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Mature Systems in Global Markets:  
The Need for an Institutional Division of Labour

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# Mature Systems in Global Markets: The Need for an Institutional Division of Labour\*

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## Abstract

This paper approaches innovation as a need and not as a choice, particularly in the case of mature systems, defined as localized systems of production that are deeply specialised in mature industries. Their only strategy to achieve competitiveness is an innovation-driven shake-out combining new technological patterns with the existing resources and involving local institutions in production in order to avoid an unbearable shock. The Italian case is useful to introduce the idea of an institutional division of labour limited by the extent of the market and the institutional coherence of the system. According to this approach, the innovation policy has also a political dimension, which development and competition possibilities depend on.

Keywords: Mature industry, Innovation, Institutions, Policy

JEL Classification: B52, L23, N64, O33, P16

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## 1. Introduction

The innovation is one of the most relevant elements in competition nowadays. Generally innovation is considered as a possible strategy followed by entrepreneurs according to their businesses or by research institutions and governments according to social goals. Instead, this paper approaches innovation as a need and not as a choice, particularly in the case of mature systems, defined as localized systems of production that are deeply specialised in mature industries. According to that, the aim here is to demonstrate that innovation activities have to be structurally included in the production organization with a renewed involvement of institutions. In order to do this, the attention will be mainly focused on the Italian case. Other than my direct experience about it, the Italian manufacturing system presents some relevant elements outlined in Section 2.

Firstly, just like Germany and Japan, Italy has played a central role in the second industrial divide (Piore & Sabel, 1984) due to the crisis of the Fordism in the 70s. Hence, it is particularly interesting to analyse the conditions for a radical change in the organization of production in a framework already experienced by the successful case of the industrial districts. Secondly, this specific way of organizing production mainly concerns traditional industries of manufacturing (Geografie del nuovo Made in Italy, 2009; Dei Ottati, 2004; Bianchi & Labory, 2011; Bianchi, 2002), mostly in the maturity stage. In such a context, it becomes very difficult to face new competitors from emerging countries and the troubles of a knowledge-based economy (Foray & Lundvall, 1996). Lastly, those industries are characterized by high sunk costs both economic and social due to their specialisations (Marshall, 1890; Marshall & Marshall, 1879). That embedding generally prevents the possibility of exit or industrial conversion, thus the only strategy is an innovation-driven shake-out, going through a formalised participation of institutions in production.

Section 3 focuses on the phenomena of globalisation and international crisis not in order to individuate competition criticism, but rather some elements useful to a renewed organisation of production. On one side, globalisation represents an exceptional increase in the extent of the market providing the opportunity for a radical change in the organisation of labour (Bianchi & Labory, 2011) and, according to Adam Smith, for relevant improvements in the ways of production that could be generally considered as innovation. On the other side, the current crisis has suggested the need for a change in creating more relevant investment opportunities in production (Bianchi & Pozzi, 2010a).

Section 4 concerns the possibilities to increase the competitiveness of mature industries, considering both the need for shifting them to the knowledge-based economy and a renewed involvement of institutions. More precisely, it is not only the recognition about the central role of institutions in innovation systems (Cooke, Heidenreich, & Braczyk, 2004; Etzkowitz & Leydesdorff, 2000; Freeman, 2008; Lundvall, 2010; Malerba, 2004a; Nelson, 1993; Poma, 2003), but the suggestion here is to look at institutions in a wide sense (Nelson & Sampat, 2001) and to organise manufacturing activities depending on an institutional division of labour.

Finally, Section 5 describes an approach to innovation policy consistent with this concept of institutional involvement and that is, for this reason, also political. In such a context, innovation policy is mainly institutional change, which consists in the allocation of new production capabilities enabling the participation of institutions to the production process.

## **2. From industries to mature systems: the Italian case**

As described by Patrizio Bianchi (2002), during the second half of 70s the Italian manufacturing system responded to the oil crises with a deep reorganisation that has not appeared as not the large firm disintegration, but rather as the deconstruction of the whole industrial system in small enterprises joining other ones already producing differentiated goods in specialised niches. Nonetheless, SMEs have become the entrepreneurial leading model characterised by a development often independent from the large enterprises that at same time were facing their own internal reorganisation at that time.

Therefore, SMEs has been able to keep the employment growth (Bianchi, 2002). This phenomenon has been possible because of the organisation of SMEs in integrated and localised entrepreneurial systems competing with large enterprises (Marshall & Marshall, 1879; Marshall, 1890). This has been the renaissance of the industrial districts, characterised by a high density of small and specialised enterprises in a bound space. The “industrial atmosphere” created by that concentration (Marshall & Marshall, 1879) has provided to SMEs their competitive advantage, but in the Italian case it has achieved such a deep economic and social embedding (Poma, 2003) to make the industrial districts substitute industries in the industrial organisation research (Becattini, 1979). The territorial dimension is fundamental.

Competition and cooperation coexist within the district boundaries (Becattini, 1979; Poma, 2003), due to the division of labour generally organised over some lead-

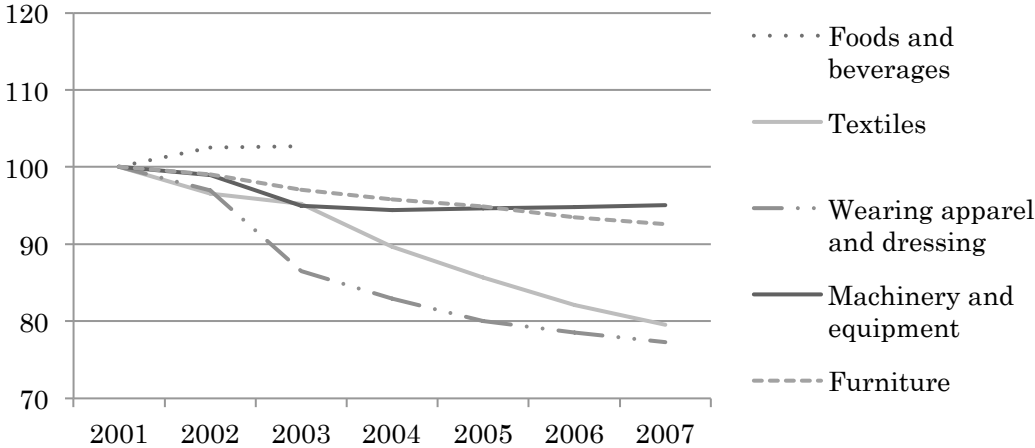
ing enterprises and a network of several contractors (Bianchi, 2002). The fault of this spontaneous, but fragile equilibrium is to delay or to stop some typical processes of industrial development, such as the dynamics related to the response to external spurs, the growth of the firms, the technological evolution of specialisations and the entry-exit mechanisms (Poma, 2003).

The main industries in Italian manufacturing are foods and beverages, textiles and fashion, furniture, and automation (Geografie del nuovo Made in Italy, 2009). During the last three decades they have been able to increase their exports and added value creating the phenomenon known as “Made in Italy”. Nonetheless, only automation has partially experienced a renewing path (Freddi, 2009; ANTARES, 2004), whereas the other ones have continued to operate within the same technological pattern and the same industrial life cycles. Hence, Italian industrial districts have come to face the maturity of their referential markets and, as a consequence, they can be intended as mature systems.

Actually, a mature market is characterised by a slowing output growth, the decline in entry, and the stabilisation of market shares. In such a situation competition shifts to price (Klepper, 1997). Thus, the attention is paid more to the process than to the product with a consequent growth of investments in capital-intensive methods. This behaviour couples with the need for gaining additional economies of scale and increasing the minimum efficient size and it leads to a reduction in the number of competitors (Klepper, 1996). Figure 1 shows data about the number of enterprises in the main Italian industrial specialisations and suggests that a mature stage is at least the case of textiles and fashion (wearing apparel and dressing), furniture, and automation (machinery and equipment).

But mature systems as defined before are an industrial paradox in the con-

**Figure 1. Number of enterprises in the main Italian industries.**  
**Years: 2001-2007, 2001=100. Source: Elaboration on Eurostat data**



crete, because the decrease in the number of enterprises and the adoption of labour-saving techniques probably generate a strong decline in employment and the overlap between the industrial and the territorial dimension causes dramatic problems of social sustainability and the loss of a relevant amount of high-specialised physical, human and knowledge capital. The result is weakened possibilities of industrial recovery. Therefore, in the case of mature systems the only strategy to achieve competitiveness is a shake-out that combines new technological patterns with the existing resource endowments in order to avoid an unbearable shock.

### **3. The impact of globalisation and international crisis**

The suggested sort of shake-out has as its main feature the definition of a new industrial trajectory and, as a consequence, the reorganisation of the relations of production. But in the case of mature systems this is also the reorganisation of social relations. Thus, the stakeout is a radical change so risky that compels both the enterprises and the social basis to cope with a structural uncertainty and the need for a really attractive set of conditions and incentives to change (Poma, 2003).

Nowadays, the conditions are provided by globalisation, because «globalisation has dramatically increased the extent of the market» (Bianchi & Labory, 2011, p. 41). According to Adam Smith (1776), this phenomenon provides the possibilities to improve the division of labour that is just a reorganisation of the production relations and a redefinition of the industrial specialisations. Hence, mature systems have mainly to look at globalisation as the binding framework more for self-responding to the need of radical change, than for facing aggressive competitors.

In the same way, from an industrial point of view international crisis currently provides the incentive to change. As suggested by George J. Stigler (1951), specialisations are achieved according to long cyclical fluctuations (Schumpeter J. A., 1939) and the lock-in by historical events (Arthur, 1989). Generally a crisis breaks such lock-in configurations leading to redefine the set of relations within the production processes. However, those relations continue to operate beside the same technological pattern without any change in industrial specialisations. Such a transformation is provided only by a structural crisis stating the end of a long wave and the start of a new one (Bianchi & Labory, 2011; Bianchi & Pozzi, 2010a; Perez, 2008).

This sort of crisis is mainly characterised by a progressive shift of financial resources from production activities to more profitable speculations creating a «gap between the financial and the productive spheres of economy» (Bianchi & Labory,

2011, p. 33). Thus, the possibilities to achieve new degrees of specialisation couple with the need for providing more attractive investment opportunities and these correspond to the offer of expected profits and market power. The only element able to provide them is innovation (Schumpeter J. A., 1939; Schumpeter J. A., 1942) and this is the reason why the mature systems shake-out has to be innovation-driven.

Even so, similarly to other knowledge-based activities, innovation has no predictable outcomes and often it is not possible to efficiently organise it (Nonaka, 1994), but such issues can be partially at least managed at the moment of the shake-out. In fact, other than the nature of the product, the efficiency of a production process depends on the degree of specialisation in the different phases and functions (Stigler, 1951), but not always an optimal one is achievable within the firm or among several firms due to matters of size, sunkness, risk, and so on. For this reason, the shake-out has to increase the extent of the division of labour, loosening its boundaries and allowing someone else never involved before to participate.

Hoever, to really improve the outcome of the system shake-out, also new participants have to be locally embedded in such a way. Thus, an innovation-driven shake-out of mature systems needs to involve local institutions. In this way, production and competition stop to be only entrepreneurial matters and achieve a territorial dimension (Poma, 2003). Hence, given the industrial specialisation, the economical and social constraints, and the set of conditions and incentives provided by the globalisation and the international crisis, an innovation-driven shake-out involving the local institutions is, on one side, the only industrial strategy for mature systems to gain competitiveness and, on the other one, the most radical transformation bearable by the system.

#### **4. An institutional division of labour for competing**

The relevance of institutions in the dynamics of innovation systems is widely recognised by the institutional-evolutionary paradigm, mainly defining the context for innovation activities, governing them, providing the most part of new knowledge through universities and other public research centres and allowing all players involved to share this knowledge (Cooke, Heidenreich, & Braczyk, 2004; Etzkowitz & Leydesdorff, 2000; Lundvall, 2010; Malerba, 2004a; Nelson, 1993).

Institutions are “systems of established and embedded social rules that structure social interaction” (Hodgson, 2006, p. 18). Next to them, there are more general social structures and rules, conventions and habits that emerge as relevant factors



inducing routines in economic processes (Nelson & Winter, 1982). Of course these routines have some productive and competitive rationale, nevertheless time and space localisation of the production activities are relevant too. In fact, because of their social dimension, institutions are historically shaped (Leydesdorff, 2006) and historically shape the way to organise the production.

Hence, institutions are factors bearing on economic performance and in this way they can be considered more generally as “standardized social technologies” (Nelson & Sampat, 2001, p. 44). All the institutions play a role in economic processes, although acting in several ways related to their nature. For this reason, there are various taxonomies about institutions in literature as that provided by Goeffry M. Hodgson (2006), even so the relevant distinction here is the one between institutions as shared rules and beliefs and institutions as organisations and authorities.

According with Richard R. Nelson and Bhaven N. Sampat (2001), the first ones can be strictly named as the “standardized social technologies”, each one with its own implicit function. Generally, in Western Countries they are the result of long paths in which values, interests and feelings have been overlapped building the whole set-up of societies (Rawls, 2001). Nonetheless they affect directly the organisation of production. The most famous case is the influence of the Protestant ethics on the development of capitalism analysed by Max Weber (1905).

Instead, the second kind includes structured groups of people able to make a choice in shaping the economic processes. This is the reason why these kind of institutions are submitted to continuous, more or less direct, and democratic on purpose mechanisms of turn-over. They are authorities if their mission is to conserve public interests and organisations if they take care of collective, but partial ones. Because of their possibility of making choices and taking decisions, authorities and organisations can be defined as active institutions.

Both these kinds of institutions are in such a way something laying upon social relations, and upon the economic ones among them. Thus, according to Karl Marx (1859) institutions could be intended as super-structures, but this idea run the risk to consider institutions mainly as a burden. Instead, I suggest looking at institutions as infra-structures, i.e. something staying among the relations of production, although preserving their political nature.

This perspective has three main implications. The first and more articulated one concerns the approach to existent institutions. On one side, they do not represent only a cost for democracy. In fact, it has been demonstrated that, at certain conditions, there could be an advantage in organising relations beyond the path of the economy (Coase R. H., 1937; Williamson, 1996). On the other one, institutions

often mark a distinction between industrialising and industrialised countries (Chang, 2003). Nevertheless they are not an element of dominance or superiority, but rather an additional resource at the disposal in the production processes.

Both social technologies and active institutions provide an “institutional atmosphere” shaping the production possibilities (Poma, 2003). Nonetheless, social technologies in such a way represent the basic tools and facilities available in production organisation, whereas active institutions are at least potential players in the production processes. As a consequence, they can be involved in the division of labour that in this way becomes an institutional division of labour.

In an innovation perspective, there are several groups of active institutions that should take a part in the production processes. Sketching out a framework based on the Italian experience, among authorities there are mainly the local administrations and the development agencies. Furthermore, universities and chambers of commerce like local autonomous departments of the national government can be considered as close to them. Organisations rather include the institutionalised shareholders, i.e. unions, entrepreneurial and professional associations, trusts and credit institutions. But the institutional division of labour is not the hypothesis of «more or less institutionalised “negotiations” between multiple self-interested groups of actors» (Kuhlmann, 2001, p. 961). Each one of the active institutions produces some positive externalities in pursuing its mission. Accepting the institutional division of labour approach means turn these contributions into a recognised, structuralised and formalised set of productive actions. According to Patrizio Bianchi and Sandrine Labory (2011), firms have to “unbundle” the production processes and to let the active institutions get in the supply chain. Thus, positive externalities turn into externalised phases of production taking directly part to the division of labour.

The second implication concerns the relation between economy and policy. Despite of the neoclassical paradigm and the hypothesis about an auctioneer (Walras, 1874), the suggested approach is based on the belief of the dominance of policy. The considerations about the social and political aspects of institutions lead to claim that there is not any natural order related to the structure and functioning of institutions. They are at least the indirect outcomes of political processes. In other words, institutions as fundamental synthesis of social relations strictly depend on «the stakeholders’ desirability of the outcomes» (Bianchi & Pozzi, 2010a, p. 43). In the same way, also the evolutionary idea inspired by Hayek (1937) about self-organising systems (Nelson & Winter, 1982; Etzkowitz & Leydesdorff, 2000; Leydesdorff, 2006) risk to fall in trouble without admitting a role for collective will-

ingness and responsibility in choosing possibilities and limits of the structural change formalisation.

The final implication concerns the relations between institutions inside local systems. It is well known that industrial policy requires the coherence among the policy actions or more generally the routes of interventions (Bianchi & Labory, 2011). Nonetheless, the suggested approach needs something more. Referring to the institutional division of labour, it could be said that «the extent of this division must always be limited [...] by the extent of the market» (Smith, 1776) and the institutional coherence of the system of production. In fact, without any consistency in institutional structure, functions and tasks, there is no real possibility for a local system to be effective. The most part of this coherence arises from “lock-in” mechanisms making the institutions coevolve beside a trajectory (Leydesdorff, 2006) and the institutional division of labour really feasible.

## **5. A political approach to innovation policy**

The goal of innovation policy here is the industrial shake-out of mature systems through the institutional division of labour. The direct involvement of institutions as part of the supply chain is a crucial element in order to preserve the industrial specialisation of a system as a whole, including physical, human and knowledge capital. Despite of that, introducing an institutional division of labour in mature systems is a deep but bearable change in the social and economic relations inside the system. As a consequence, the innovation policy outcome represents itself a sort of Schumpeterian innovation, a structural transformation without any inconsistent break with the past (Schumpeter J. A., 1942).

Hence, in this approach innovation policy needs first of all a large social agreement about the shake-out trajectory and a shared willingness to change among the active institutions. Nonetheless, these ones are not pure political aspects behind innovation policy, but they define the boundaries of possibilities and capabilities in the industrial development. On one side, starting from the pre-existing capital endowment, the trajectory of the shake-out designs the set of technological platforms adoptable inside a mature system. On the other one, the willingness to change sets the divisibility of labour among active institutions, that determines the depth of their potential specialisation and, as a consequence, the effectiveness of the achievable lock-in configurations (Arthur, 1989). Each deviation or free-riding be-

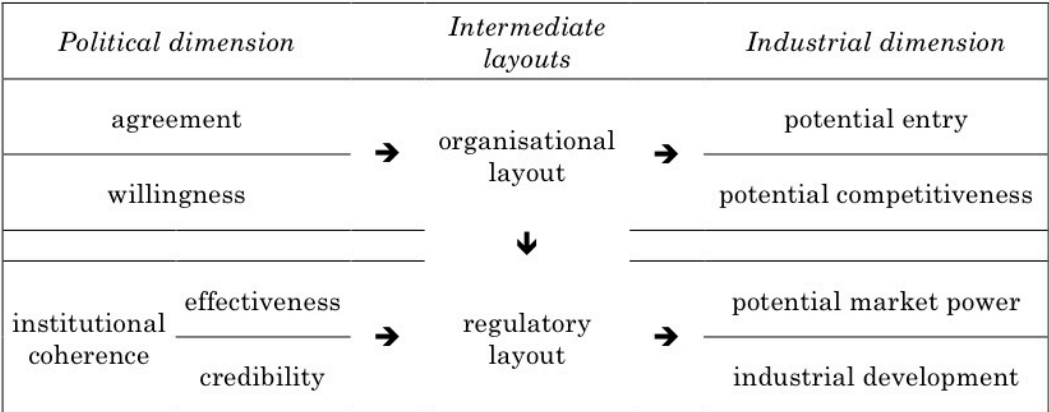
behaviour among active institutions could tighten the evolution boundaries (Olson, 1965) and compromise the effectiveness of the development path.

Thus, the political dimension of the innovation policy turns into the industrial one, shaping its effects because of the dynamic nature of specialisation. Depending on the variety of specialisations, technological possibilities represent the opportunities of entry, i.e. the potential occasions to face a new market. Instead, depending on the intensity of specialisations, the institutional divisibility of labour sets the potential efficiency and competitiveness of the supply chain, i.e. the capabilities to stay in a market. In addition, the political dimension affects the period to realise both industrial possibilities and capabilities, period that is related to the effectiveness of political processes inside the system. As a consequence, the faster is the overlap, the earlier a lock-in configuration could be managed, i.e. a potential market power is provided. According to that, the institutional coherence of the system has not only a static relevance, but also a dynamic one.

Nonetheless, the dynamic effect of the institutional coherence does not end inside the system, but it provides the credibility of the innovation policy too. Just the credibility is the element turning the system possibilities and capabilities of competing into actual competitiveness. Because the industrial shake-out gives to competition a territorial dimension, capturing external provisions is the main route to expand and to improve competitiveness (Poma, 2003). The amount of captured provisions shapes the constraints in choosing how many and which technological platforms to get effective among the possible ones, i.e. in the long term that amount determines the intensity and the quality of the industrial development through the selection of the system lock-in configurations.

Anyway, the relation between the political dimension of the innovation policy and the industrial one is not direct and goes through an intermediate level of change made by two different layouts (Figure 2). The first one is organisational and con-

**Figure 2. Dimensions of the institutional division of labour.**



cerns the assignment of some phases of the production process to the active institutions. Of course, each active institution has its own vocation to undertake one or more roles within the institutional division of labour. The phases have to be selected considering their compatibility with the several institutional missions and functions.

The best-known example is the third mission of universities (Etzkowitz & Leydesdorff, 2000; Poma & Ramaciotti, 2008; Poma & Ramaciotti, 2010). Pursuing its own mission, university already carries out two functions relevant for the knowledge production, i.e. education and scientific research, but without any constraint to such a relation with the development path of the system, that is only a possibility.

In Italy, a little improvement is represented by introducing the opportunity successfully experienced abroad to join the two historical missions of the Humboldtian university with a third one, in order to encourage technology transfer by the creation of liaison offices and the promotion of spin-off activities (Poma & Ramaciotti, 2008; Poma & Ramaciotti, 2010). Adding this new function has undoubtedly induced university to pay more attention to the industrial issues, but it is not still enough according to an approach based on the institutional division of labour. Actually, university continues to lack of the involvement in the development paths, particularly concerning its trajectories. Only by recognising these trajectories and contributing in their definition, university can take part in the institutional division of labour. Moreover, it is in recognising and participating to the system development that university demonstrates its willingness of participation and, thus, of specialisation.

Although it could seem that the admittance of a change depends just on providing appropriate incentives, but this is not true. Like in every process of institutional evolution, also in the university case a resilience to change could emerge (Poma, 2003). Just in order to avoid resilience to delay or stop the evolution process, the political dimension has weight. Therefore, if university actually participates in the institutional division of labour, it is obvious that its own tasks would not be only to provide applied research directly manageable into the production process, but also to redirect both the educational and scientific research functions according to the perspectives established by the development trajectories.

If there has already been a debate about the role of university in the new competition framework, more difficult is the argumentation about the other active institutions, especially organisations. Because of their original missions, unions and associations should have first of all the capabilities to deal with the organisational is-

sues, particularly in setting up the production according the new trajectory and to define the need for physical, human and knowledge capital in the industrial shake-out and during the following development path. Instead, trusts and credit institutions have an important role in setting up mechanisms useful to satisfy this need and make other functions to be effective. In such a way, they have a bottom-coordination responsibility.

The last group of active institutions are the local authorities. Because they are entitled to seal the development, they are empowered of an up-coordination role. Although this is an advantaged condition, local authorities have to assume such a new functions, formally separating the externalities provided to the system from the activities closely related to the government action, as in the case of development promotion agencies. This functional spin-off process is an entitling one by which not only local authorities, but also the other active institutions gain the capability to participate in the institutional division of labour. Hence, the mechanism to get institutions to access to production is the building of a market relation system that, as in the bargaining case (Coase R. H., 1937; Coase R. H., 1960), are aimed to provide the need entitlements for the allocation of production capabilities.

Nonetheless, some problems could arise. One is related to the possibilities of coordination among several authorities governing at different territorial levels on the same localised system. Another one concerns the set of regulatory tools at the disposal. In fact, there is the possibility that the industrial shake-out of the system would partially depend on the regulatory intervention by high-level institutions that are not embedded in the evolution process and, as a consequence, also excluded from a political point of view.

The second layout is actually the regulatory one. The organisational layout defines by itself a set of functions opening the supply chain to the active institutions, but the change is not completed and, even, it could be self-defeating for the development path without to have been finalised. In fact, the assignment of new functions to the active institutions forces to introduce regulatory reforms making the institutional structure to couple both with the historical and the assigned missions. Otherwise, the industrial shake-out could run into two kinds of problems.

Firstly, an efficiency loss could arise in following the industrial trajectories, due to a «bifurcation process within an evolving system» (Leydesdorff, 2006, p. 197). Bifurcation is not per se a trouble affecting the system evolution and it rather is the phenomenon providing middle term adjustments in response to the less long waves. Nonetheless, the second and really destructive problem for the development paths and the shake-out-invested resources could be caused by bifurcation, if it would be a

structural process. In this case, the institutional coherence would be compromised and there would be no political sustainability both internal and external.

Therefore, the regulatory layout is not an issue less relevant than the other one. According to this approach regulation is not only the act of formalising the institutional division of labour, but also the way to gain the institutional coherence and to realise the institutional division of labour in order to cope with the extent of the market.

## 6. Conclusions

This paper is inspired by the Italian experience, as introduced. In Italy the industrial system is mainly characterized by a large number of SMEs deeply specialised in mature industries as heritage of the successful experience of the industrial districts. Nowadays, these industries are the most in trouble in the international competition framework shaped by globalisation and the international crisis. Difficulties mainly arise from some structural elements as the sunkness of social and economic embedding and the consequent limitation in the openness to new opportunities. Even so, in Italy there are also some relevant behavioural matters linked to the structural ones, such as the lack of investment opportunities (Bianchi & Labory, 2011) and the low intensity of the R&D system (Malerba, 1993), as well as policy-related matters, like the impoverishment of the educational system. All of these could seriously lead the industrial system to lock-in in not desirable configurations.

Although this is the national trend, some interesting and effective practices have been implemented. The Regional Programme for Industrial Research, Innovation, and Technology Transfer (PRRIITT) (Poma & Ramaciotti, 2008; Poma & Ramaciotti, 2010) and the in-progress reform of the educational-training system in Emilia-Romagna are some of those. Testing the suggested approach in comparison with the result of these policies will certainly be stimulating to continue the reasoning about the institutional division of labour.

Therefore, the Italian case has been useful to introduce the idea of an institutional division of labour and to provide a political approach to innovation policy. Nonetheless, I believe that this approach could be generalized in order to provide a useful tool for interpreting the organisation of the innovation systems and the policies for innovation also in better performing situations. An institutional division of labour is anyway consistent with the fact that «there is increasing elaborate division of labour in the generation of knowledge» (Metcalf, 2005, p. 53).

Knowledge has always been a basic element in production as noted by Adam Smith (1776), but nowadays it has even extended to shaping structurally the competition framework. The institutional division of labour is based on the main assumption that institutional activities concern not only government (Etzkowitz & Leydesdorff, 2000; Leydesdorff, 2006; Poma, 2003), but they also represent production capabilities. Thus, production has an economic, a social and a political dimension. The last one is not intended as determination external and super-ordinated compared with production, but as the collective choice related to a collective and overall effort aimed to the change.

Indeed, the involvement of institutions in this process, and more precisely the active institutions, leads to a sort of division of labour limited by the extent of the market and by the institutional coherence within the system. This coherence has two meanings: from the internal point of view, it is the condition for the evolution process to be effective and to give the system a market positioning; from the external one, it is the condition to do not waste the heritage employed in the change and to make an industrial development route to be really feasible. Both these conditions depend on a regulatory layout, able to lock-in the whole system in a configuration consistent with the depth of the change and the real access to the supply chain by the active institutions.

In this way, the institutional coherence is related to the institutional agreement and willingness to change strongly constraining the organisational layout of the system. On one side, the agreement among institutions and, through democratic processes, within the whole system designs the nature and the variety of specialisation resulting from the industrial shake-out. On the other one, the willingness of each active institution to participate in the division of labour defines the potential level of specialisation.

In order to put into action these agreement and willingness, active institutions have to be entitled of specific functions separated from their original tasks. Like with the third mission of university, the spin-off of what is considered a positive externality is the solution that should be provided by the regulatory layout. Hence, the institutional participation to the production process depends on building a set of new market relations within the system in order to allocate new production capabilities. The innovation policy is the set of tools providing this institutional change.



## References

- ANTARES. (2004). *Il distretto della meccatronica a Reggio Emilia*. Camera di Commercio di Reggio Emilia & Associazione degli Industriali di Reggio Emilia, Forlì.
- Arthur, W. B. (1989). Competing Technologies, Increasing Returns, and Lock-In by Historical Events. *The Economic Journal* , 99 (394), 116-131.
- Bach, L., & Matt, M. (2005). From economic foundations to S&T policy tools: a comparative analysis of the dominant paradigms. In P. LLerena, & M. Matt (Eds.), *Innovation Policy in a Knowledge-Based Economy* (pp. 17-46). New York: Springer-Verlag.
- Becattini, G. (1979). Dal "settore" industriale al "distretto" industriale. Alcune considerazioni sull'unità di indagine dell'economia industriale. *Rivista di economia e politica industriale* (1), 7-21.
- Bianchi, P. (2002). *La rincorsa frenata. L'industria italiana dall'unità nazionale all'unificazione europea*. Bologna: Il Mulino.
- Bianchi, P., & Labory, S. (2011). *Industrial policy after the crisis. Seizing the future*. Cheltenham: Edward Elgar Publishing Ltd.
- Bianchi, P., & Pozzi, C. (2010a). La crisi economica e la politica industriale. In P. Bianchi, & C. Pozzi (Eds.), *La politiche industriali alla prova del futuro* (pp. 17-59). Bologna: Il Mulino.
- Bianchi, P., & Pozzi, C. (Eds.). (2010b). *Le politiche industriali alla prova del futuro*. Bologna: Il Mulino.
- Chang, H.-J. (2003). *Kicking away the ladder: development strategy in historical perspective*. London: Anthem.
- Coase, R. H. (1937). The Nature of the Firm. *Economica* , 16 (4), 386-405.
- Coase, R. H. (1960). The Problem of Social Cost. *Journal of Law and Economics* , III, 1-44.
- Cooke, P., Heidenreich, M., & Braczyk, H.-J. (Eds.). (2004). *Regional Innovation Systems* (Second ed.). London: Routledge.
- Dei Ottati, G. (2004). The remarkable resilience of the industrial district of Tuscany. In P. Cooke, M. Heidenreich, & H.-J. Braczyk (Eds.), *Regional Innovation Systems* (pp. 21-43). London: Routledge.
- Etzkowitz, H., & Leydesdorff, L. (2000). The dynamics of innovation: from National Systems and "Mode 2" to a Triple Helix of university–industry–government relations. *Research Policy* , 29, 109-123.
- Foray, D., & Lundvall, B.-A. (1996). The knowledge-based economy: from the economics of knowledge to the learning economy. In OECD, *Employment and growth in the knowledge-based economy* (pp. 11-32). Paris: OECD Publishing.

- Freddi, D. (2009). The integration of old and new technological paradigms in low- and medium-tech sectors: The case of mechatronics. *Research Policy* , 38 (3), 548-558.
- Freeman, C. (Ed.). (2008). *Systems of Innovation*. Cheltenham: Edward Elgar.
- Fondazione Edison, & Symbola (Eds.). (2009). Geografie del nuovo Made in Italy. *Il Made in Italy e la crisi*. Milano.
- Hayek, F. A. (1937). Economics and Knowledge. *Economica* , 4 (13), 33-54.
- Hodgson, G. M. (2006). What are Institutions? *Journal of Economic Issues* , XI (1), 1-25.
- Klepper, S. (1996). Entry, Exit, Growth, and Innovation over the Product Life Cycle. *The American Economic Review* , 86 (3), 562-583.
- Klepper, S. (1997). Industry Life Cycles. *Industrial and Corporate Change* , 6 (1), 145-181.
- Kuhlmann, S. (2001). Future governance of innovation policy in Europe - three scenarios. *Research Policy* , 30, 953-976.
- Leydesdorff, L. (2006). "While a Storm is Raging on the Open Sea": Regional Development in a Knowledge-Based Economy. *The Journal of Technology Transfer* , 31 (1), 189-203.
- Llerena, P., & Matt, M. (Eds.). (2005). *Innovation Policy in a Knowledge-Based Economy. Theory and Practice*. New York: Springer-Verlag.
- Lundvall, B.-A. (Ed.). (2010). *National Systems of Innovation: Toward a Theory of Innovation and Interactive Learning*. London: Anthem Press.
- Malerba, F. (Ed.). (2004a). *Sectoral Systems of Innovation*. Cambridge, UK: Cambridge University Press.
- Malerba, F. (2004b). Sectoral systems of innovation: basic concepts. In F. Malerba (Ed.), *Sectoral Systems of Innovation* (pp. 9-41). Cambridge, UK: Cambridge University Press.
- Malerba, F. (1993). The National System of Innovation: Italy. In R. R. Nelson (Ed.), *National Innovation Systems* (pp. 230-259). New York: Oxford University Press.
- Marshall, A. (1890). *Principles of Economics* (1959. Turin: UTET. Italian ed.). (A. Campolongo, Trans.)
- Marshall, A., & Marshall, M. P. (1879). *The Economics of Industry* (1975. Milan: ISEDI. Italian ed.). (G. Becattini, Trans.)
- Marx, K. (1859). *A Contribution to the Critique of Political Economy* (2010. Macerata: Quodlibet. Italian ed.). (M. Musto, Ed., & G. Backhaus, Trans.)
- Metcalf, J. S. (2005). Systems failure and the case for innovation policy. In P. Llerena, & M. Matt (Eds.), *Innovation Policy in a Knowledge-Based Economy. Theory and Practice*. (pp. 47-74). New York: Springer-Verlag.
- Nelson, R. R. (Ed.). (1993). *National Innovation Systems*. New York: Oxford University Press.

- Nelson, R. R., & Rosenberg, N. (1993). Technical Innovation and National Systems. In R. R. Nelson (Ed.), *National Innovation Systems* (pp. 3-21). New York: Oxford University Press.
- Nelson, R. R., & Sampat, B. N. (2001). Making sense of institutions as a factor shaping economic performance. *Journal of Economic Behavior & Organization* , 44, 31-54.
- Nelson, R. R., & Winter, S. G. (1982). *An Evolutionary Theory of Economic Change*. Cambridge, MA: The Belknap Press of Harvard University Press.
- Nonaka, I. (1994). A Dynamic Theory of Organizational Knowledge Creation. *Organization Science* , 5 (1), 14-37.
- North, D. C. (1990). *Institutions, Institutional Change and Economic Performance* (1998. Bologna: Il Mulino. Italian ed.).
- OECD. (1996). *Employment and Growth in the Knowledge-based Economy*. Paris: OECD Publishing.
- Olson, M. (1965). *The Logic of Collective Action: Public Goods and the Theory of Groups* (1990. Milan: Feltrinelli. Italian ed.). (S. Sforza, Ed.)
- Perez, C. (2008). Structural crises of adjustment, business cycles and investment behaviour. In C. Freeman (Ed.), *Systems of Innovation* (pp. 38-73). Cheltenham: Edward Elgar.
- Piore, M. J., & Sabel, C. F. (1984). *The Second Industrial Divide: Possibilities for Prosperity*. New York: Basic Books.
- Poma, L. (2003). *Oltre il distretto. Imprese e istituzioni nella nuova competizione territoriale*. Milano: Franco Angeli.
- Poma, L., & Ramaciotti, L. (2008). La valorizzazione della ricerca universitaria mediante l'interpolazione dei saperi. Infrastrutture materiali e immateriali. *L'Industria* , XXIX (Special Issue), 269-297.
- Poma, L., & Ramaciotti, L. (2010). Politiche pubbliche per l'innovazione: il ruolo dell'università. In P. Bianchi, & C. Pozzi (Eds.), *Le politiche industriali alla prova del futuro*. (pp. 219-252). Bologna: Il Mulino.
- Rawls, J. (2001). *Justice as Fairness. A Restatement* (2008. Milan: Feltrinelli. Italian ed.). (S. Veca, Ed., & G. Rigamonti, Trans.)
- Schumpeter, J. A. (1939). *Business Cycles. A Theoretical, Historical and Statistical Analysis of the Capitalistic Process*. New York, Toronto, London: McGraw-Hill.
- Schumpeter, J. A. (1942). *Capitalism, Socialism and Democracy* (2001. Milan: ETAS. Italian ed.). (E. Zuffi, Trans.)
- Sen, A. (1983). Development: Which Way Now? *The Economic Journal* , 93 (372), 745-762.
- Smith, A. (1776). *An Inquiry into the Nature and Causes of the Wealth of Nations* (2005. Rome: Newton Compton. Italian ed.). (F. Bartoli, C. Camporesi, & S. Caruso, Trans.)

- Stigler, G. J. (1951). The Division of Labor is Limited by the Extent of the Market. *The Journal of Political Economy* , 59 (3), 185-193.
- Uyarra, E. (2010). What is evolutionary about 'regional systems of innovation'? Implication for regional policy. *Journal of Evolutionary Economics* , 20 (1), 115-137.
- Walras, L. M. (1874). *Elements of Pure Economics* (1972. Turin: UTET. Italian ed.). (A. Biagiotti, Ed.)
- Weber, M. (1905). *The Protestant Ethic and the Spirit of Capitalism* (1991. Milan: BUR. Italian ed.). (A. M. Marietti, Trans.)
- Williamson, O. E. (1996). *The Mechanisms of Governance* (1998. Milan: Franco Angeli. Italian ed.). (M. Turvani, Ed.)