

POLICY BRIEF



Policy Incentives for the Creation of Knowledge: Methods and Evidence (PICK ME)

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INTRODUCTION

Innovation policies under crisis constraints

“Reinventing Europe through innovation” has been announced as the core message of the post 2010 Lisbon Agenda to address the unprecedented challenges that Europe is facing under the current economic crisis (European Commission, 2009). More than ever what matters is putting knowledge into practice to achieve environmentally, socially and economically sustainable growth and jobs.

The ongoing global economic crisis and its impact on the performance of both developed and lagging regions, has renewed the attention on innovation policies. Europe cannot compete unless it becomes more inventive, reacts better to consumer needs and preferences and innovates more. Innovation is seen as the carrier of new opportunities and the way out from economic stagnation and decline. The successful transition toward technology intensive economies defines the conditions for the creation and sustainability of new jobs, tackling the upsurge of unemployment, in particular in areas characterized by specialization in mature industries.

In this direction, demand pull innovation policies are the key lever to boost changes in technological trajectories, to unleash the potential of individuals, regions and countries investing effectively into infrastructures, competences, creative environments and businesses’ needs. For EU policy, this means going beyond the focus on more R&D and technology to discover how much putting knowledge into practice depends on knowledge itself, money but also trust (European Commission, 2009).

Economic Transition and Technological Change

Globalization has changed substantially the contours of the current economy. Unlike previous experiences, the current globalization process has contributed to an unprecedented shift in the competitive advantages of countries and regions. As acknowledged by Antonelli and Fassio (03/2013), the division of labour has undermined the competitiveness of advanced countries especially in mature industries. At the same time, the globalization of capital markets has favoured the growing outflow of capital via foreign direct investment.

Advanced countries are facing exceptional challenges and the need to exploit new specializations. Spatial transactions costs have fallen for mundane, standardized and non-knowledge intensive activities, but at the same time they have risen for creative, non-standardized and knowledge intensive activities (Leamer, 2007). In a context in which the latter are produced under increasing return to scale based on agglomeration economies, while the former are located in constant return to scale environments (McCann, 2008), Europe is in the urgent need of rethinking to its development trajectory placing itself as knowledge centre of the global economy. Regions that have been more successful in making the transition from low to high value added industries are in fact, those experiencing higher wages and better economic perspectives in both manufacturing and related services (Moretti, 2013).

The transition toward technological intensive specializations is however a challenging goal, especially for lagging regions in Europe. Endogenous capabilities may be not sufficient to engage changes in technological trajectories and demand driven innovation policies can help to tackle structural disadvantages and exploit novel potentials. This implies sustaining the acquisition of distinctive skills by investing in human capital and attracting knowledgeable individuals, while building up local firms' capabilities and absorptive capacities; facilitating the formal and informal interactions between different actors (universities, firms and individuals), creating networks of cooperation and trust; favouring industrial transition toward knowledge intensive specializations while attracting high value added foreign firms.

Skills, Mobility and Local Capabilities

One of the most important mechanisms through which public policies may impact on the structure of local skills and the creation of knowledge is the production of graduates (see, among others, Pavitt, 1991; and Salter and Martin, 2001). Graduates bring an "attitude of the mind" and a "tacit ability" to acquire and use knowledge in new powerful ways (Senker, 1995). However such impact is likely to depend on the demand conditions of the area/region where graduates are located/attracted to. This implies that, at the micro-level, it is crucial to understand how the match between supply and demand of skills actually occurs, especially across regions at varying stages of techno-economic development.

For example, using data on Italian graduates Marinelli (14/2011) shows that policies aimed at building up skills, without tackling regional structural disadvantages, are not sufficient to generate the desired local development outcome. In this context a more in depth understanding of the mobility behaviour of skilled individuals is needed. To reverse the brain drain and benefit from high-skilled population, investments in human capital should be coupled by a development agenda capable of responding to both, the short-term and long-term professional ambitions of local graduates (Iammarino and Marinelli, 10/2012). Backward regions are unlikely to retain their graduates, who chose to give up on a better quality of life in search of job opportunities elsewhere. Education policies need to be accompanied by industrial and innovation measures that enable local graduates to develop their career and transfer their knowledge into local labour markets. This also implies building up local firms' capabilities to exploit local potential, transforming in economically viable innovation the availability of novel sources of individual embodied knowledge. Furthermore, increasing and new modes of interaction and communication between university and education institutions, on the one hand, and private sector, on the other, can help transform local

innovation systems into more collaborative entities and raise the awareness of local and regional needs for ensuring sustainable economic development.

The evidence in this direction is reinforced by a wider spectrum of analysis on other categories of individuals that are carriers of knowledge and competencies. Crescenzi and Gagliardi (2013), looking at inventors, show that the mobility of knowledgeable individuals benefit recipient areas only when local economic actors are capable to exploit these novel sources of individual embodied human capital. The effective transfer of knowledge, within local labour markets, passes through the capability of local firms to complement internal sources of information with additional external flows. This finding is endorsed by Gagliardi (2013) arguing that, the possibility to benefit from international skilled migration inflows depends crucially on local capabilities to engage processes of collective learning. As acknowledged by Antonelli, Crespi and Scellato (06/2012), the external conditions, such as the quality of local knowledge pools, together with the internal firms' dynamic capabilities, exert a specific and localized effect upon the persistent introduction of innovations. Hence the localized path dependent character of innovation persistence calls for a systematic and systemic approach to technology policy.

Trust, Networks and Knowledge Circulation

Trust and cooperation shape the networks through which valuable knowledge is exchanged and re-combined (Audretsch and Feldman, 2004), stimulating relational proximity and preventing stagnation and lock-in (Boschma, 2005). Relational networks connecting individuals, groups, firms, industries with different knowledge bases are a critical precondition for knowledge generation and transfer. In this context innovation emerges from a cumulative process embedded in the social context and systematically affected by mechanisms of interactive learning, stimulating the exchange and re-combination of knowledge (Crescenzi, Gagliardi and Percoco, 2013).

The role of interactions and networks becomes fundamental to understand the generation and diffusion of innovation, so that it may be qualified as the emergent property of a system, rather than the product of individual actions (Antonelli and Scellato, 18/2011). In this context, the concept of Regional System of Innovation clarifies how the complex structure of localized interactions between private and institutional actors contributes to shape local innovative performance (Iammarino, 2005, Evangelista et al, 2002).

As also mentioned above, within the innovation system University is a key node. It represents a fundamental public actor impacting on the generation and diffusion of knowledge, over and beyond its contribution to the creation of new skills. The scientific knowledge supplied by universities and research centres, complementing the technical knowledge of private actors, is a crucial ingredient of the innovation process (Frenz and Letto-Gillies, 2009). By exploiting novel survey data on inventors, collected under the framework of the PICK ME project, Scandura (07/2013) shows that scientific and market knowledge sources are complementary for inventors' patenting performance and that the joint use of scientific and market knowledge has a higher impact than the separate use of each of the two. On top of that, recent findings by Antonelli and Fassio (01/2012) stress the heterogeneous capability of different disciplines (hard sciences, social sciences, humanities and medical sciences) to contribute to economic output.

The importance of the systemic approach to innovation and the relevance of the network dimension based on interactions between different actors, support the need of policy intervention to sustain cooperative relations between them. At the same time, the complementarity between different sources of knowledge and the heterogeneous social return of scientific research in different fields advocates a careful design of public policies.

Industrial Diversification and Multination Corporations

Globalization requires a clear rethinking of the industrial specialization of European regions (Antonelli, 04/2013). The transition toward knowledge intensive economies has been widely identified as the way out

from the current economic crisis. How this shift occurs is however not straightforward and different areas face different challenges.

As acknowledged by Pika and Saviotti (01/2013), three innovation-based processes contribute to economic development: growing productive efficiency, the emergence of new sectors and the increasing quality and differentiation of existing products. First order regions with strong path dependence in innovation activities should keep exploiting the Schumpeterian concept of creative destruction, favouring the emergence of new sectors and stimulating an increasing quality and differentiation of incumbent sectors (Pika and Saviotti, 13/2011). Second order regions, specialized in mature industries, should invest on the emergence of new, related, higher value added sectors. This implies breaking the path for which new innovators introduce new technology while old innovators rest stuck in old innovation (Colombelli and Quatraro, 03/2012). At the same time, this requires taking advantage from the persistence of innovation and the cumulative nature of technological change. Success breeds success, current innovation is explained by past innovation and, thus, synergies between old mature specialization profiles and upcoming opportunities should be exploited. In this context, the concept of technological relatedness becomes crucial. As acknowledged by Timmermans and Boschma (14/2012), economic entities like firms or industries have a higher scope for interactive learning when there is some degree, but not too much cognitive proximity. This implies that the process of regional diversification builds on the emergence of new industries technologically related with the existing one, from which competencies are recombined in new economic activities (Boschma, Minondo and Navarro, 13/2012). Finally, third order regions characterized by problems of structural decline face the most exceptional challenges. In a context of persistent disadvantages, weak industrial structures, and lack of innovative capabilities, the emergence of new, high value added industries is unlikely to happen without a significant policy intervention.

Within this context, processes of industrial diversification aimed at sustaining/ revitalizing/creating the relationship between knowledge generation, diffusion and management, rely substantially to the attraction of external actors, among which Multinational Corporations (MNEs). MNEs may bring new competencies, contributing to build up new capabilities. As key driver of connectivity they operate as carriers of resources, fostering the international knowledge connections on which more advanced technologies rely (McCann, 2008). At the same time MNEs, in their shift from asset exploiting to asset creating strategies (Cantwell and Mudambi, 2005), tend increasingly to tap into local competitive advantages. This tendency may reinforce the position of established centres of knowledge/leaders of the global economic landscape, but it also opens new opportunities for emergent actors coming from the fragmentation of the global value chain and the searching for new distinctive capabilities. Bearing in mind that geography is becoming increasingly important for MNEs and, in turn, MNEs are becoming progressively more important for economic geography (Iammarino and McCann, 2013), policy makers should focus on context-specific development strategies aimed at: boosting the creation of local distinctive capabilities through investments in human capital coupled by industrial and innovation measures enabling skilled individuals (at different levels of skills) to develop themselves and transfer their knowledge; stimulating local firms to build up novel competencies and exploit the systemic nature of innovation processes; favouring industrial diversification toward higher value added activities through initiatives of business support and network creation.

The dramatic fall in the Gross Domestic Products (GDP) for most of the countries in the developed world is creating the conditions for the upsurge of unemployment, industrial decline and social deprivation. The exceptional challenges accompanying the current situation require a novel approach calling for collaborative, crosscutting responses reaching out to business, individuals, universities, multinational enterprises and social actors. This implies adopting a systemic approach to innovation policies stimulating not only business innovation, but also social innovation as a process bringing together individuals and communities to address specific challenges.

Engaging the young

Youth unemployment is a current major issue of concern in Europe. Young people must become engaged in the society and they have to play their crucial role as carrier of new, fresh competencies and skills. Europe should invest on education and job training. At the same time it becomes necessary to create the conditions for the effective exploitation of these resources into labour markets, stimulating local firms to exploit distinctive skills building up those capabilities that are key to compete in the global economy.

Socializing innovation at local and global scale

Businesses innovate mainly for private returns while societies must innovate for social returns; coming out from the current crisis requires both!

Stimulating a systemic approach to innovation means qualifying innovation as the property of a system, rather than the product of individual actions. In turn this implies looking at the returns of innovation as a social outcome that benefits individuals, local and global firms and communities. Public policies should favour the creation of systems exploiting the possible recombination of complementary sources of knowledge and creating the incentives for cooperation and knowledge transfer.

Upgrading infrastructural facilities

Every major recession has been followed by radical changes to the industrial structure. The destruction of old, mature industries is a necessary condition for future growth, but the emergence of new industries has to be supported by new infrastructures, encouraging the creativity and innovation of all economic actors in the society. Several regions in Europe are still lacking of connectivity, novel hard and soft infrastructures would favour the attraction of new resources and the creation of new social models of knowledge circulation, stimulating the creation of networks and trusts.

Complementing private and public financial resources

Innovation is a risky activity and many private actors are unable or unwilling to invest on highly uncertain projects. This is particularly true for small and medium enterprises facing exceptional financial constraints. In a period of scarce resources the emergence of innovation outcomes requires the integration of public resources and private activities, carried out by large enterprises. This implies abandoning the standard approach to demand driven innovation policies as public support to cope with short term shocks and investing on effective long run strategies, aimed at building local distinctive capabilities, creating the incentives for large/multinational firms to increase their private return by tapping into local systems of innovative networks.

The PICK-ME research project will be aimed at undertaking following tasks:

- To develop taxonomy of policies to foster innovation, with a particular focus on demand-driven innovation initiatives.
- To develop new databases and elaborate new indicators for analyzing and assessing the impact of demand-driven innovation policies at different government levels;
- To analyse the influence that demand has on the introduction of technological innovations when and if the generation of knowledge can actually take place, both from a quantitative and a qualitative viewpoint;
- To investigate the interplay between demand-driven knowledge activities and the dynamics of both pure and pecuniary knowledge externalities, and how these affect local performances in Europe and the diffusion of knowledge;
- To assess the relationship between the evolution of demand and the dynamics of knowledge-base in knowledge intensive sectors, with a particular emphasis on development and the organization of innovative activities;
- To extract policy guidelines for public administrations practitioners in order to support them in the future design and implementation of innovation strategies at different levels;

These tasks will be pursued by implementing the following activities:

- Detailed modelisation of the impact of both direct and catalytic funding schemes on the rate and direction of innovation activities at the regional, national and European level;
- To develop a public database including detailed information about already implemented demand-oriented innovation policies so as to measure and monitor their influence on innovation activities;
- To develop a comprehensive database concerning knowledge indicators, like patents, publications, skilled labour force, suitable for advanced analyses in terms of research topics and technological fields at various levels of aggregation;
- To provide decision makers with policy recommendations in order to support them in the future design and implementation of regional, national and European demand-oriented innovation strategies. Specifically, best practices and scientific support to policy activities will be provided.
- To disseminate the policy implications to practitioners and policymakers at different government levels (local/regional/national/European), in order to provide them with tools to develop improved innovation policies in the future.

PROJECT IDENTITY

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FURTHER READING	Antonelli C. e F. Crespi, The "Matthew Effect" in R&D Public Subsidies: The Italian Evidence, <i>Technological Forecasting and Social Change</i> , 2013. Elsevier. Open Access at: http://hdl.handle.net/2318/848 Colombelli, A., Krafft, J. and Quatraro, F., High Growth Firms and Technological Knowledge: Do gazelles follow exploration or exploitation strategies?, <i>Industrial and Corporate Change</i> , 2013. Oxford, Oxford University Press. Open Access at: http://hdl.handle.net/2318/873 . Pyka, A and. Saviotti, P.P. The Co-Evolution of innovation, demand and growth, <i>Economics of Innovation and New Technology</i> , 2013. Open Access at: http://hdl.handle.net/2318/877