

Losing areas and shared mental models: towards a definition of the cognitive obstacles to local development

By Paolo Seri

Max Planck Institute for Economic Systems
Evolutionary Economics Unit
Kahlaische Str. 10, D-07745 Jena, Germany,
E-mail : seri@mpiew-jena.mpg.de

Abstract

In almost all the different approaches composing the eclectic literature on local development a strong emphasis is given to locally shared mental models as the basis for reaching agreement, resolve conflict and facilitate, through trust, cooperation. Nevertheless, if stability in the patterns of interactions facilitate the exploitation of recognized common-pool of resources, it lower the capability of exploring new opportunity. In this paper a theoretical analysis of the connection between shared mental models and the difficult to mobilize human capital in less-favorite regions is given on the basis of a social cognitive approach to local development.

Paper prepared for presentation at the DRUID Winter Conference,
Copenhagen, 18-20 Jan. 2001.

What evolves is the directedness of learning – the relative ease with which certain associations are made and acts are learned, and other bypassed even in the face of strong reinforcement. (Wilson, 1995, 'Sociobiology' p. 79)

1. Introduction

The spatial dimension of innovation and learning has received little attention in the conventional economic literature, mainly because of the difficulty to integrate territory-specific factors in the high level of abstraction requested by marginal calculus. With the advent of evolutionary political economy, however, this under-socialized, spaceless conception is being replaced by a richer, more realistic conception in which innovation is conceived as a socially embedded and territorially structured process (Lundvall 1992; Dosi *et al.* 1994; Cooke and Heidenreich 1998). The emerging dialogue between innovation researchers and economic geographers sees, roughly said, the former turning to geography to help to explain uneven patterns of innovation, and the latter turning to innovation to help to explain uneven patterns of geography.

This convergence of interests, though, has exclusively focused on advanced regions in the world economy.

Starting with the 'resurrection', in the late 1970s in Italy, of the Marshallian concept of industrial district by means of Becattini¹ -- which scope was to explain the explosion of the 'NEC phenomena'² -- academic analysis concentrated its attention on a growing number of successful industrial district (Becattini; Brusco; Bagnasco; Rullani; etc), innovative milieux (Camagni; Maillat; Cappello; etc), learning regions (Morgan; Landabaso; etc), industrial clusters (Porter..) and regional systems of innovation (Lundvall; Edquist; etc). The fact of concentrating exclusively on successful local systems made the analysis of the preconditions for local development (mostly related to the definition of social capital) almost tautological. The absence of

¹ As reported by himself, the first time that he 'extracted this concept from the oblivion' was in: Becattini, 1979, "Dal settore industriale al distretto industriale. Alla ricerca dell'unita' di analisi dell'economia industriale", *Rivista di Economia e Politica Industriale*, n. 1.

² The spontaneous emergence of the dense vertically disintegrated and localised systems of production in the North-East and Centrum of Italy.

a consistent comparative analysis had as a result the fact that the institutions assumed to have an explanatory power in the successful industrial district were never reported as 'absent' in local systems that had not been successful. From the one hand, that made it difficult to generalize the findings into a meta-theory; on the other hand, a more comprehensive understanding of the obstacles to the mobilization of human capital in 'losing local systems' did not emerge.

The state of 'immobility' of the latter ones is hardly explained by the mechanisms of incremental adaptation, actually working in successful industrial district or clusters. While there incremental technological and organizational innovations lay on a commonly recognized productive identity, 'learning' in losing areas implies more fundamental changes that derive basically from the absence of a common recognition of hidden resources or, alternatively, on the collective focus on obsolete forms of organizing traditional resources, strategies and forms of productions.

In the case of 'regional lock-in' the process of succession and realignment of inherited resources and strategies imply the whole restructuring of governance structures that frame actors, power relations and ideas. The embeddedness of the local public action in such situations and subordinately the limited extents and forms to which it can adopt learning strategies from elsewhere are the typical 'vicious circles' in which losing areas are locked in.

The reflections of this paper are based on a study on the field that I conducted in one area of the central Italian Apennine. The study was part of a project in course in the University of Ancona³, where the system of the Italian Apennine is analyzed as an area with partially geographic and economic similarities.

In particular, in this paper I will concentrate the discussion on two categories of problems affecting this kind of areas, which can be included in the field of 'cognitive economics'. The first one is the original problem of 'mobilizing' human capital, in the sense that at the basis of the difficult to change individual strategy there exists a cognitive 'anchoring' on persisting locally shared mental models (North 1994; Hirschman 1958)⁴. The second one consists in the frequency of adoption of the

³ The project is actually in course under the coordination of A. G. Calafati in the University of Ancona where I participated on the preparation of the Socio-Economic Plane of one of the National Parks included in the territory of the Apennine.

⁴ It is possible to associate to every community in the territory a shared cognitive frame that determines both the ways they use and organize worldwide scattered knowledge into the local process of production. In other words novelties have to be confronted with the knowledge

emerging novelty, which depends, in turn, on the conductivity of the internal relational structure of the local system. Forms of internal ‘compartmentalisation’ will not allow attaining the necessary critical mass for strategic change.

In doing so, this paper attempt, more generally, to explore how key notions from a cognitive approach to Evolutionary Economics can be applied to two key topics in Economic Geography: (1) the process of localized ‘collective learning’ in a spatial context, (2) the adjustment problems and the resistances to change that ‘losing areas’ are confronted with.

The structure of the paper will proceed as follow: in the next section the psychological concept of mental models will be analyzed in relation with the notion of driving forces of evolutionary change. In the following section an attempt to define the spatial dimension of shared mental models, and in particular, those psychological categories directly related with (and defining) the unit of analysis of the local dimension is made. In the fourth section an analysis of the cognitive obstacles to local development will be attempted. Finally some preliminary conclusions and policy remark are presented.

2. Substantive rationality, mental models and driving force of economic development

In his attempt to find a way out to the ‘discouraging result’ of the intensive study of the problem of economic development during the 1950s, Albert O. Hirschman ‘*place[d] the difficulties of development back where all difficulties of human action begin and belong: in the mind*’ (Hirschman, 1958 p. 11). Although Hirschman was mainly concerned with developing countries, his analysis remains pertinent to the ‘innovation deficit’ of ‘losing areas’ in developed countries, particularly as regards the role of the cognitive anchoring of individuals in established “*group-focused image of change*” and the role of agreement-reaching and cooperation-enlisting mechanisms. While the first point is related to the existence of a collective “focal point” that hide the recognizing of “*resources and abilities that are hidden, scattered, or badly utilized*”, the second stresses the difficult to reach collective agreement on new (i.e.

embedded in the territory (for an application of the notion of absorptive capacity in local contexts see Cohen and Levinthal, 1990). The concept of ‘anchoring’ is a particular case of cognitive inconsistency between new possible form of organizational development and the territorial embedded knowledge. In psychology this concept is referred to as a cognitive heuristic by which judgement and decision are made on the basis of irrelevant shared frames of reference (Antonides, 1996).

not traditional or social embedded) emerging opportunity⁵. Both problem are related with what will be later called ‘mental models’, how they are created and shared through the environment.

The basic proposition to be briefly addressed here is to define mental models as a fundamental driving force of economic development, and to present consequently an operational conceptualization of learning that we will use as a base to understand the process of learning at a local level.

The adoption of the concept of mental models in evolutionary economic follows from a set of assumptions of ‘bounded cognition’ (Langlois 1998; Simon 1957) as a direct reaction to the unsatisfactory explanatory power of the neo-classical assumption of substantive rationality. Neo-classical economics has evolved, since Marshall left the scene, into a series of applications of the constrained optimization model, under complete information. In the early 1950s, Von Neumann introduced game theory in order to extend the Walrasian models to incomplete information and market interdependencies, and to contemplate different outcomes. However the overarching presumption is that the resulting choices always reflect substantive rationality. One of the most convincing defense for substantive rationality is provided by Milton Friedman in his famous *Essay on Positive Economics*, where he approached the theory of causality in economics. In his example on the theory of the wheat’s price, he assumed that although ‘the color of the eyes of the broker could certainly have an influence in the single bargain’, it is not necessary for the substantive rationality model to be a descriptive model, with the detailed implication true at the individual level. Rather, the model is supposed only to be applied at the aggregated, or market, level.

Even if we accept this justification, and the philosophic approach behind it, there is still a fundamental problem for the substantive rationality paradigm: there are situations of collective decision, or resource allocation, that substantive rationality models explain poorly (Ostrom 1998) furthermore it doesn’t explain the permanence of under-utilized resources. Examples of this sort, with respect to the creation and exploitation of collective goods at the local system’s level, are provided in the fourth section.

⁵ Consistent with the problem of collective legitimacy of novel behavior is his theory of “Exit voice and loyalty” by which “new or dissenting *voice*” are often motivated to *exit* the original institutional environment instead of working to reach an agreement.

Within the framework of the proposed evolutionary theoretical approach a crucial source of socio-economic evolutionary change is human learning, cognition and creativity (Witt, 1997; 2000). Cognitive economics offers today some useful tools to describe decision making on the theoretical as well on the empirical level. In this framework of analysis human perception emerges as the basic cornerstone in explaining the process of construction of individual knowledge and behavior. The theoretical framework, we are here proposing, follows the Austrian tradition which considers the relevance of the active role of the human brain and mind in receiving, interpreting and give significance to external data. As pointed out from Rizzello (1997), this emerges as a path dependence process: ‘human brain organizes external stimuli by classifying them in the previous neuronal structures, which citoarchitectonics results from the innate neuronal characteristic and the previous classifications of other external stimuli, depending on the subject’s previous experience’. The so constructed ‘mental model’ works as an *evaluating function* in the human mind. It re-shapes and selectss the stimuli coming from the environment forming a mental ‘image’⁶ of the state of the world that, in turn, define behavior.

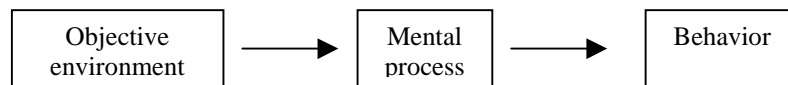


Fig. 1 A basic cognitive economic paradigm

Following this basic scheme, we can try to give a definition of learning with respect to the structure and the change of the mental model. At a certain time our mental model is the result to the past exposition to a certain type of environmental stimuli and recurrent problems in the attempt to exploit perceived resource. Our mental model is shaped to fit with this set of stimuli, problems and resources. Once the external environment changes its characters, our mental informational structure and consequently our action will experience a mismatch between the expected result and the actual result. Facing this ‘difference’⁷ the agent can proceed correcting his choices in the same subset of available answer, or can seek for new solutions out of the established mental model. To learn new ways of behavior requires expending much time and effort and disrupting secure routines, thus, we have to contemplate a degree

⁶ For a deeper analysis of the concept of ‘image’ see Boulding K. E. *The Image*, 1961.

⁷ The concept of ‘difference’ is contemplated by Bateson in his book *Mind and Nature: A Necessary Unity*. Dutton. 1979.

of inertia in the process of changing the structure of our mind, resulting in the possibility to not correct at all our set of choice although we are informed from negative feed-back. Following Bateson (1979) we can define three degree of individual learning: (I) 'zero learning' → no correction of choice; (II) 1st level learning → correction of learning in the same subset of available answers; (III) 2nd level learning → correction of choice in a new subset of not already available answers. The degrees of individual learning are here assumed to depend from the screening (amplification or minimization) effect of the immediate environment to the evaluated difference, or cognitive dissonance.

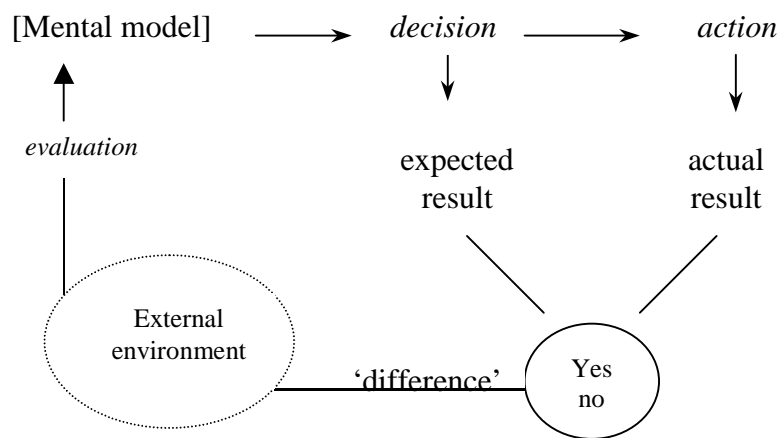


Fig. 2 The individual loop of learning

3. Shared mental models and local systems

To transfer the concept of individual learning shortly outlined above to an aggregate level implies a huge empirical and theoretical jump. Nevertheless, a conception of learning as an evaluation function related to the individual mind remains a coherent approach to clarify, and give an operational framework, to the magmatic concept of 'learning' as it seems to be when we refer this concept to a less-favored region as a whole. A first step in this direction is a more precise conceptualization of the unit of analysis.

The definition of a 'region' as a theoretically distinct unit of analysis presupposes the existence of economically relevant variables that cannot be traced back to the singles firms, individuals or institutions, but need, in order to be included in the analysis, to consider the region as a whole. The general and necessary role of the region in

economic theory is at the locus of what economists have begun to call ‘untraded interdependencies’ between actors; as pointed iconoclastically out by Michael Storper “*these untraded interdependencies generate region-specific material and non material assets in production. These assets are the central forms of scarcity in contemporary capitalism, with its fantastic capacity for production of standardised outputs, essentially because they are not standardised*” (Storper 1995, p. 192).

The stress on the uniqueness, peculiarity and contingency of territory-specific features, source of unexpected local economic development as well as of persistent local backwardness, and the failure of firm-centered, standardized, incentive based and state driven regional policy led to a reconsideration of these territorial specificity and make theorization works (in particular growth theory) more problematic.

A fundamental territorial specific factor at the basis of the definition of the concept of region is that of culture, common beliefs or shared mental models. Cultural factors, and more specifically the path of formations and accumulation of social capital play an important role on making the process of territorial economic development path-dependent (Maskell 1999). Abramovitz, 30 years ago, introduced the concept of social capital, and later on, Banfield first (1958) and then Putnam (1993) made an example of how the process of development in North and South Italy depend on different paths of social interactions. Both demonstrated that the local “original culture” – trust or not trust and limited trust (trust only between the members of the extended family, or “*familismo amorale*” as Banfield wrote in 1958) – is responsible for the bad performance of the institutional performance of the Mezzogiorno.

To understand the local structure of social capital it is necessary to cluster the population in terms of the density of information that are exchanged. At the basis of the notion of (social) network lays the concept of boundary, i.e. group of individuals between whom a higher quantity of informations are exchanged than outside the network. To this extension, the *size* of the social network or “compartment” (Grabher 1996) is fundamental to the extent by which *critical mass* can be reached in order to generate social and economic change. If the size of the network is limited to that of the “extended family”, as in Banfield analysis, or for other reasons – like simply the physical closure of the system, or more complex forms of compartmentalization due to interest contrasts – to small-sized group, difficulty we can expect relevant changes in that society.

In order to deal with the issue of how individuals extend their informational network on the territory, we need to make a step back and turn to the formation process of the mental models in relation with the external environment. In the previous section we described mental models as an encoding device, in this view, the global environment may be regarded as ‘a mass of messages without addressee’ (Golledge, 1997) where perception is a process by which we select those messages that are of concern to us. In other words we use mental models to *select* and encode input from the environment. Mental models consist in a set of categorical *templates* that through a vast amount of recurrent experience we build up in our mind. Perceptual input is then compared to the set of templates stored in the mind. If the input fails to match a conceptual template or pattern, then it is compared with another and another until finally one is found that matches it sufficiently well to aid in categorization. Input is assimilated in term of this particular template, and a bit of information is thus encoded in the brain. In selecting the appropriate template for the pattern-matching process, there is a preliminary sorting activity that eliminates potentially irrelevant ones and concentrates on the few that are thought to be most suitable in helping with the current task. In artificial intelligence terms, this process is termed activation spread, and the search for a potential pattern matching is undertaken via a complex hierarchically organized network of encoded information (Holland 1993; Simon 1990).

Of course those informations available on the ‘global space’ that fails to match with our mental model are on a first moment put aside, and until they don’t reach a critical frequency of stimulation they won’t change our categorical system or mental model. Learning entails developing the mental model’s structure in order to make sense out to new varied signals received by the senses. These signals can be classified in two kinds: those coming from the physical environment and those from the socio-cultural environment (Hutcinson and Hazleurst 1992). When regarding with perception in space, one most frequently focuses on the visual sense. Regardless of which of the senses are the focuses of attention, it is recognized that each has a minimum of sense-organ stimulation that is necessary before sensory experiences are evoked – that is, a *perceptual threshold* exists. Factor influencing the threshold level in any particular sensory situation include not only the physiological receptor limits but also the constrains imposed by the immediate social, economic and cultural environment. For example, when we perceive something to be ignored, contrasted, or simply not consistent with our aspirations? Or when is something ‘too far away’?

To answer the *when*, *why* and *how* of these questions it is necessary to incorporate the notion of a perceptual threshold.

We can imagine that the threshold level is ‘constructed’ over a first physiological receptor limit of the human senses and then improved in a ‘constructionist’ sense. From birth to our failing years, the brain is confronted with a seemingly limitless number of messages from the environment, but the wideness of the set of messages we can confront with, is strictly local in the first years of life ‘and until we are not able to use internet it doesn’t become global’. Thus, a lot of what we hear, see, and experience, is in the first stage of our life – because of physiological constrain – necessarily local, and this will, according to Piaget, strongly influence how we feel and who we eventually become. In a second stage – when our ability to range our experience is no more constrained from physiological factor – the signals coming from the local environment, which contribute through “observational learning models” to construct our vicarious experience (Bandura, 1986 ch. 7), continue to exert their relative major power with respect to the others because they stimulate our brain with a relative major frequency. It is mainly through this process that local models of behaviour, or shared mental models can be maintained over time in spite of a globalizing process of the informational space.

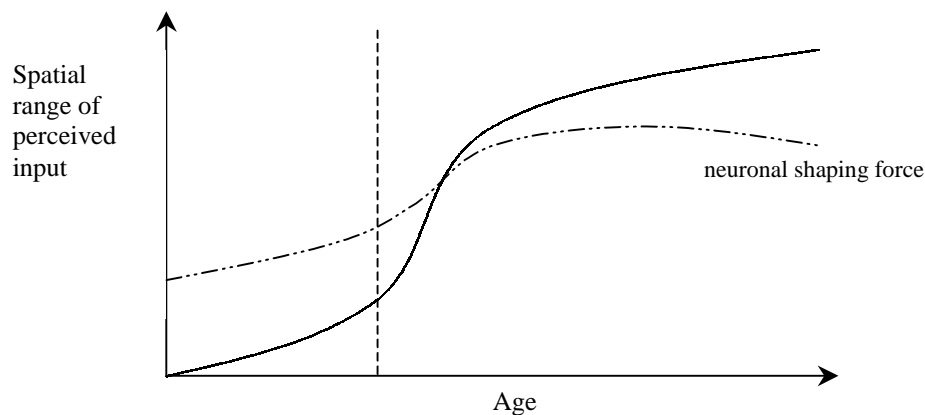


Fig. 3 Space as a cognitive device that focus collective learning processes

In this sense the notion of *proximity* matters not only as regard to the process by which it permit technological spillover and trust relation in industrial networks but,

more fundamentally, to the extent to which it act as a cognitive device that focus collective behavioral learning, and thus, allow – to a certain degree – the preservation, at the social level, of local behavioral traits.

4. *Obstacles to change*

Obstacles to local development are often seen as the scarcity of conventional factors, like for example capital, education or entrepreneurial skills. Searching for the ground at the basis of institutional inertia and untapped resources, Hirschman argued that all these scarce factors could be reduced to one, more basic scarcity, namely “the basic deficiency in organization”. In other words “*the fundamental problem consists in generating and energizing human action in a certain direction*” (Hirschman, 1958; p.25). In fact anthropologists have long known that under appropriate conditions, industrial skills can be learned by any people, race or human group, and entrepreneurial successes are, on the average, not the result of individualistic and over-gifted Schumpeterian entrepreneurs, but the effect of a lowering of the local start-up threshold due to a general improvement of the milieu.

The major problem remains that to individuate and to make the collective action *conscious* of the “direction” in which the milieu should be improved.

Growing emphasis on territorial competitiveness aims to make local collective action conscious of the direction of the trajectory that could be *viable* for local development⁸. Two obstacles are here analyzed, concerning the difficult to individuate and improve viable trajectory of development, and related respectively to the emergence of deviating behavioral strategies from over-embedded groups of shared mental models and the nature of the relations between these social or economic group.

4.1. *The primary problem of the emergence of novelties*

⁸ *Territorial marketing* for instance, i.e. the coordination of commercial strategies to publicize historical ‘territorial reputation’, is the evidence of a collective *consciousness* of a local viable trajectory (Lazzeroni, 1998; Cozzi, 2000).

As stressed by North, individual learning, in the face of strong uncertainty, relies deeply on (locally) shared mental model (North, 1994). With respect to losing areas, one defining feature is the *anchoring* of individual strategies on shared cognitive frames of reference linked with an exploited (obsolete) local form of production (being it agricultural or industrial former dominant forms of organizing production and coordinating strategies of commercialization).

Stability in local patterns of interactions makes recognition, reexamination and ultimately reinterpretation of established models of behavior improbable.

Most studies on local systems of production share the common view that path dependency provides a perspective that captures much of the essence of change. Although, to go beyond the simple assumption that the future will contain more of the same, the degrees of behavioral constraints across the social structure, should be analyzed.

Some examples of geographical difference between behavioral attitudes are presented in behavioral geography's studies (Lefebvre, 1991; Gregory, 1997; Golledge and Stimson, 1997). In these, for instance, a geographical difference is presented between pragmatic and normative cultures. Pragmatic cultures are more market driven, more open to ad-hoc solutions and are tend to be oriented toward problem seeking. Normative cultures, instead, are more concerned with following institutional rules, and tend to solve emerging problems within the range of already locally existing solutions. Meeting changes in demand and exploring new modes or types of production is a major objective in pragmatic cultures while normative cultures are more interested in adhering to the 'correct' procedures as a way of obtaining (social or community) legitimacy. Both behavioral attitudes can be analyzed within the developed framework of local self reinforcing and circular learning process, in fact individuals tend to conform to institutional pressure which in turn depend on the local frequency of adoption of pragmatic vs. normative individual behavior.

Individual behavior can, of course, deviate from established social models, but the degree and the direction of behavioral innovations are strongly influenced from the *initial conditions* of the social environment. In order to be able to make a range of conjecture on the local viable trajectories it is however necessary to recognize the set

of the local society where “novelties” (and then, development trajectory) can be functional integrated with the established socio-technical system⁹.

4.2. From single disagreements to collective actions again

In addition to the most spectacular and emphasized aspect of entrepreneurship (the Shumpeterian capability to break with old patterns of organizing the process of production and commercialization) other components, involving the ability to engineer agreement among all interested parties, are requested. In other words, in order to avoid the isolation and ‘dyeing out’ of a particular behavioral innovation or its “exit” from the local system, we must analyze the processes that bring about the internal diffusion, adoption and conservation of the particular behavioral innovation. This means to analyze the internal relational structure and conductivity of the local system.

In order to develop a framework to operationalize the empirical analysis on the process of learning of the local system, we first make a distinction between the elements forming the cognitive structure of the system, and then we analyze the concept of compartmentalization, as a problem of subdivision of the system in over-embedded small-sized sub-group that block the diffusion and hinder the attainment of a critical mass (Witt, 1997).

We can distinguish the mind or ‘learning structure’ of a local system into the different elements:

- individual knowledge
- individual competencies
- shared mental models
- collective competencies
- systems of relationship and compartmentalisation

⁹ The concept of *functional integration* is used here to summarize those processes of functional local addition to old capital and historical capability already introduced in several works on economic development written during the 1950s and containing, more or less explicitly and more or less self-consciously, a theory in which strategic complementarity play a key role in development. Concept like *linkages* (Hirschmann 1958), or the clear distinction made by Scitovsky (1954) between technological and pecuniary external economies are now formulated again emphasizing the capability to builds on and assess reinforces applicability of existing knowledge, skill, experience and behavioral models in local firms and local environment. Notions like local regime of accumulation (Lipietz 1986), socio-technical systems and technological trajectories (Ropohl 1999, Dosi and Orsenigo 1988), and windows of locational opportunity (Boschma and van der Knapp 1997) or more general ones, like the Kaufmann *grammar models* (1993), aim to describe the necessary condition of continuity in the (local) trajectory of innovation.

In order to distinguish their different forms of learning, it seems to be useful to separate knowledge from technological competencies. In fact we define knowledge as the space of information that we are able – according to the constraints of the local environment – to scanner and to structure (as described in section two and three), while the technological competence is realistically mainly a matter of ‘buying it’ (either through education or ‘capital embedded’ technology) when the analysis concern a backward area. In this sense the development of a technological competence is sub-sequential to the knowledge (or awareness) that it has to be developed.

The systems of relationship are fundamental for the ‘learning capability’ of the local system with respect to the internal diffusion capabilities. To be more explicit, any kind of innovation needs to reach a critical mass of adoption to escape regional lock-in and to set off a self-augmenting mechanism. To understand the conductivity of the system the notion of *compartmentalisation* – introduced by neo-Darwinism to escape the biological principle evoked by the crude Darwinism of the ‘survival of the fittest’ – can be used to describe ‘lack of communication and co-operation’ between sub-local groups. In fact, spatial proximity is usually regarded as a not better specified condition to stimulate a process of ‘collective learning’, which lowers transaction and search costs, and encourages co-ordination between actors. This is not always automatic, on the contrary, sometimes proximity led to small-sized over-embedded shared mental models, both on the social and industrial level, that with the aims to better exploit or enjoy ‘their only commonly perceived good’ lose in exploring and absorbing capability. Through this process of over-embeddedness and over-exploitation minor groups or segments of the local society arise, which are not able to communicate and do not want to co-operate with the others actors of the system (Ostrom, 1998).

Privileged groups that benefit from the existing local socioeconomic arrangements and thus have a vested interest in preserving them can create great obstacle to sociocultural change. They support efforts to change that enhance their well-being but actively oppose those that jeopardize their social and economic status (Bandura 1986, ch. 4).

5. Some preliminary conclusions.

As long as “losing areas” are concerned, a focus on the extent by which individual learning is influenced by the local environment and vice versa, how frequency-dependent problems give rise to the creation of lock-in situation, is requested. More than for successful local systems, where the established productive specialization let focus the analysis on the industrial network, a careful (and contingent) examination of the social structure is needed to find incentive to “mobilize” human capital and overcome institutional inertia. Through an analysis of the formation of mental model and the extent to which they are shared in space, I propose a definition of local system with respect to the cognitive smoothness and internal convergence of strategies. The existence of a common “focal point” facilitate cooperation and coordination, but reduce the capability to explorative behavior out of the boundaries of shared and legitimated mental models.

In additions to this problem of original emergence of novelty (usually common to more simples local society), forms of internal “compartmentalization” (in more complex one) can obstacle the attainment of the necessary critical mass for strategic change.

According to what has been here theoretically developed, and trying to trace some preliminary conclusions, we can structure a strategy of local development for losing areas in four phases. The first one consists in individuating potential resource and ability that are hidden, scattered or badly utilized and selecting an optimal sub-set (or compartment) for introducing innovations; (2) creating the necessary preconditions for the emerging of innovative projects; (3) implementing a demonstrably effective program; (4) helping in dispersing the innovations to the rest of the system through the identification and elimination of the contingent obstacles at the basis of the internal compartmentalization.

References

- Amin, A. (1989) 'Specialisation without growth: small footwear firms in Naples', in Goodman E., Bamford J. and Saynor P. (eds.) *Small Firms and Industrial Districts in Italy*, Routledge, London.
- Arrow, Kenneth Joseph, (1974) *The limits of organization*, New York, Norton.
- Bandura Albert, (1986), *Social Foundations of Thought and Action. A Social Cognitive Theory*, Prentice-Hall, Inc., Englewood Cliffs, New Jersey.
- Barca F. (2000), *New Development and Policy Shift in the Italian Mezzogiorno*, Paper presented for the workshop on 'Localities, Networks and Institutions – The Italian Case (1950-2000)', Max Planck Institute for Research into Economic Systems, 9-11 November.
- Bateson G, *Mind and Nature: A Necessary Unity*. Dutton. 1979
- Becattini, G. (1999), "Formiche e mimecologi. A proposito di classificazioni e autotrasformazioni dell'attività produttiva" in *Trasformazioni dell'economia e della società italiana. Saggi in onore di Giorgio Fua*, Gruppo di Ancona (ed.), Il Mulino, Bologna.
- Belussi F. and Gottardi G. eds (1999), *Evolutionary Patterns of Local Industrial System*, Ashgate, Aldershot.
- Bianchi P. and Miller L. (1995) 'Collective action, strategic behaviour and endogenous growth' in *On Economic Institution, theory and application*, Groenewegen et alii (eds), Edward Elgar.
- Cooke P. and Morgan K. (1994), 'Growth Regions Under Duress: Renewal Strategies in Baden-Württemberg and Emilia Romagna', in Amin A. Thrift n. (eds), *Globalisation Institution and Regional Development in Europe*. Oxford; Oxford University Press.

- Crozier, M. (1986), 'Strategies for Change in View of Societal Learning Processes', in Alejandro Foxley, Michael S. McPherson and Guillermo O'Donnell (eds), *Development, Democracy, and the Art of Trespassing: Essays in Honour of Albert O. Hirschman*, Notre Dame, Indiana: University of Notre Dame Press, pp. 219-232.
- Dei Ottati, G. (1994), 'Co-operation and competition in the industrial district as an organisation model', in *European Planning Studies*, no. 4.
- Douglas, Mary (1995), *Converging on Autonomy: Anthropology and Institutional Economics*, in *Organization theory: From Chester Barnard to the present and beyond*, Williamson, Oliver E., Second edition. New York and Oxford: Oxford University Press. pp. 98-115.
- Golledge, R. and Stimson R. (1997), *Spatial Behavior, a Geographic Perspective*, The Guilford Press, New York.
- Grabher, G. (1993), "The weakness of strong ties: The lock-in of regional development in the Ruhr area". In: G. Grabher (ed.): *The Embedded Firm – On the socioeconomics of industrial networks*. London: Routledge, 255-277.
- Grabher, G. and Stark D. (1997), *Restructuring Networks in Post-socialism – Legacies, Linkages and Localities*, Oxford University Press.
- Gregory, D. (1994), *Geographical Imaginations*, Oxford, Basil Blackwell.
- Hirschman, A. O. (1958) *A Strategy of Economic Development*, Yale University Press, New Haven.
- Hutcinson, E. and Hazleurst, B. (1992), 'Learning in the Culture Process', in Langton C. et al., *Artificial life II*, Redwood City, Addison-Wesley, pp. 689 – 706.
- Lefebvre, H. (1991), *The Production of Space*, Oxford, Basil Blackwell.

- Mazzola F. and Asmundo A. (1999), 'Sistemi locali manifatturieri in Sicilia. Analisi dei potenziali distretti industriali', in *Quaderni di ricerca*, Banco di Sicilia.
- Myant M. *et al.* (1996), '*Successful Transformation? The Creation of Market Economies in Eastern Germany and Czech Republic*' Edward Elgar.
- Ostrom E. (1998), *A Behavioral Approach to the Rational Choice Theory of Collective Action – Presidential address*, American Political Science Review, Vol. 92, No.1.
- Puga D. (1998), European Regional Policy in Light of recent Location Theories, mimeo, November.
- Rizzello S. (1997), 'The Microfoundations of Path-dependency', in Magnusson L. *et al.* (eds): *Evolutionary Economics and Path-dependence*, Cheltenham, Edward elgar, pp98 – 118.
- Ropohl G. (1999) 'Philosophy of socio-technical systems', PHIL & TECH 4,3, Spring, pp. 59-71.
- Schein E. H. (1996), 'Three culture of management: the key to organisational learning', Sloan Management Review, Fall 1996.
- Seri, P. (1999), 'Progetti ed Effetti nei Parchi Naturali. Una Metodologia di Valutazione per lo Sviluppo Economico Locale', In '*Aree Protette e Sviluppo Economico*', Federazione Italiana Parchi / Ministero del Tesoro, Milano.
- Simon H. A. (1990), Invariant of Human Behavior. *Annual Review of Psicologia*, 41, 1-19.
- Storper M. (1995) 'The resurgence of regional economies, ten years later: the region as a nexus of untreated interdependencies', *European Urban and Regional Studies*, 2, 3: 191-221.

- Witt, U. (1997), 'The Hayekian puzzle : spontaneous order and the business cycle', in *Scottish journal of political economy*, 44, 1. pp. 44 – 58.
- Witt, U. (1998), 'Multiple equilibria, critical masses, and institutional change: the coup d'état problem', in *The politics and economics of power*, ed. by Samuel Bowles *et al.* (eds), pp. 286 - 299, Routledge, London.
- Witt, U. (2000), 'Self-Organization in the Economy and its Driving Forces', in *Decision Prospective Auto-organisation, Melanges en l'honneur de Jacques Lesourne*, Thepot J. *et al.* (eds), pp. 455 - 467, Dunon, Paris.
- Winner, L. (1993), 'Upon opening the Black box and finding it Empty: Social Constructivism and the philosophy of technology', in *Science Tecnology & Human Values*, Vol. 18 No. 3, pp. 362-378.