

Does the Concept of “Community of Practice” Show New Trajectories for the Evolution of Industrial Districts?

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Abstract

The aim of this paper is to find a framework that could be useful to evaluate the utility of the concept of “Community of Practice” (CoP) for understanding the dynamics of knowledge creation and sharing in Industrial Districts (IDs). The CoP concept stems from the managerial experience of large corporations, which have found in it a kind of “living repository” of knowledge. The source of the concept of agglomeration of firms in ID is completely different. Anyway, many similarities can be found between the concepts of ID and CoP, as well then some differences. The paper proceeds as follows. First, it explains the three main concepts useful for understanding further argumentations: knowledge, ID, CoP. Next, it offers a framework to put in comparison the two concepts of ID and CoP. In the end, an example of how the applications of tools, coming from the CoP concept, can be useful to formulate some hypotheses on the evolutionary behaviour of IDs is shown.

JEL – classification: D83; M54; R12

Key words: Community of Practice, Industrial District, Knowledge, Learning

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1. Introduction

Mainstream economics describes capital stock and natural resources as strategic factors for organisation (see the works of economists such as Marshall (1920) and Chamberlin (1933)), Nelson and Winter (1982) add to the framework the power of innovation, Nonaka and Takeuchi (1995) mainly focus on the importance of knowledge creation.

A non-neoclassical theory of economics, based on the assumption of increasing returns, has taken more and more space in the academic debate, in opposition to a diminishing returns theory.

The concept of increasing returns is relatively old, Adam Smith (1776) in his “Wealth of Nations” emphasises it for explaining both specialisation and economic growth. But only recently, thanks to the efforts of mathematical formalisation done by Arthur (1994) and the changed context of nowadays knowledge based economy, we can appreciate its undergoing implications.

Let me briefly explain the strategic differences between these two approaches.

The theory of diminishing returns assigns industry participants identical production functions, implying the use of identical technologies by all the competitors; under these strict assumptions, a unique predictable equilibrium for the economy can be found. Maybe this view could have been useful to understand the 18th century English farms and 19th century Scottish factories and even some 20th century American manufactures (Teece, 1998), but what is sure is that nowadays, where processing information has become more strategically relevant than manufacturing activities (Castells, 1996), development of application and transfer of new knowledge has overtaken the raw material processing. At the same time the centre of gravity in employment moved, in the most advanced countries, from manual and clerical workers to knowledge workers, who are the only ones able to generate value for organizations.

In many cases diminishing returns activities have been replaced by activities characterised by increasing returns (Arthur, 1994). In few words the concept of increasing returns can be explained as “which is ahead tends to stay ahead”, according

to a mechanism of positive feedback that occurs substantially reinforcing the winners and challenge the losers. The best-one equilibrium that characterised conventional economic theory has been “destroyed” by emergent multiple, non-predictable equilibriums.

Teece (1998) argues that producer learning is one of the factors driving the increasing returns phenomena, together with standards and network externalities, customer lock-in and large up-front costs. How can an organisation learn? How does it access to knowledge “repositories”? What are the institutions that could aid organisations to recognise and enhance its resources? These are crucial questions for understanding the dynamics of its growth and development.

Starting from the concept of knowledge (Nonaka and Takeuchi, 1995), the purpose of this work is to understand how CoPs, a new concept arisen from the field of management, can be useful to deepen the process of knowledge creation and sharing of IDs. In the end, assuming that’s impossible to overlay the two concepts, could be realizable, instead, a sort of “community of practice” of the community of actors belonging to the local system?

The next paragraph gives some definition of the main concepts used in this work, which are: knowledge, CoP, ID. The third tries to put in comparison the two concepts of ID and CoP, creating a framework to evaluate the usefulness of the first concept in the explanation of the knowledge creation and sharing process in IDs. In the fourth paragraph, starting from the tools offered by the CoP concept, it will be presented a framework useful for measuring the relative capacity of a single industrial district to front effectively the challenges of the globalisation process, for staying competitive in a rapidly changing environment. Some testable hypotheses are formulated and a first attempt of operationalising the framework has been made. In the end, some final comments will be presented.

2. About knowledge, ID and CoP: an outline

In this section will be briefly summarised the three main concepts useful for understanding further argumentations:

- Knowledge;
- ID;
- CoP.

The process of jumping from a concept to another will be the natural consequence of the multiple interactions between them. Hopefully it won't be an obstacle to the clearness of the explanations given below.

The competitive advantage of firms in today's economy stems not from market position, but from difficult to replicate knowledge assets and the manner in which they are deployed (Teece, 1998). What are we referring to when we speak about knowledge? Let me start from the differences between data, information, and knowledge, even if these concepts aren't easy to separate in practice. Data can be defined as "observations of states of the world" (Davenport, Prusak, 1997), and, as known, are without any meaning if we are not able to extract information from them. Peter Drucker (1988) defined information as "data endowed with relevance and purpose", putting in evidence the human mediation during the phase of data elaboration. Information can be captured using data mining technologies, applied for example, to the most powerful system of collection of data: a relational database. This kind of database can easily answer many query, thanks to the capability to go over different data-matrixes, which can be connected using a key-code. These systems of analysis allow to "manage data" and extrapolate from them information. If we add to information a context, we can obtain knowledge, which is valuable information from the human mind, and includes also reflection and synthesis. Davenport and Prusak (2000: p.5) give a definition of knowledge that well expresses its value and complexity: *"Knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. In organizations, it often becomes*

embedded not only in documents or repositories but also in organizational routines, processes, practices, and norms.”

New thinking-streams believe to the fact that knowledge can be articulated as a collective intelligence (Lévy, 2002), which ultimately brings to an organisational wisdom (Pór and Molloy, 2000). Collective intelligence represents the evolution of knowledge from a “property” of individuals to a “resource” of social organisms (Pór, 1995; Lévy, 2002). This process implies a progressive empowerment of organization’s human and intellectual capital, through the development of synergies, for instance, between its people and computer network. Starting from the assumption that individual knowledge is scarce and incomplete, proponents of collective knowledge believe that intelligent organizations should be able to valorise employees’ diversity, encouraging processes of learning by interaction. Collective wisdom embodies the capability to sustain the intelligence infrastructure of an organization, enhancing its overall adaptability and building a sustainable competitive advantage.

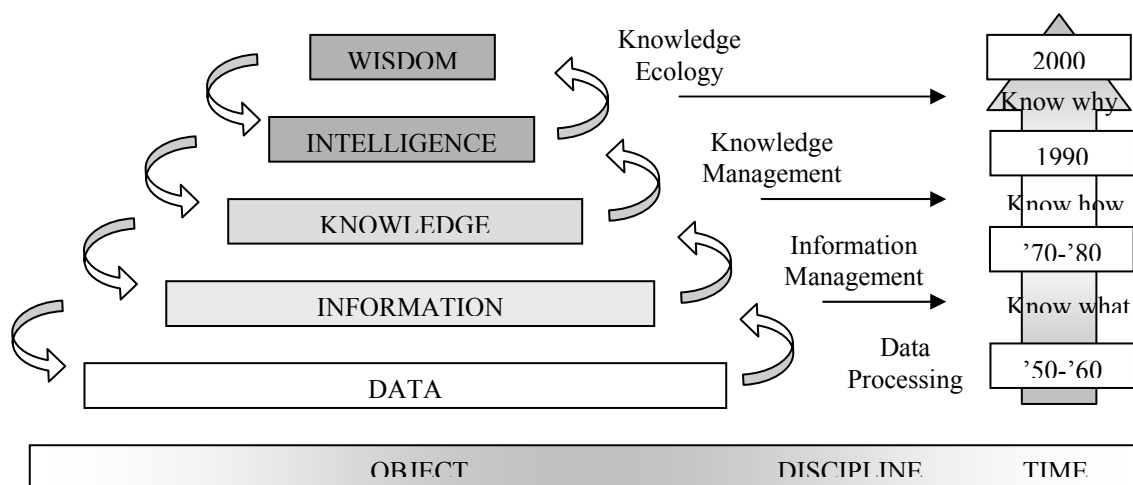


Fig. 1: From data to wisdom: an holistic approach to the process of achieving knowledge. An elaboration from Laszlo and Laszlo (2002)

The graph presented in Fig.1 wants to create a framework for understanding the dynamics of shifting the attention from data to knowledge and vice versa, which implies a generous process of feed-back between the different stages. In fact we can identify in it an ascending path, characterised by growing complexity and increasing human

involvement, and a descending path, which allows focusing in any time in the specificity of the analysed problem and to re-formulate the previous hypotheses.

We can also identify a temporal pattern (see the right side of the fig.1) that describes the amount of academic attention given to the different aspects of organisation. During the 50s and 60s the challenge for increasing the competitiveness of organisations lied on the capability to collect great amounts of data (from accountability, logistic, client-supplier relations...) then, during the next years, thanks also to modern systems of data-elaboration and reporting, the attention shifted to a more coherent vision of the organisational processes. The capabilities to manage information and knowledge, and not merely data processing, are viewed as new strategic factors.

Nonaka and Takeuchi (1995), drawing on Polanyi notion of tacit knowledge, suggest the identification of two types knowledge: tacit (not codified, not transferable) and explicit (codified, transferable). The conversion of tacit to explicit knowledge, and vice-versa, gives rise to a four phases process of learning. The evolving spiral of the knowledge-creating process, which is called the SECI process (Nonaka, Toyama, 2002), is probably the best representation of this converting-process, which is articulated in four phases. :

- a. Socialisation → learning as knowledge transfer from one agent to another, sharing and creating tacit knowledge through direct experience (tacit to tacit knowledge);
- b. Externalisation → learning as the capability to produce new relevant pieces of knowledge, articulating tacit knowledge through dialogue and reflection (tacit knowledge to explicit knowledge);
- c. Combination → learning as knowledge improvement, systemizing and applying explicit knowledge and information (tacit plus explicit knowledge into new knowledge);
- d. Internalisation → learning as absorption capability, acquiring new tacit knowledge in practice (explicit knowledge to tacit knowledge, but also absorption of tacit knowledge from outside).

Becattini (1979) defines an industrial district, in a neo-marshallian perspective, as a local agglomeration of small and medium enterprises, all of them involved in the same productive process, but where everyone is specialised in a particular phase, everyone is independent by each other, but it lies in a local network of geographic and productive relationships with the others. As a result, an integrated industrial area arises, which produces economies that are external to the single firm, but internal to the localised thickening of intra-inter industrial and social relationships. The ID is the extreme synthesis of the social-economic interactions between the mechanism of light industrialisation and the embedded territory or institutional space (Maskell and Malmberg, 1999; Storper, 1997; Amin, 1993). Now, at the beginning of the 21st century, the idea of the localisation of the economic development in specific places and its organisation in cluster has become a diffuse convention (Rullani, 2000).

One of the sources of competitive advantage of local systems lies in the capability to share tacit knowledge between all the nodes of what can be named a “Multilevel Neural Network” (Pilotti, 1999) (inter-firm relationships plus institutional context) and to feed it continuously in a kind of “knowledge garden”. What we are talking about? Just a few words to create an environment where the arguments here involved can be collocated. Discussing the limitation of the neoclassical approach, Tsoukas (1996) puts in comparison neoclassical economics and behaviourism, arguing that an analogy between them can be found. Firms as well as individuals are thought to be:

- fixed;
- bounded;
- survivable entities.

Neoclassical approach, which sees at firms as black boxes characterised by input-output regularities and predictable behaviour, clearly doesn't take account of two important factors: time and space, which make every kind of organisation and every environment rather unique.

This uniqueness is one of the roots of the success of IDs, which were born and grow in a specific space, giving them the resources they need to arise, and whose evolution is dominated by the innovations (most incremental) they are capable to adopt during time.

Sticky (Von Hippel, 1998)¹, non-articulated, tacit forms of knowledge are among the most relevant drivers of innovations for firms located in an ID. Firms histories, their lived experiences, the routinisation of the production activities, the amount of relationships they are able to build up and the common sharing of the same life style are the main sources of tacit knowledge.

Those relationships characterise what is called social capital (Jacobs, 1961; Bourdieu, 1985; Coleman, 1988; Putnam, 1993)², which, in fact, contribute to shape tacit and contextual knowledge embedded by individuals belonging to a community. Furthermore, groups of local situated firms naturally benefit from this embeddedness that allows substantial reductions in the costs of access to knowledge.

Understanding industrial dynamics could become even more complicated if we consider that time and space are transforming in two emergent social forms: “timeless time” and “space of flows” (Castells, 2000). In fact, thanks to the recent development and diffusion of communication technology, time is compressed and de-sequenced (time sometimes tends to zero in on-line transactions, and past, present and future lose their value, as in the electronic hypertext, where the sequence becomes randomly managed), and space of flows allows virtual connections overtake the role of social interaction dominated by geographical contiguity.

The “virtuality” is not always positive, because it widens the temporal and spatial lags that characterise social and economic exchanges (Castells, 1996) and in some way destroys the “common ground”. Building new “pipelines” (Bathelt et al., 2002) induces to sustain huge investments that could, in fact, reveal as sunk costs.

Industrial districts are living a period of transition where the neo-Marshallian model (closed local networks) can't work efficiently anymore: new configurations occur. This model risks suffering from mechanisms of lock-in and path dependence, which don't enable IDs to grow and take advantage from potential external sources of knowledge.

¹ The author refers at the concept of stickiness of a given unit of information, in a given instance, as the incremental expenditure required to transfer it in a form useable by a given information seeker. When this cost is low, information stickiness is low; when it is high, stickiness is high.

² For a comparison among Bourdieu and Putnam 's concepts of social capital, see M. Siisiäinen (2000), for a contribution focused on trust, see Belussi (2002)

Coró and Grandinetti (1999), at the end of an empirical analysis on the evolutionary patterns of nineteen Italian industrial districts, explain:

“Districts are relating more and more with external holders of knowledge and resources, transforming a relatively closed system of exchange at local level into something rather different”.

In order to evolve competitively, and above all to introduce complex innovation, they add, Italian IDs must be able to develop strategic relations with service providers outside the district, in fields where the internal competences are weak, such as information technology, quality management, marketing communication and so forth. The empirical evidences coming from their survey show that firms belonging to the analysed IDs begin to build new fruitful extra-district relationships. This “opening” process, obviously, occurs at different levels, but what’s matter here is to appreciate the arising consciousness of the potential advantages achievable from the exploitation of new channels of communication, moving progressively beyond the pre-existent links and barriers.

Actually Bathelt, Malmberg and Maskell (2002) have deepened the duality that characterises the process of local learning, facilitated both by local “buzz” and “global pipeline”. These two concepts are strictly connected to the necessity to find out a new model of organisation, which takes account both of the power of the embeddedness and of the opportunity of knowledge exchange through long distances. This becomes possible thanks to a path of growing attention to phenomena of “absorptive capacity” (Cohen and Levinthal, 1990). With this term Aage (2001) addresses the ID’s capability of achieving external knowledge, which is re-processed inside the system as an “internalisation” of the competences acquired. The result could seem the devaluation of what is embedded. But this is not true. The recent “openness” of the ID, partially due to new tools from information technology, should not be viewed as “killer” of the competitive advantage given by sharing tacit knowledge between the “small community” of the local system. At least, they can be considered as “lubricants” of the relationships, allowing the enlargement of the network through the creation of new nodes, maybe new “growth poles” (Perroux, 1955), for the whole system. The new challenge is to establish at what extent this “contamination” of new knowledge could be

profitable for the ID, according to the price of obtaining it (due to the great degree of uncertainty that is involved in building new partnerships with distant-not direct observable actors).

The geographical proximity has allowed so far the growth of a reciprocal trust between the actors of the district, deriving from repeated exchanges (personal capital, or self-interested trust) and from the sense of belonging to the same community³ (collective capital, or social-oriented trust) (Dei Ottati, 2001, Lyons and Mehta, 1997).

Only a deep study on the source and nature of local trust could help us understanding if it can “survive” also in a virtual network, where the advantage of proximity no longer exists. A first attempt to answer this question is to think at the concept of network externalities (or network effects), rooted on the Metcalfe’s Law (Shapiro and Varian, 1998). This law is based on a natural observation: if a net is formed by n units and the value that every one of them gives to the net is proportionate to the number of other units in the net, then the global value of the net (the value assigned by all the units) is proportionate to $n*(n-1) = n^2 - n$. Substantially, it states that the value of a network increases with the square of the number of members of the network, showing a form of increasing returns or positive feedback to network size.⁴ In the same way advantages of replications are reached in the case of information goods, an increasing agents network virtually interconnected could facilitate trust diffusion. In the local environment of an ID, agent’s behaviour is pushed by reputation-saving constraints, fearing a possible exclusion from local exchanges. Why don’t we take in consideration cheating effects on a bigger interconnected virtual marketplace? (Multiplicative effects and faster flows of information through the actors). Nevertheless, if trust is strictly connected with the sense of belonging to a community, and it is not based to individual experience, we can accept the hypothesis that it can survive into a virtual community (Orléan, 1994). In this

³ For the definition of an industrial district as a community see the works of Becattini (1990), Dei Ottati (1995).

⁴ As Arthur (2000) points out, in his dissertation about myths and realities of the high-tech economy, we should more precisely pay attention to the type of network we are dealing with. In a radial network, where members are connected with a common node, but not with each other, for instance, benefits from network effects could not occur or could be very weak. In a combinatorial network (combination between people), a community can be formed and it can exhibit network effects.

way, future cyber-marketplace could be an efficient solution to connect agents over long distances.

Coming back to the concept of “gardening”, it seems to be really connected with the typology of learning that takes place in an ID. Most of the interaction mechanisms occurring inside the local network are spontaneous and sometimes caused by path-dependence. Maybe we can speak about a sort of “serendipity” (Pilotti, 2000), which has always allowed “things go well” till now. Can this random process survive if we change some of the undergoing assumptions? Maybe a re-thinking of the all system has to be done. Maybe new institutions have to be created, not forcing the delicate distrectual dynamics, but simply showing the road of new organisational, communicative and technical opportunities. That is “gardening”.

Lave and Wenger (1991) first introduced the concept of CoP in 1991, underlining the importance of sharing practice in the process of learning in large corporations. They describe a CoP as:

“...a set of relations among persons, activity, and world, over time and in relation with other tangential and overlapping CoPs”.

And more:

“...an intrinsic condition for the existence of knowledge”

These “communities” are organisms constituted by a group of professionals, informally bound together, who, aimed by a common purpose, share their distinctive capabilities to solve organizational problems. They could be, for example, engineers engaged in deep-water drilling, or consultants specialised in strategic marketing, or reps offering technical support (Brown and Duguid, 1991). Some of the most important features that characterised their existence are their organic, spontaneous and informal nature. The member’s attitude of giving the own contribution to the problem solving process is reinforced by the self-selected membership mechanism of participation.

The CoP main purpose is to develop members’ capabilities and build exchange knowledge, which becomes useful, for example, to drive strategies and generate new line of business.

“The strength of CoP is self-perpetuating” (Wenger, 2000a).

That’s why this concept differs from other forms of aggregation, like:

- a formal work group;
- an informal network;
- a “team”.

The last one, for example, normally is formed by a group of workers built to accomplish a specific task (as the team involved in the enhancing of the “knowledge creating company” described by Nonaka (1991), and implied in the Japanese concept of “ba”⁵), and exists until the project has been completed. Instead CoP, as Wenger (2000b) explains, has the property of lasting for long time, allowing, in this way, the sedimentation of a social capital. This tacit and common based knowledge exalts over time the potentiality of the community and its ability to solve problems (Lesser and Everest, 2001).

Although CoPs are fundamentally informal and self-organised, they need to be “cultivated”. Wenger (2000b) uses a nice metaphor to illustrate the dynamics of its communities: he compares them to gardens, which give the best results if someone takes care of them, without forcing the natural and biological rhythm of “reproduction”. The concept could be made clearer if we have recourse to another metaphor as well, coming from the Manzoni’s description of the Renzo’s vineyard in “I promessi sposi”. This vineyard is left abandoned, without any care, and this state causes the complete anarchy governs between the “ecological equilibrium” of the plants born and grown around it. The soft caring hand of Renzo is comparable to the role of the manager, who simply benefit “cultivation” through:

- identifying potential communities;
- providing the support-infrastructure;
- using non-traditional methods to measure value.

⁵ The concept has been proposed originally by the Japanese philosopher Nishida and (afterwards) Shimizu and it is close to the English word “place”. It refers to organizational contexts within individuals interact at a specific time and place over a certain time period, a kind of shared space for emerging relationships, as it has been described by Pilotti (2000).

Substantially, managers' efforts should be addressed to develop the CoPs, integrate them into the organisation and consequently leverage their power.

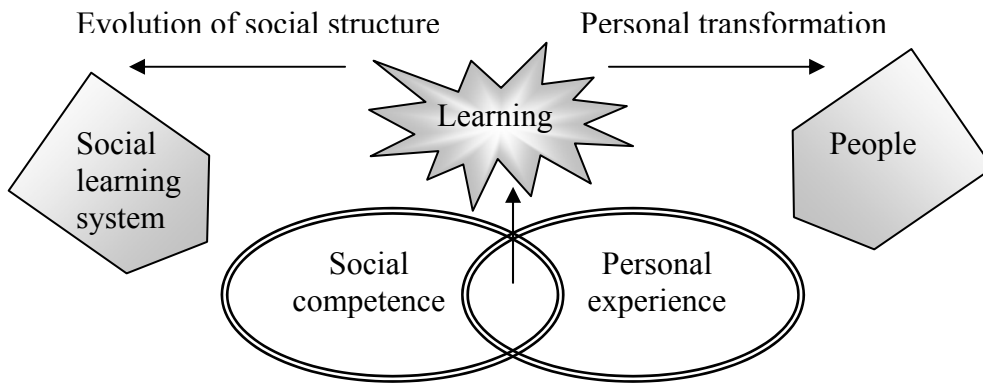


Fig. 2: Learning in a social perspective.

It is cleared that, speaking about CoPs, the central point becomes the process of learning, and in particular, learning in a social perspective. In fact it takes place by the interplay between competences defined in a social community and the personal experience, as it is described in fig.2.

A community of practice can be viewed as a social container of the competences that make up the system. There are, in particular, three way of belonging to social learning systems:

- engagement → doing things together, everyday routine;
- imagination → creating an imagine of yourself and your community, self-consciousness;
- alignment → sharing experience with other that can contribute with their efforts.

One mode can dominate the others, giving different qualities to different social structures. For example, a nation is a community based on imagination; a community of practice at work is based on engagement.

Going further, two pretty amazing issues arise, and specifically they are:

- “learning at the boundaries”
- “identity”.

Let me start from the first: the existence of a CoP implies the existence of a boundary, as Wenger (2000a) writes: “*shared practice by its very nature creates boundaries*”.

The boundary divides what is the core experience of the CoP from foreign competences that can be useful to create new opportunities for enhancing the competitive advantage of the whole organisation (as illustrated in fig.3).

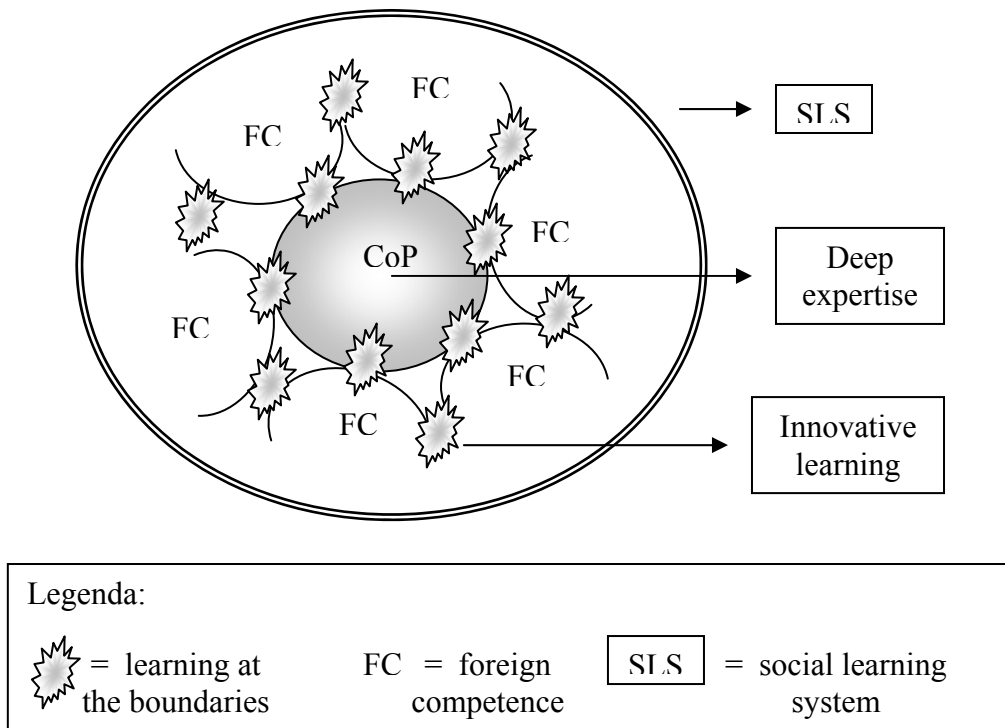


Fig. 3: The process of learning at the boundaries.

Boundaries are both sources of new opportunities and potential difficulties, according with the cognitive distance between the CoP’s own experience and the foreign competence (fig.4). The interaction with new CoPs can be worthy if their

competences are sufficiently different, at the same time, if they are too dissimilar, the inter-community learning will cease.

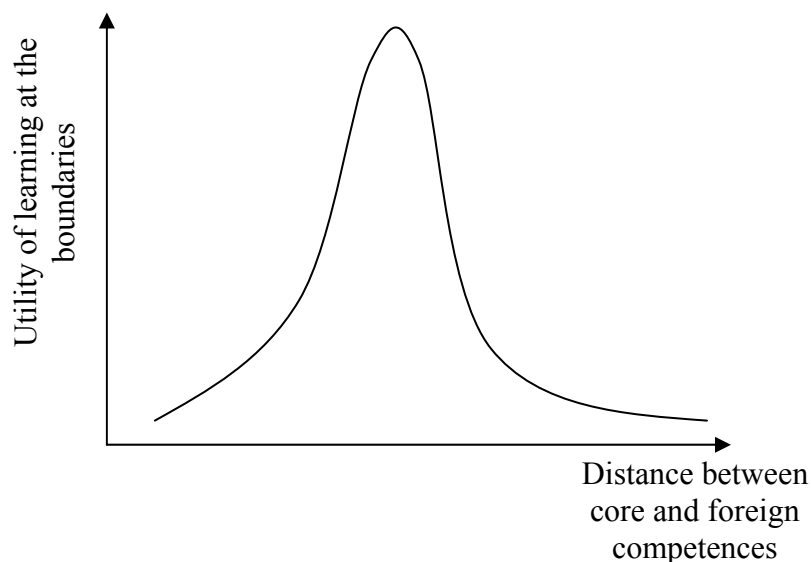


Fig. 4: The utility function of learning at the boundaries

Wenger (2000a) finds three dimensions of the boundary effects:

- coordination → to discriminate what is really useful to the organisation;
- transparency → to make easier the access to the boundary;
- negotiability → to find an equilibrium between the powers of the actors involved.

The act of crossing the boundaries can be improved by the existence of intermediaries which work as links for the dissemination of trust mechanisms. According to Granovetter (1973), in fact, whether person trusts a given leader depends heavily on whether there exist intermediary personal contacts that can, from their own knowledge, assure him that the leader is trustworthy, and who can, if necessary, intercede with the leader or his lieutenants on his behalf.

When we speak about boundaries and about learning at the boundaries, we understand that some bridges have to be built for activating the connection.

Again, Wenger (2000a) proposes four kinds of bridges:

- brokering→brokers between communities:
 - i. boundary spanners→one specific boundary over time;
 - ii. roamers→creators of connections moving knowledge by going place to place;
 - iii. outposts→capturing news from the “forefront”;
 - iv. pairs→personal relationship between two people.
- boundary objects→supporting connections between different practices:
 - i. artefacts→tools, documents or model adopted;
 - ii. discourses→common language to communicate easy;
 - iii. processes→shared processes and routine.
- boundary interactions:
 - i. boundary encounters→visits, discussions, sabbaticals...;
 - ii. boundary practices→huge work at the boundary;
 - iii. peripheries→connection with what’s outside the community (by FAQ, fairs, websites...).
- cross-disciplinary projects→combining knowledge of multiple practices to get something done (see the “double-knit” organisation in McDermott, 1999), establishing a learning loop between:
 - i. community of practice;
 - ii. project teams.

As I said above, the other important concept Wenger underlines is “identity”.

“Knowing is an act of belonging, then our identities are a key structuring element of how we know” (Wenger, 2000a)

We can argue that the concept of belonging includes other three key-concepts:

- knowing;

- learning;
- sharing.

In the case of the CoP, identity involves also the concept of “multi-membership”. It’s the capacity to belong to different communities ((i.e. the community of workers, of friends, of the family...)) and switch from one to another, without losing the previous identity (as fig. 5 shows).

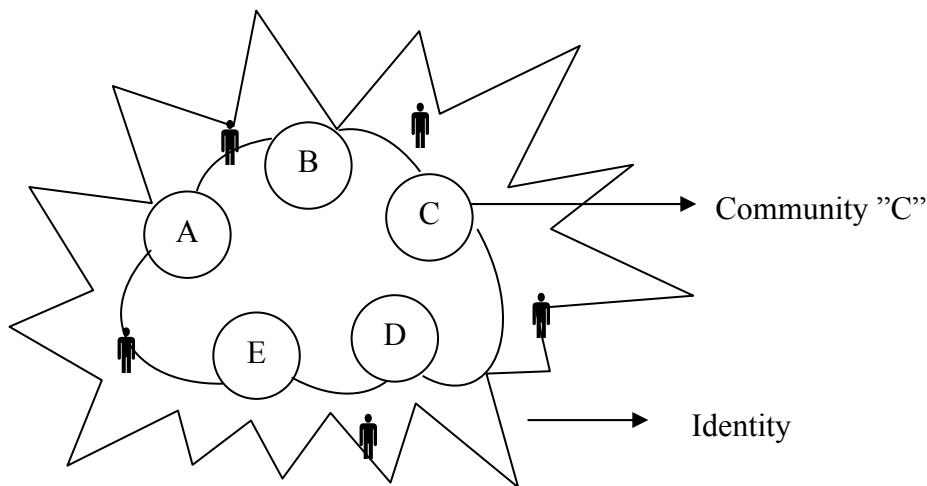


Fig. 5: The multimembership

In the same way, we can belong to a community of practice, but sharing some information with another community, involving a natural process of learning at the boundaries. Three qualities can be associated to identity: connectedness, expansiveness and effectiveness, all of them empower the capacity of imagination, increasing the number of “worlds” at whom we felt to belong. As a consequence, broader learning systems are been built, and the value that a community can generate hugely arises. Combining different aspects of our identities, multi-membership is a source of personal growth and social cohesion, because it builds relevant bridges across practices, towards higher degrees of pro-activity.

3. Comparing ID and CoP features: a framework

Putting in comparison the two concepts of CoP and ID, we can find some similarities as well then some differences, which I tried to summarize in the scheme presented below (Tab.1).

The table includes also some new means, not yet well “codified” in the literature, inspired by CoP concept, which can improve the learning process of the ID.

ISSUES/MEANS	COMMUNITY OF PRACTICE	INDUSTRIAL DISTRICT
Tacit Knowledge/Spatial Proximity	X	X
Codified Knowledge/Cognitive proximity	X Web-sites, sabbaticals, FAQ	X Creation of a Shared Language and Symbols
Identity	X	X
Social Capital (Trust etc.)	X	X
Spontaneous Participation	X	X
Function of gardening	Manager	Metaorganisers
Learning at the Boundaries	Peripheral interactions between different CoPs	Creation of Pipelines
Articulated process of knowledge	X	Serendipity

Tab. 1: A comparison between the concept of CoP and ID

Notes: a cross indicate the presence of the issue, few words illustrate the differences in the means used to accomplish the issue.

In my view, two issues belonging to the concept of CoP are particularly useful to understand the dynamic of “management” of knowledge in ID:

- Gardening;
- Learning at the boundaries.

How gardening can be translated in the ID language for becoming reliable? When thinking at gardening we image that should exist an actor that “takes care” of the knowledge flows, enhancing, somehow, the capabilities of “absorbing” new knowledge and transforming it in tools useful to the wealth of the system. In CoP this role is carried

out by the manager, who follows the work of the community, giving it a vision and allowing it to work autonomously, free to create without constrictions. It's evident that, in the end, the last decision belongs to the manager, who, after having done cost/benefit analysis, will decide to realise or not the proposals. When we shift in IDs, the situation becomes more complex, because we have a plurality of managers, or entrepreneurs, and consequently a plurality of interests. Problems of coordination arise. Who should be the "guide" in this case?

We can think to an interface between local firms and external (extra-district/extra-region/global) environment, which allows not only the diffusion of the tacit knowledge embedded into the elements of a local system (the power of the learning energy, see the next paragraph for an explanation), but also the selection of the external knowledge that could be absorbed. Cohen, Levinthal (1990) speak about "gatekeepers", or "boundary spanners", referring to members of an organisation that are able to "translate" strategic external information in opportunities for improving the ongoing activities. At the same time, they point out that background knowledge is necessary for the success of the transmission, and argue that, without it, even with the presence of an high-capable gatekeeper, we can't escape a knowledge short-circuit. Pilotti (1996, 2000) identifies meta-organisers as peculiar subjects in a local system with the specific functions of connecting the multiplicity of technologies, the heterogeneity of organisations and the internal market transactions, achieved through cooperation and competition. These operators could be as well innovative firms and local institutions, which work as switchers for integrating different flows of resources in a horizontal dimension. The result of their efforts is the promotion and diffusion of a generative learning, rooted in the capability of mixing effectively tacit and codified knowledge. Amin, Cohendet (1999), in fact, pinpoint that only the combination of tacit and codified knowledge is able to assure a competitive advantage in decentralised business network, breaking the fruitless fight concerning the identification of a sort of hierarchy between them. They indeed compare features of local decentralised systems and global decentralised systems, underlying the importance, for both, of learning by monitoring versus learning by doing, for discouraging lock-in, sclerosis and over reliance on established routines.

In any case, what seems to be the most important tool for guaranteeing the effectiveness of the use of external knowledge is the capacity of selection. Simon (2002) as well, faces the problem of the over abundance of information that need to be filtered for fronting the scarcity of attention that characterises modern life. What we really need, he says, is not to increase the number of accesses to information, but the quality of the information selected. This fact implies the utilisation of some kind of information processors that are able to “justify” (Nonaka, Toyama, 2002) the cost of achieving a new unit of information. That’s the problem we have to focus nowadays: justification.

In deciding the strategy and its operations, we are slowly shifting to the “know-why” (see fig. 1); fundamental questions to which we have to go back are: “why do we do this?”, “why do we exist?”, “why we need this resource?” and so forth.

The process of choosing between many sources of information takes a lot of time and implies high investments in “monitoring” and integrating activities. As I said above new and “foreign” information has to be measured on the basis of the real needs of a firm and the advantages that can be achieved with its incorporation in the on going organisational or technological process. This implies a constant analysis of the “state of art” of the held resources and of the possible matching between “old” and “new” inputs. Could a single small firm sustain these costs of judgement? Maybe it doesn’t. That’s why firms located in cluster could avoid this type of sunk-cost allowing the constitution of “ad hoc” observatories, which could spread around information useful for all the system. In this way physical or cognitive proximity advantages could be deployed, exploiting economies of joint use.

In the end, these observatories would have the scope of avoiding what I called knowledge short-circuits. Applying constantly SWOT (Strength, Weakness, Opportunity, Threats) analysis on the basis of the system inner resources and potential external ones, they would be able to structure “ad hoc” problem solving. The INEXSK approach (Mansell and When, 1998), for instance, is an example for measuring to what extent infrastructure, experience, and skills may contribute to the knowledge-based economic growth and development of a country, building a “knowledge infrastructure” indicator. A similar analysis could be done in the smaller context of an ID. The individuation of “who” could hold this monitoring-role is still a problem without good

answers. We can think to institutions as well as scientific parks or research units. There is not a universal solution that fits for every peculiar local system. Considering the heterogeneity of agglomeration forms, which differ in terms of competitiveness, industry structure, size of firms and organisational arrangements, perhaps in every one there's a different inclination towards the one or the other monitoring structure. Only an empirical analysis of the network of relations between the agents will give us an answer.

The concept of gardening is strictly related with the concept of learning at the boundaries. In the case of an ID, learning at the boundaries is quiet difficult, not only because of the necessity of an efficient meta-organiser, or observatory, but also because we have to bypass the problem of the transfer of embedded knowledge. To what extent are we available to open our "black box" to external units, how can we transfer knowledge, and what is the weight of the needed investments? Argote and Ingram (2000) explore the "anatomy" of knowledge in organisation, proposing the knowledge reservoirs framework. Starting from the point that knowledge transfer is the process through which one unit is affected by the experience of another, they try to measure it by measuring changes in knowledge in what they call multiple reservoirs. The term "reservoir" derives from the French "reserver", meaning "to keep for future use", giving the idea that knowledge can be used again. They identify three basic elements (reservoirs) in organization where knowledge is embedded: members, tools, and tasks. The combination between them generate six networks, each of them can be moved from one site to another or can be used to modifying knowledge reservoirs at a recipient site. This process allows the transfer of knowledge. Obviously moving network is difficult. Their analysis indicates that the most problematic knowledge conduits are the sub networks involving people (for example the member-tool-task network). But what is nice to underline is that evidences provide that moving people is one of the easiest way to transfer knowledge. This is perfectly suitable to strengthen the idea that learning at the boundaries is a mean to facilitate quick knowledge flows. Knowledge exchanges can be realised thanks to, for example, what Wenger calls boundaries encounters (see above at the second paragraph). How can we realise "boundaries encounters" in IDs? For sure we can promote events that allow the exchange of people between different contexts, in

terms of visits, or promote events, such as fairs, which could become poles of fertilisation for multi-contextual ideas.

These encounters could aid the building of pipelines between actors, even far from where the district is located. Monitoring pipelines would give the extent of the innovative capabilities of the systems, putting in evidence gaps or “structural holes” between actors that should be connected (according to the evidences provided by the observatories).

4. Implications and testable hypotheses

In the end, starting from the assumptions presented in the first part of this paper and the ideas coming from Bathelt et al. (2002), an interpretative scheme of the attitude of different industrial districts towards the learning process can be designed (fig.6).

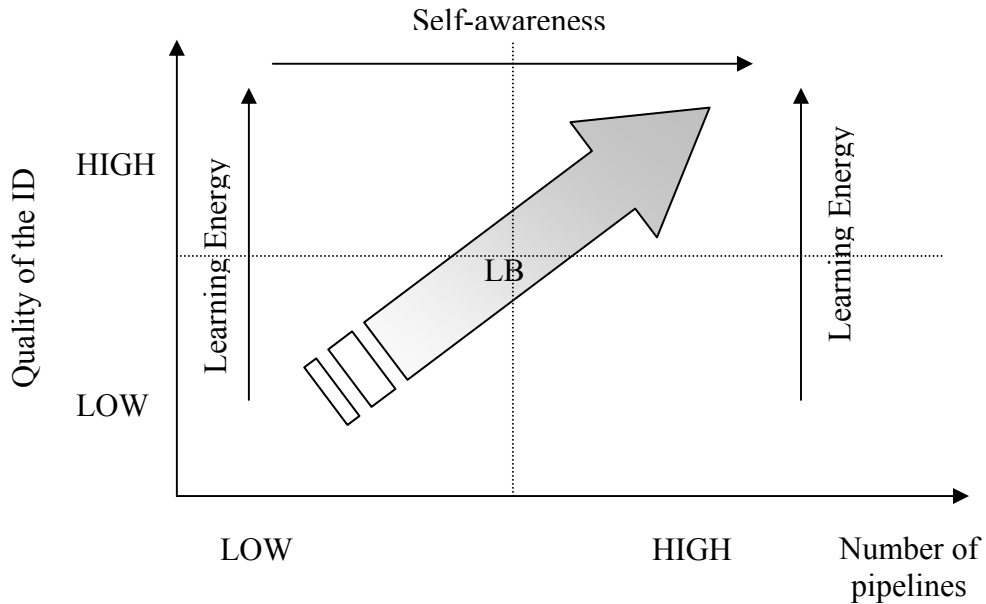


Fig. 6: An interpretative framework for the “learning capacity” of IDs.

LB = Learning at the boundaries

In this figure we have represented on the x-axis the number of pipelines (read: the openness degree of the district), which can be easily translated in the capability to achieve resources outside the close districtal system: the more it is, the more the system is “evolutionary”. On the y-axis we have positioned the quality of the ID (read: the level of expertise), which is the capability to manage and increase its core competences.

According to the combination of these two variables, we can fit every district in one of the four sections of the Cartesian diagram. What is important to put in evidence here is the possibility of moving from one section to another through different paths:

- 1) Cultivating the learning energy;
- 2) Arising the self-awareness;
- 3) Learning at the boundaries.

Let me start the exploration of these growth patterns from the first of the list. If the analysed ID is positioned at the bottom of the diagram, it means that there is a lack of expertise. Maybe there is a bad deployment of the local resources, maybe there are some structural holes in the local network of relationships between the actors of the system, or there are some inner problems of diffusion of the tacit knowledge cumulated during time, or, at the worst, the knowledge shared is not meaningful. In this case, great efforts to cultivate learning energy have to be done. What is learning energy, and how can be cultivated? Learning energy concerns the initiatives that the ID takes in keeping learning at the centre of its enterprises, recognizing and addressing gaps in its knowledge as well as remaining open to emergent directions and opportunities. Formal educational programmes and informal training are at the very root of the capabilities of learning. An evolutionary district should be ready to pick up every occasion for achieving new information to be processed in new knowledge, that finally takes to new style of organization, new technological processes or new products development. Only with the aid of lifelong learning, workers (as said, one of the most important knowledge repositories) could be constantly “up-to-date”, ready to take advantage of the potentialities of new communication and information systems, to shape new concepts by the interplaying of their previous experiences and the new knowledge flows. Only

combining tacit and codified knowledge coming from the inside and the outside of the local system we can reach some competitive advantages. Community of practices seems to be a good channel for meeting the two types of knowledge. Could be possible to build a CoP in the ID? Small family firms are often too much busy in the daily routines to see the advantages coming from the “cultivation of the learning energy”. Meta-organizers could provide the vision of the future challenges that firms are going to front without the right amount of education, promoting initiatives that could fit both the need of bringing their enterprise up-to-date on one side, and the need to respect the production timetable on the other side. It’s a matter of meeting effectively time to work and time to learn, that are often matched, but that sometimes need to be viewed as different moment of an holistic process of growth. New tools, that form the “knowledge local infrastructure”, from ICT (Information and Communication Technology) could be very helpful in this field, allowing the creation of alternative educational channels, such as, for example, the distance education.

Coming to the other concept proposed, that’s arising the self-awareness, it refers to the pattern of openness through an increasing number of pipelines. Only after having analysed the opportunities and threats (the last part of the SWOT analysis) of acquiring external resources, according to the inner competences to deploy them, we can select what and how many pipelines it is profitable to build. The capability of selection is included in what I called self-awareness.

Finally, we have the pattern of learning at the boundaries, which allows firms to learn from external experiences, from new services that could enrich the quality of their products, their competitiveness and their visibility in the actual global world. This process can be viewed as a short cut for jumping in the upper section at the right of the Cartesian diagram illustrated in fig. 6.

Developing events that aid people meet each other and stimulating the labour force mobility, could be two ways for making easier the exchange between competences belonging to different communities, permitting a flow of knowledge between different repositories.

Anyway, what remains the most important feature characterising an evolutionary district (characterised by generative learning) is the permeability of its boundaries, the flexibility towards new opportunities of learning, to the extent of losing the own identity in the identity of the whole complex system of the external challenges.

Drawing from the graph presented in fig.6 and the evolutionary patterns described above, some testable hypothesis can be formulated. The objective is the evaluation of the innovative attitude of IDs, which stems from the fertile combination of the learning at the boundaries and the learning energy. Here these research hypotheses will be presented, and a first attempt of making the framework operative will be suggested. In particular, some variables helpful for the purpose will be associated to the two patterns of learning.

Let me now formulate the hypotheses:

1st hypothesis: The quantity of learning energy embedded in an ID is proportionate to the propensity of learning at the boundaries.

2nd hypothesis: The innovative attitude of a district grows with the growth of the learning energy.

3rd hypothesis: The innovative attitude of a district grows with the growth of the capability of learning at the boundaries.

For testing the hypothesis we need to associate variables to concepts. In the table below (Tab.2) a list of indicators potentially useful are been identified.

LEARNING ENERGY	LEARNING AT THE BOUNDARIES	INNOVATIVE ATTITUDE
Infrastructural networks for transportation: <i>airports, harbours, railways, roads</i>	Trade Fairs, Conventions	R&D inputs
ICT Infrastructure: <i>electrical and optical (laser) apparatus, software with industrial applications, PMI management</i>	Web sites, Virtual Marketplaces	Patent data

<i>applications and applications linked to distribution</i>		
Formal education: <i>private and public university research centres and middle schools</i>	Internationalisation of business and export of manufactured goods	Bibliometric data ⁶
Training programme	Labour mobility	Ad hoc data sources
Financial institutions for economic activities	Seminars, meetings	...
Professional services	Temporary employment of university researchers by small and medium-sized companies	
Quality control and product certification	Science and Technological Parks	
Investments in new manufacturing plants	...	
Exhibition centres		
...		

Tab. 2: Some useful indicators for measuring empirically the effectiveness of the concepts discussed in this work

5. Some conclusive comments

This work wanted to explore the possibilities, offered by the ideas connected to the concept of CoP, of finding new keys to analyse the process of knowledge creation and sharing within an ID.

In a world dominated by high degrees of uncertainty, deriving from the growing global competition and from the need of changing the actual organisation system in order to front the new challenges of an enlarged market, the process of creation and transfer of knowledge has a strategic role. That is why the idea of putting in relation the emergent concept of CoP with the distrectual issues has come up.

After having defined the meaning of knowledge, CoP and ID, for the comprehension of the argumentations further presented, the attention has been shifted towards a

⁶ These data allow to point out the patterns of scientific publication and citation.

comparison between the concepts of CoP and ID, which makes similarities and differences come out. In particular, the comparison evidences the importance that the interplaying between tacit and codified knowledge has in both cases.

In the end, an example of possible use of ideas related to the CoP concept to measure the “evolutionary attitude” of an ID has been shown. The possibility of learning at the boundary comes up as a key tool for increasing competitiveness in a global market, offering the opportunity to enlarge the number of pipelines starting from the ID. As deep is the capability to exploit local resources and develop inner learning energy, as ready is a district to engage long bridges towards the exploration of new (co-located or not) sources of knowledge. The relation between the two processes along time can be explained watching the reciprocal behaviour of the two curves in fig. 7.

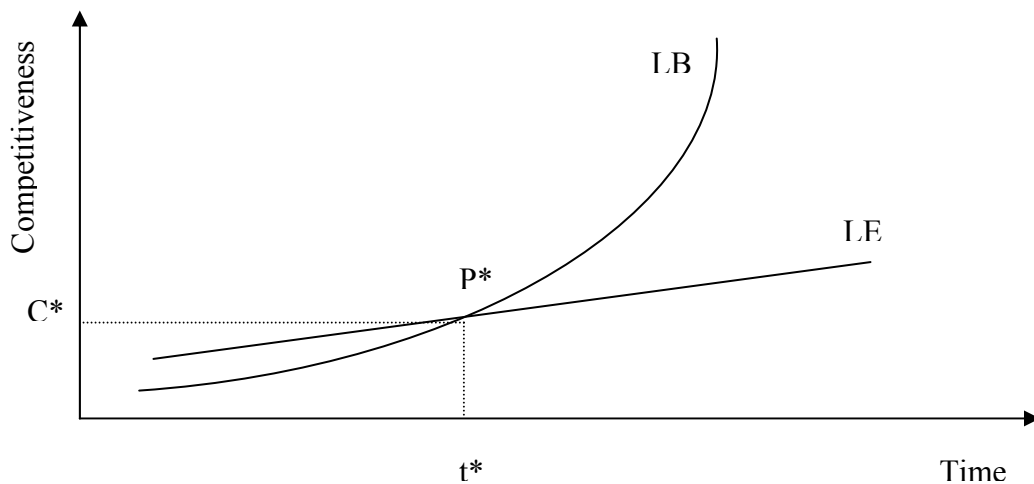


Fig. 7: Comparative effects on the ID competitive edge and reciprocal behaviour of learning at the boundaries (LB) and learning energy (LE).

In the graph presented in fig.7, the effectiveness in terms of competitiveness during time of learning at the boundaries (LB) and learning energy (LE) is illustrated. As we can see, at the beginning of the “history” of an ID, the factor that takes to higher values of competitiveness is the development of the learning energy. It means that this first phase is characterised by strong efforts in building the own identity. After a crucial point in time, the learning at the boundaries overtakes the learning energy as a strategic factor. It makes as leverage to increase faster the competitiveness of the system. If a life

cycle of the district could be designed, learning energy could be one of the possible revitalization processes.

There are no doubts that this is only a general assertion; it doesn't take account of the specific ID business activity and the line of business. Different activities can take to different ways of interaction between the two curves during time. If, for example, we refer to a high technology district, we can imagine that learning at the boundaries could absorb most of the whole energy used in the first period of its life and, may be, in all its life. Obviously, some empirical evidences are needed to evaluate the effectiveness of the framework.

Anyway, we can assume that the concept of CoP offers a lot of suggestions useful for deepening the process of knowledge creation in IDs. The next step in the analysis could be verifying if a community of practice in itself could be built inside an ID, creating a melting-pot where tacit and codified knowledge can interact and feed each other in an ecological system.

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