts to take a complex analysis of economic reality and create a policy formula based on it, runs the danger of missing its target. An example from an earlier period with a different policy framework may help to understand this point. In the 1950s and 1960s, a theoretical analysis of industrial complexes was used as the theoretical justification for growth pole strategies in many countries. The results were impressive in certain cases, at the national level (e.g. French industrial planning in the late 1950s), but were almost total failures at the regional level in all places. Later on, growth pole policies failed at the national level in most developing countries.

In order to avoid similar problems in the transformation of the current analysis into policy, both technical and substantive reductionisms must be avoided. This analysis of learning is not inherently about small firms, networking, localism, or flexibility per se; it is rather about adaptive technological learning in a territorial context. The proper goals of such policies are:

(a) for traditional or small-scale intermediate products, ongoing adaptation of products and processes, especially through product differentiation or moves up the price-quality curve, so as to respond to ongoing and inevitable entry by competitors, whether large firms or other regional systems; and

(b) for scale-intensive or new technology products, moves along the technological frontier, where that frontier is unknown or unknowable. The entire substantive thrust of any new deal economic policy must be geared to these substantive goals, as specified in light of particular products and their worlds of production to be developed. New deal economic institutions are only means to these ends.

The real danger exists, as theory now becomes packaged into policy, that such policies will become detached from this substantive content and necessary procedure of building convention, and instead devolve into mechanical formulas and self-referential content. Three particular tendencies are worrisome.

### From Framework to Formula

Networking is now frequently discussed in policy literature as a sort of recipe for any form of communication between firms. This has no necessary relation to the precise conventional forms of inter-firm relations which underlie successful worlds of production. Networking has to be a means to realizing a common developmental pathway characterized by learning. The content and shape of a network, as well as the degree of external network, will differ according to the products to be made and the specific way productive activity becomes a world of production.

The provision of services to firms, in substantive terms, represents a strong departure from traditional public goods provision. In the latter, public goods are provided where markets fail, due to the free rider problems that come when such goods are non-exclusive. As a result, public goods are provided which have non-specific assets: they are non-exclusive. But the provision of concrete, real services to real worlds of production involves public goods with asset specificities and, hence, a certain measure of exclusivity. It will not do to disguise service centers as mere providers of any old, generic public goods, and yet this is the tendency in the literature. Another danger is that service provision will be turned into a pretext for doing almost anything that supports local firms (especially the politically-popular "small" firms) with no substantive criteria for assessing the purpose of these services. Indeed, some services can have perverse effects. Modernization services, for example, can be used by some firms to distance themselves from local competitors and thereby to "exit" from their local interdependencies. Many technological extension services are premised on the principle of survival for the fittest, not collective learning. Initially positive effects can then be followed by catastrophe (e.g. the French *plan textile*). Services for learning in other words, only work when the goal is clear and when

the services are consistent with the conventions of the world of production to be assisted, as understood by the participants themselves through talk.

Perhaps the most pernicious element of the current policy debate is the category of *small firms* as a goal. Small firms do play essential roles in many successful worlds of production. But smallness is not a goal, nor is there necessarily any commonality among firms merely because they are small. A small firm in a high technology industry, whose products are evaluated according to their scientific-technological content, has virtually nothing to do with a small firm subcontractor to a major garment producer: their underlying conventions of work, product markets, inter-firm relations, etc. are totally different.

Finally, the category of localism has become important in the heterodox framework, because of its theoretical recognition of the agglomeration and territorial embeddedness or specificity of conventions in many learning-based production systems. The problem is that localism cannot be an end in itself: the territoriality of relations that go into learning is, in all cases, highly complex. If the strength of a particular local economy (one that corresponds to the jurisdictions of public institutions) is to be promoted, it is better to focus on learning and its conventional underpinnings than directly on localism. At its worst, localism could lead to an artificial closing off of the production system, reducing its flexibility and hindering the development of conventions that go beyond local borders but ultimately strengthen the local economy.

### The Dangers of Cooperation

Nowhere is the danger greater than in the sudden stress on "cooperation" as a key to world class economic performance. Cooperation was, correctly, discovered as a dimension of certain kinds of highly successful industrial systems, principally in Italy and Germany, and its discovery has prompted a necessary corrective to the stress on competitive atomistic interaction of most economic thinking. But it is fully contradictory with the notions of sectoral diversity and the plurality of ways of successfully organizing modern production (the plurality of "worlds" in other words), to hold up cooperation as a model for behavior in all cases. There are worlds of production where particular, conventionally-rooted forms of cooperative coordination can be useful, but there is no general model of cooperation for all industries in all places.

### Boilerplate Approaches to the Learning Economy.

The transformation of this new heterodox thinking about economic development into an all-purpose formula is dangerous as well. Porter's (1990)<sup>52</sup> "diamond" of development is perhaps the best-known and certainly the most widely employed of such policy formulas. The framework has two main problems. The first is that it is superficial: for the most part, it restates the obvious outcomes of

success as observed in many places (the four points of the diamond). It then "reverse engineers" these outcomes, claiming that they were causes of success. But of course this does not follow. Attempting to create success by installing outcomes has always been the downfall of industrial policies; the fact that Porter has based his model on an admittedly more sophisticated analysis of real world experiences does not prevent the result from being equally prone to failure. Second, by abstracting across a wide variety of cases, i.e. preferring an extensive form of reasoning to an intensive one, it turns a great diversity of experiences into a single formula, with potentially great errors (e.g. all success is based on high levels of domestic intra-sectoral competition, etc). The record already shows that "intangible factors play a central role in distinguishing cases of success in the new policy framework from dramatic failures."<sup>53</sup>

#### Scientism and Prescriptive Rationality<sup>54</sup>

Many of the problems described above stem from the tendency of analysts to seek determinate causes of industrial performance and for policy makers to extend that via prescriptive rationality. One of the greatest ironies observable at the present time is the transformation of an analysis explicitly inspired by "non-Cartesian" and "context and contingency sensitive" epistemologies into an all-purpose technocratic formula for development. The "architecture" of a production system and of public, organized institutions is only interesting insofar as it helps understand the patterns of action which constitute production; the objects (technologies, tools, infrastructures) are themselves the outcomes of human practices and exist to facilitate such practices; rules, skills, and formal roles depend, for their efficacy on the identities of agents. The problem with much policy-oriented analysis is that it tends to reduce its vision to architecture, objects, rules, skills and roles, and to prescribe changes in them. Not only does this ignore the substantive object of analysis, but by attempting technocratically to prescribe behavior for the agents of the system, it has a high risk of failure.

#### The Entrepreneurial State, "Laboratories of Democracy"

The third great danger is that heterodoxy will be used as a pretext for a neoconservative retreat of the national state from its appropriate duties, and the installation of a system of ferocious and destructive inter-regional competition. In recent years, the turn to the region in the United States was stimulated essentially by a retreat of the federal government from the economic development field. In a nation where industrial and regional policy have always been quite weak by comparison to Western Europe, this left a policy vacuum which many states and localities attempted to fill. In some cases, small tentative steps toward the support of regionally-based clusters of firms have been taken, and certain elements of the policy framework described above have been set into place. But in many of the American cases, they resemble only superficially the framework discussed here; instead, what has been done is to set up public-sector centers for delivering services to individual firms on a local basis (often

"pay as you go"), where the collective and coordinative aspect of world-building has no place in the effort. These "laboratories of democracy"<sup>55</sup> are often nothing more than effective privatization and atomization of industrial policy.<sup>56</sup> And recent federal programs, notably the Clinton Technology Policy, duplicate these problems by making federal resources available only via proposal-based inter-firm competition.<sup>57</sup>

The attempted devolution and decentralization of industrial policy in certain areas of the European Union has a different starting point, of course. Many European nations have long had more activist policy frameworks and highly centralized states. It has become imperative to allow more initiative at regional level. France, for good reason, is now more than a decade into her experiment with administrative and policy decentralization. Still the results are mixed, in part because formal devolution of decision making does not in and of itself lead to the creation of capacities for action at regional or local level.<sup>58</sup>

It is essential that such European experiments not lead to the outcome which is already observable in the United States. There, a more pernicious form of localism in economic policy is known as the "entrepreneurial" state.<sup>59</sup> The locality and its governmental agencies are viewed as collective entrepreneurs in competition with each other. In practice, this often means simply attempting competitively to lower the price of labor, taxes, etc, so as to attract inward investment. But even when it involves such politically-correct measures as stimulating firm start-ups, the ideology of inter-place competition serves to block out any fruitful discussion of the need for higher levels of government to set certain ground rules (such as on inter-place price competition) and to provide certain kinds of services (e.g. national education policies, infrastructure, and other generic public goods). The danger exists that the European Union's principle of subsidiarity will be reduced to savage inter-place price-cost competition.

This points out that subsidiarity in economic policy needs to have certain kinds of boundaries, and that what is to be built at sub-national levels is not entrepreneurial states, but what we might call -- taking our cue from the East Asian development literature -- "developmental states." These distinctly activist, strategically oriented, systematic state efforts differ entirely from the notion of state entrepreneurialism and are much more consistent with the analysis developed in this paper.<sup>60</sup>

## **IX. SUMMARY**

At the end of this analysis, it will be helpful to draw the threads together.

The institutions of the new economy consist of a complex circular relationship between specific, convention-bound, learning-oriented production systems -- worlds of production -- which are

themselves institutions, and various kinds of formal, organized institutions, notably firms, public governmental institutions, and other organizations such as universities, unions, and trade associations. Any policy framework which involves the creation of public institutions to build or sustain the institution of the learning economy has to be based on ways to cut into this circle, and must reject the traditional logic of "public=institution" versus "private=non-institution."

We identified four major steps in the economic strategy in the new economy. The first is strategic assessment. The technical dimension is the determination of what kinds of products, where the product is the essential unit of analysis, and not the sector or the input-output system, are susceptible to being mastered in the economy at hand, where mastery is defined as ongoing competitive technological learning. There is a complex interaction between the product as a technology -- a knowledge field -- and its associated process technology. Just as products evolve through learning, so do processes, and both have dynamic parallels and complementarities which spill over their boundaries at a given moment.

However, strategic assessment is not only a technocratic task. Learning depends on the conventions which define collective identities of the actors in the production system by giving them access to a common context of coordination. Without this context, learning will fail, no matter how good the hardware is. The context cannot be produced by plans, nor bought by subsidies; in order to know whether the strategy is possible, it has to be known whether there is any reason to expect actors to go along. The circular relationship described here can only be broken into by talk. Talk is a necessary element in, and component of, strategic assessment.

The second step is the definition of the capacities for action and identities of actors which are associated with the world(s) of production to be assisted by policy. Each world -- a specific, local or national concretization of Interpersonal, Market, Intellectual, or Industrial action and coordination -- involves conventions, which coordinate inter-firm relations, markets, labor markets, and so on. These are the substantive goals, the specific (and differentiated) end points of policy. They, too, can only be defined through the difficult and clumsy exercise of talk, in concert with analysis.

The third step is the implementation of specific versions of heterodox meso-economic policies, whose content is defined by combination of technical assessment and social process, especially talk. The substantive method of heterodox policies is not to attempt the construction of learning-based worlds of production from whole cloth, but rather to try to create precedents which build confidence and hence make possible the deepening and widening of conventions. Small experiments are one logical way to proceed.

Finally, and only at the end of this long and "soft" process, can the need for further formal institution-building be realistically assessed and practically undertaken, the latter on the basis of confidence-precedent (and hopefully success in learning), and consequently emerging collective identities. There are other dimensions of formal institutions, i.e. having to do with macro-competition



rules, banking, education, and so on, which are not considered in this analysis. They, too, require links to the substantive concerns elaborated here. For example, education policies in different countries favor very different kinds of economic action, and push them down different routes of specialization. Some decisions about institutional structures at these levels can be taken with respect to strictly generic concerns (universal values of the society; inputs to any kind of modern economic activity); but a surprising number involve more concrete visions of the particular kind of productive economy and collective action which is desired. Here we have merely laid out the fragments of this way of thinking about the problem -- the problem of constructing coherent conventions and frameworks of action in the learning economy.



## NOTES

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1. Leamer, E.E. 1994. "Third World Imports and the Unskilled in the West." Los Angeles: UCLA Conference on The World Trading System after the Uruguay Round, December, UCLA Center for International Relations.
  2. Petit, P. 1993. "Are Full Employment Policies *Passé*?" Anaheim, CA: Paper delivered to the Annual Meeting of the American Economics Association.
  3. This is the definition which was developed by the Berkeley Roundtable on the International Economy, for the U.S. Competitiveness Council. See, for example, L. Tyson, 1987, *Creating Advantage: Strategic Policy for National Competitiveness*, Berkeley: BRIE.
  4. Krugman, P. 1990. *Rethinking International Trade*. Cambridge, MA: MIT Press.
  5. This is of course the position taken by contemporary institutional economics, where uncertainty is a result of universally opportunistic behavior, generating "moral hazards," which are only overcome either by authority (internalization) or the law of large numbers. Williamson, O. 1985, *The Economic Institutions of Capitalism*, New York: The Free Press.
  6. This idea was first developed in this context by Lundvall, BA, 1990, "From Technology as a Productive Factor to Innovation as an Active Process." Montreal: Colloquium, "Networks of Innovators," 1-3 May.
  7. Rip, A. 1991, "Meta-modeling and Technological Change." Paris: Paper delivered to OECD TEP Conference, La Villette, p. 13
  8. Asanuma, B. 1989. "Manufacturer-Supplier Relationships and the Concept of Relationship-Specific Skill." *Journal of the Japanese and International Economies* 3:1-30.
  9. This is developed in detail in Storper, M. and Salais, R., 1996, *Worlds of Production: the Action Frameworks of the Economy*, Cambridge, MA: Harvard University Press (forthcoming).
  10. See the papers in G. Grabher, ed., 1994, *The Embedded Firm*, London: Routledge.
  11. In recent years, the evolutionary school of economic thought has shown that firms have more latitude of decision making than is claimed by orthodox economic thought. There is a "loose" selection environment for disciplining those choices, not a perfectly tight optimizing mechanism of the market. So the firm is, in a sense, liberated to be a creative or satisficing agent. For an illustration of different approaches to profitability in the loose selection environment, see Storper and Salais, 1996, op. cit., chapter 4.

Our analysis complements that of evolutionary economics by showing that the firm copes with its "freedom" by using routines that permit it to reduce what would otherwise be an overwhelmingly complex, vast choice set. In the analysis advanced here, such routines are carried out in part by relational and conventional transactions, whether inside the firm or between the firm and its environment. The important theoretical point is that the firm, though freer in an economic sense than admitted by

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neoclassical analysis, can only proceed in reality by "binding" itself to the environment through C-R transactions. Such C-R binding redefines the firm's margin of maneuver in ways not imagined either by neoclassical economics, with its singular focus on markets, or evolutionary economics, with its focus on the firm. One dimension of the margin of maneuver is our second defining characteristic of learning systems: sets of CR transactions must be coherent ; and this in turn implies that webs of C-R transactions have qualities of indivisibility (see Section V for further discussion).

12. Storper and Salais, 1996, op. cit.

13. Sayer, A. and Walker, R., 1992. *The New Social Economy*, Oxford: Basil Blackwell.

14. We test this proposition that coherent sets of conventions exist, in Storper and Salais, 1996, op. cit., chapter 4.

15. Aoki, M. 1990. "Toward an Economic Model of the Japanese Firm." *Journal of Economic Literature* 28: 1-27; Sayer, A., 1986, "New Developments in Manufacturing: the Just-in-time System," *Capital and Class* 30: 43-72.

16. Dosi, G., Pavitt, K. and Soete, L., 1990, *The Economics of Technical Change and International Trade*. New York: New York University Press.

17. It is important to remember that other activities do remain, e.g. scale-intensive industries. They suffer, however, from increasing ongoing substitution of labor by capital, and therefore do not meet the employment creation criterion of the definition of competitiveness used here, though they may be capable of combining scale and high wages for the workers who do remain.

18. See, for example: G. Gereffi, 1995, "State Politics and Industrial Upgrading in East Asia," *Revue d'Economie Industrielle* 71: 79-91; and J. Zysman, 1994, *How Institutions Create Historically-Rooted Trajectories of Growth*, Oxford: Oxford University Press.

19. Patel, P. and Pavitt, K. 1991. "Large Firms in the Production of the World's Technology: An Important Case of Non-Globalization." *Journal of International Business Studies*, First Quarter, 1-21.

20. Keohane, R. 1993, "International Institutions: Two Approaches." In: Ruggie, J.G., ed., *Multilateralism Matters: The Theory and Praxis of Institutional Form*, NY: Oxford.

21. Wolfe, D., 1994, "The Institutions of the New Economy." Ottawa: Carleton University, Dept. of Political Science, manuscript.

22. Over the past several decades, economists and political scientists have attempted to come up with a unified social science, applying mostly economic analysis to problems of collective action and institution formation. See, *inter alia*, Arrow, K.J., 1951, *Social Choice and Individual Values*, Cambridge: Cambridge University Press; North, D., 1981, *Structure and Change in Economic History*, New York: Norton; Olson, M., 1971, *The Logic of Collective Action: Public Goods and the Theory of Groups*, Cambridge, MA: Harvard University Press; Buchanan, J. and Tullock, G., 1965, *The Calculus of Consent*, Ann Arbor: University of Michigan Press.

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There are many problems with such "positive political economy," notably its behavioral assumptions (rationality, individualism, exogenous preferences) and its inability to come to grips with the pervasive successful existence of institutions and collective action in reality, in the sense we define them above as conventions and relations which work (see: Storper and Salais, 1996, op. cit, chapter 13 for an extended discussion). But it has made significant advances in analyzing the difficulties of reconciling individual interests and the establishment of formal institutions: it has complemented traditional economic theories of why markets fail with newer analyses of why institutions tend to fail. In its concentration on the failures of public institutions, it has gotten something of a right-wing name, but this does not obviate some of the essential analytical lessons which can be drawn about the difficulty of establishing institutions, which are salient to the learning economy as institution. What follows is necessarily highly summary and too brief to do justice to the literature.

23. Olson, M. ( ). "Toward a Unified View of Economics and Other Social Sciences," in Alt, K. and Shepsle, eds, *Perspectives on Positive Political Economy* (to be completed)

24. Olson, *ibid*, p. 220

25. Some of these problems do not apply to learning-based systems which exist in fact. In those systems, the actors caught up in concrete relations and conventions have passed entry tests, and hence are part of what is an exclusive or, at least, semi-exclusive group. Their social identities are as members of the indivisible collectivity. They may complain about what they perceive as problematical dimensions of the indivisible web in which they are caught, but the fact that they do not exit, and that the system continues to learn in an economically competitive way, implies that they are not willing to pay the costs of severing existing relations, abandoning existing conventions for the unknown.

26. Putnam, R., 1992, *Making Democracy Work*, Princeton, NJ: Princeton University Press;  
Doeringer, P., and Terkla, D., 1990, "How Intangible Factors Contribute to Economic Development: Lessons from a Mature Local Economy," *World Development* 18: 1295-1308.

27. Hirschman, A.O. 1970. *Exit, Voice and Loyalty: Responses to Decline in Firms, Organizations, and States*. Cambridge, MA: Harvard University Press.

28. Lundvall, op. cit, relies in part on Habermas, J., 1976, *Connaissance et Interêt*, Paris: Gallimard (orig. in German, 1968).

29. Hirschman, op. cit.

30. Sabel, C., 1993, "Constitutional Ordering in Historical Context," in Scharpf, F., ed, *Games in Hierarchies and Networks*, Boulder: Westview Press.

31. Lorenz, N. (In Scott and Storper, to be completed)

32. This is the basic assumption of modern transactions-cost economics: see above, note 2.

33. We have a detailed study of French successes and failures in: Storper, M. and Salais, R., 1996,

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chapter 6.

34. Haas-Lorenz, S., 1994, "Apprentissage et proximité géographique dans une perspective évolutionniste." Aix-en-Provence: doctoral thesis, University of Aix-Marseille, Faculty of Economics, chapter 2.

35. Amin, A. and Thrift, N., 1993, "Globalization, Institutional Thickness, and Local Prospects." *Revue d'Economie Régionale et Urbaine* 3:405-430.

36. In general, the literature treats the function of reputation as a form of cross-check on behavior. It multiplies the probability of getting caught; and multiplies the consequences of getting caught. See the papers in Gambetta, D., ed, 1988, *Trust*, Oxford: Basil Blackwell.

37. Ergas, H. 1992, "The Failures of Mission-Oriented Technology Policies." Bologna: paper delivered to the international conference on systems of innovation, October.

38. Salomon, J.J. 1985, "Le Gaulois, le Cowboy et le Samourai." Paris: report to the Ministry of Industry and Research.

39. Schmitz, H. and Cassiolato, J., eds, 1992, *High Tech for Industrial Development: Lessons from the Brazilian Experience in Electronics and Automation*, London: Routledge.

40. This is meant as a deliberate critique of the "diamond" found in M. Porter, 1990, *The Competitive Advantage of Nations*, London: Macmillan.

41. Becattini, G., 1975, *Lo Sviluppo Economico della Toscana*, Florence: Guaraldi; Dei Ottati, G., (n.d.), "Prato, 1944-1963: Reconstruction and Transformation of a Local System of Production," Florence, University of Florence, manuscript; and Nuti, F., 1989, "I Distretti dell'Industria Manifatturiera," Rome: report to the CNR, National Research Council of Italy.

42. Gereffi, G., and Fonda, S., 1992, "Regional Paths of Development," *Annual Review of Sociology* 18: 419-448.

43. Even Porter, 1990, admits this. See also: Zysman, op. cit., and Wade, R., 1990, *Governing the Market: Economic Theory and the Role of Government in East Asian Industrialization*. Princeton: Princeton University Press.

44. As in Nelson, R., ed, *National Systems of Innovation*, New York: Oxford University Press, ch. 1.

45. Zysman, 1994, op. cit.

46. (Amin paper from Toronto, to be completed)

47. I argue this point in greater detail in: M. Storper, 1995, "Regional Technology Coalitions: An Essential Dimension of National Technology Policy," *Research Policy*; a similar argument may be found in P. Romer, 1993, "Implementing a National Technology Strategy with Self-Organizing Industry Investment Boards," Washington, D.C.: paper prepared for the June 1993 Meeting of the Brookings Panel on Microeconomics.

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48. What follows comes largely from: Storper, M. and Scott, A.J., 1995, "The Wealth of Regions: Market Forces and Policy Imperatives in Local and Global Context," *Futures* (summer).
49. Brusco, S., 1982. "The Emilian Model: Productive Decentralization and Social Integration." *Cambridge Journal of Economics* 6: 167-184.
50. Nelson, R., ed, op. cit.
51. Lundvall, (chapter in Nelson)(to be completed).
52. Porter, 1990, op. cit.
53. Doeringer and Terkla, op. cit; Ettlinger, N. 1994, "The Localization of Development in Comparative Perspective," *Economic Geography* 70,2: 144-166.
54. Amin and Thrift, op. cit. (Toronto paper)
55. Osborne, D., 1992, *Laboratories of Democracy* (to be completed)
56. Sternberg, E. 1992, *Photoelectronics and Industrial Policy*, Albany: SUNY Press.
57. Storper, M. 1995, "Regional Technology Coalitions: An Essential Dimension of National Technology Policy. *Research Policy* (forthcoming)
58. We have a detailed analysis of decentralization in Storper and Salais, 1996, chapter 11.
59. Maier, M. 1994, "Post Fordist City Politics." In A. Amin, ed, *Post-Fordism: A Reader*, Oxford: Basil Blackwell.
60. Wade, op. cit.