

Technological Change and the challenges for Regional Development: *building social capital in Less Favored Regions*

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Extended Abstract

In view of the current socio-economic context, in which innovation is a key driving force for the sustainable development, which challenges are facing technology-based development and cooperation, in a way to contribute for regional policies that stimulate localized learning, innovation and indigenous development within less favored regions, LFR's?

This broad question has motivated the analysis behind the present work, which considers specific case studies in Portugal, including the analysis of a number of industry-science relationships and data derived from the Community Innovation Survey. It is argued that value-based networks have the potential to make both public administration and markets more effective, which helps promoting learning trajectories for the inclusive development of society, but require effective public investments in intangible structures fostering competence building. The analysis builds on the concept of social capital, as a relational infrastructure for collective action, in a context much influenced by a dynamic of change and a necessary balance between the creation and diffusion of knowledge.

Background

While much attention has been devoted to information and communication technologies, a more fundamental change at the start of the new millennium is the increasing importance of innovation for economic prosperity and the emergence of a learning society. The analysis in this paper shows that innovation should be understood as a broad social and economic activity: it should transcend any specific technology, even if revolutionary, and should be tied to attitudes and behaviours oriented towards the exploitation of change by adding value.

We build on the idea of inclusive learning, which entails a process of shared prosperity across the globe following local specific conditions, and argue that it is crucial to understand the features of knowledge-induced growth in rich countries, as well as the challenges and opportunities for late-industrialized and less favoured regions. To achieve these objectives, we emphasize the relative importance of *infrastructures* and *incentives*, but considering the increasingly important role of *institutions* towards the development of social capital. This is because learning societies will increasingly rely on “distributed knowledge bases”, as a

systematically coherent set of knowledge, maintained across an economically and/or socially integrated set of agents and institutions.

We start by characterizing innovation in Portugal within the European context. To better understand this case study, we introduce the analysis of innovation over time and across space, inspired by the techno-economic paradigms approach. This leads us to conceptualise “learning” and the process of knowledge accumulation, as a framework to understand the new demands for being innovative. We conclude by suggesting elements for innovation policies for Portugal, arguing for the need to promote *systems of innovation and competence building* based on learning and knowledge networks.

This conclusion is based on the broad innovation framework of Smith (2001), who suggests that the knowledge bases of mature and traditional industries are cognitively deep and complex, as well as institutionally distributed. Thus, rather than relying exclusively on “high-technology” sectors, there is a need to integrate policies relating to education, science and technology, and social and economic development, so that there is a diversification of actions to support the creation and diffusion of distributed knowledge bases. This is particularly applicable to catching-up countries and regions, with the practical consequence that growth will not be based just on the creation of new sectors, but on the internal transformation of sectors which already exist, namely by exploiting their distributed knowledge bases through adequate incentives and institutions.

The necessary conditions for knowledge and learning

To frame the empirical evidence on the bases of a unified conceptual framework of analysis, we consider the incentive structure of “the market” which is determined by competition. Competition in product and factor markets provides signals to economic actors about the potential returns among alternative options, thus determining their investment patterns. Endogenous growth theories, because they are based on the existence of dynamic externalities and imperfect markets, require a careful understanding of the structure of competition. On the one hand, because of the nature of knowledge, investment of private agents often fails to acknowledge spillover effects, or may not be able to anticipate the full extent to which there is further learning potential in a new technology. On the other hand, incentives to invest in new knowledge depend on the existence of some degree of monopolistic rents. These rents may not exist in latecomer countries exposed to international competition, if they are solely adopting foreign technology.

As a result, private investment levels (which result from the incentive structure provided by the market to economic agents) in activities with learning or spillover potential tend to be lower than the social optimum, and may even generate what is known in the literature as “low-level equilibrium traps”. This happens when private but not social returns from productivity-enhancing investments—i.e., accounting for spillovers—are below those of nonproductivity-enhancing investments, causing stagnation in growth. This situation may be overcome by inducing decision-makers to include the spillover effects in their accounting processes, or by creating monopolistic markets that generate above-normal returns.

In principle, these shortcomings of the market mechanism call for some sort of government intervention - a second major factor affecting the firms’ incentive structures. Governments are concerned with making sure that societal costs and benefits are endogenized in the decisions of

private firms. In a learning environment this may mean subsidizing research activities, investing in education, protecting infant industries, promoting exports, or even disciplining firms. But government intervention must balance the potential distortions on competition that may come from intervention with the needs to “correct market failures”: artificial restraints on competition can also divert profits to activities other than building technological capabilities. In relatively closed regimes with strong pressure to substitute imported for local goods, there may be little incentive for firms to improve, since they can capture the local market regardless of their own productivity.

In the neoclassical view, infrastructure is related with the existing amount of labor, capital, and natural resources. The new theories bring to stage other important factor inputs, in particular human capital, and R&D expertise embodied in firms, universities, and laboratories. Thus, infrastructure will encompass, in addition to labor and capital, what we call technology infrastructure, or technostructure. Considering a distinction between labor and capital on one hand, and technostructure on the other, enables a separate analysis of the roles played by each of these aspects in the development path of a particular industry or region.

The examples discussed in the paper show how the interaction between sets of incentives and the technostructure of a particular region, industry, or nation fosters and hampers the patterns of knowledge accumulation and the development process. Nevertheless, it will also be clear that, although incentives and infrastructure greatly inform our understanding of the behavior of firms, government policies, and industrial trajectories, they do not tell the whole story about the differences across countries and regions. That is because both incentives and infrastructure do not operate in a vacuum, being shaped by and shaping the particular context where they operate. In other words, for a market system to function well, the country or region must have embedded a set of social capabilities that allow it to function according to the theoretical principles of allocative efficiency and Pareto optimum social welfare.

Critical Aspects

If one considers innovation as a broad social and economic activity, two key questions need to be considered. First, the understanding of conditions for integrated learning processes. This has led Conceição, Heitor and Lundvall (2003) to build on Lundvall and Johnson’s learning economy and to discuss the learning society in terms of innovation and competence building with social cohesion. They view innovation as the key process that characterizes a knowledge economy understood from a dynamic perspective, while competence is the foundation from which innovation emerges, and which allows many innovations to be enjoyed. In other words, it contributes both to the “generation” of innovations (on the supply side of the knowledge economy) and to the “utilization” of innovations (on the consumptions side of the knowledge economy). Conceptually, the foundations for the relationship between learning and economic growth have been addressed in the recent literature, with learning being reflected in improved skills in people and in the generation, diffusion, and usage of new ideas.

Further, the ability to learn seems to be the main driver of long-term growth, but learning can occur at different levels. Individual people, firms and organizations, and countries all are dependent of learning for development. There are also different ways through which people, firms, and countries can learn. Learning can be an unintended consequence of experience and augmentation of scale, as formalized at the firm and then country level by Arrow. On the

contrary, formalized and intentional learning methods such as education, training or R&D is often the result of an utility maximization rational decision from the point of view of the firms. The new growth theories attempt to formalize the way in which learning mechanisms can impact on economic growth.

Second, the relevance of considering distributed knowledge bases across economically and/or socially integrated set of agents and institutions, which leads us to the concept of social capital. In the broadest sense, social capital is associated with the “social capabilities” that allow a country or region to move forward in the process of development. In a more sophisticated treatment, Coleman states that social capital is “a variety of different entities, with two elements in common: they all consist of some aspect of social infrastructure, and they facilitate certain actions of actors—whether personal or corporate actors—within the structure.”

None of the case studies analyzed provides single and definitive answers to the problem of achieving learning societies. But it is our aim to argue that social capital is key, and that infrastructure (in the broad sense described above) and institutions are the elements out of which social capital is born. Different types of institutions can be effective, as long as they enable collective learning and collective innovation. As in every situation where institutions are important, history matters. Path dependence and increasing returns lead to self-reinforcing cycles, whereby events, often sporadic and serendipitous, define current patterns of development. But the good news is that if we understand the dynamics of institutional change and evolution (that is, of “collective learning”), we can also create conditions for future development.

The regional question

The problem of regions as platforms of policy articulation is not simple, particularly when it involves the adaptation of competition or innovation policies to regional economic development concerns by societies and economies of divergent interests. We set this in order to define the ‘regional question’ through related issues of *scale*, *complexity* and *reflexivity*. The ‘regional question’ emerges from current *regulationist* perspectives on the problem of regions, which argue that regions are often analyzed unreflectively (‘reflexive capitalism’) as isolated or pre-given and politically neutral. The *regulationist* emphasis holds that regions are historically constructed, culturally contested and politically charged. We find that the ‘regional question’ thereby contributes to the renewed focus of Regional Innovation Systems, RIS, by embracing the growing attention to skilled labor supply as central to this debate, rather than the mere positive externality of agglomeration economies that it is often attributed. We look to wage relations and science-industry labor mobility, market (financial/monetary) and labor regulation, forms of competition, State and governance and international regimes (e.g., EU, WTO) for this renewed orientation. In drawing the regulationist discourse closer to the, often times orthodox, literature on RIS will enrich its fundamental concepts of institutional ‘learning’ and ‘knowledge flows’, particularly where it concerns LFRs. We aim to shed light on the call for new indicators that will allow one to measure the long-term changes in regional innovation capacity as opposed to the “linear” input and output indicators such as GDP.

Main Recent Publications

- P. Conceição, M. V. Heitor, B.-A. Lundvall (eds.), (2003), *Innovation, Competence Building, and Social Cohesion in Europe- Towards a Learning Society*, London: Edward Elgar.
- P. Conceição, D. Gibson, M. V. Heitor, G. Sirilli, F. Veloso (eds.), (2002), *Knowledge for Inclusive Development*. Westport and London: Quorum Books.
- P. Conceição, M. V. Heitor and F. Veloso (2003, forthcoming), “Infrastructures, Incentives and Institutions: fostering distributed knowledge bases for the Learning Society, Technological Forecasting and Social Change.
- Conceição, P. and Heitor, M. (2003). “Systems of innovation and competence building across diversity: Learning from the Portuguese path in the European context,” in Larisa V. Shavinina (Ed.). In “*International Handbook on Innovation*”, Elsevier
- P. Conceição, M. V. Heitor (2002), “Knowledge Interaction Towards Inclusive Learning - Promoting Systems of Innovation and Competence Building”, *Technological Forecasting and Social Change*, 69(7), pp.641-651.