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Promoting bottom-up industrial and innovation policy in developing countries

This article draws on our experience in promoting innovation systems in developing countries. An innovation system goes beyond the innovative behaviour of individuals and enterprises, and looks at the way that knowledge is generated, absorbed and transformed into desired outputs in a specific context through the interaction and dynamic of a network of public and private institutions. From a territorial perspective, the interaction between enterprises, institutions and the influence on specific kinds of knowledge and technological capability on the region's character and strategic options are important. At a local level, there is little difference between an innovation systems approach and industrial policy. Both approaches seek to stimulate growth, improved



competitiveness and more sustainable use of local resources. While industrial improvement interventions typically aim at firms, innovation systems focus on the interaction of different elements in a broader system. Both require a search and exploration approach to what works and what is possible.

The theory of innovation systems was developed based on post hoc case studies of First World economies. The reality in developing countries is different, and thus the

approach must be adapted to work there. For instance, in developing countries:

- There is often a general weakness and instability in the economic environment, for instance created by a weak social market system that is incomplete or non-existing, poor coordination between differing innovation, industry and sectoral policies, a dominance of top-down vs. bottom-up policies.
- The institutional frameworks are different, for instance there is a low level of relevant knowledge



organisations and a lack of diverse knowledge abilities, a disorganised private sector with narrow interests, fragmented support mechanisms in the form of formal institutions and many network failures.

- The business conditions are challenging, for instance there is an absence of innovation-based vs. price-based competition; there are many persistent market failures, and often there is a high demand for low-cost, less sophisticated products.
- The sophistication and level of interaction of the supply chain to the end user is weak and often not present in a developing country

This means that in a developing country context, it is not sufficient to take a check list approach to see whether certain preconditions, institutions and behaviours exist or are present. It can be assumed that only parts of the system exist, but that the elements are isolated, incomplete and overburdened. Rather, the approach should be to assess how the different parts of the system interact, respond to challenges faced by the private sector and adapt based on global technological practice. In other words, ways to improve the dynamics



and interaction within the system must be found. This can often be achieved by looking at who is innovating and how different actors use, create and diffuse new knowledge, and how different actors exchange ideas, information, knowledge and technology.

While national innovation and industrial policy typically selects sectors and industries based on their potential to create jobs, increase exports or attract investment, a bottom-up approach is less concerned with selection based on data and statistical analysis. Rather, the focus should be on how knowledge is accumulated, applied, disseminated and transformed in the region, and on the dynamics and interaction between different organisations (public and private) in the region.

An important starting point that is part of the ongoing process of improving an innovation system is to understand which enterprises, organisations and even individuals are using knowledge in an innovative way, or which stakeholders are actively accumulating and combining knowledge from local or external sources. Connecting with these actors and also networking the generators and users of knowledge are important.



In a regional approach, tacit knowledge is very important. Tacit knowledge is hard to capture and transfer, and exists because individuals and organisations are shaped by common practice, cultures and other socioeconomic factors. Ways to improve the exposure of individuals and enterprises to new knowledge (new to the context) and new technologies must be found. The absorptive capacity of individuals and enterprises must be developed and stimulated. This can, for instance, be achieved by assisting enterprises to recruit graduates with different kinds of specialisation than the norm in the enterprise, or by fostering closer cooperation between academics and enterprises. While education and skills development is another important way to increase absorptive capacity, it often takes a long time. Creating other ways for individuals and enterprises to experiment with new kinds of knowledge and technology are important, and costs of these technologies are dropping fast. Examples include establishing fabrication laboratories or rapid design and prototyping centres to reduce the costs of trying out new ideas, and making sure that the youth, emerging entrepreneurs, graduates, researchers, enthusiasts and existing enterprises have access to these facilities.





Identifying the disseminators of knowledge is an ongoing process. Knowledge flows do not always follow formal channels (like from universities to businesses). Often important knowledge flows through standards, specifications from buyers, from equipment suppliers and even unintentionally from service providers such as couriers, computer technicians, etc.

However, in a regional approach, the focus is not only on how knowledge is used locally. Attention must be given to those who regularly access knowledge from outside the region. These actors connect the local with the regional or the global markets. They could include exporters (they know what markets outside of the region demand), multinationals (they know something about process combinations and market performance criteria) or academia (they are connected to international knowledge communities).

Lastly, in a territorial approach, unique problems, or resource drains in a region mobilise actors and develop not only unique local solutions, but creative partnerships and new dynamics. However, social pressure from the region can also distract from the pursuit of development opportunities due to political reasons or a shortage of resources. When positive results become visible, more

actors can be mobilised (crowd in) and unlock more resources. Here it is important to identify individuals or organisations that know something about the unique problems in the region. These could be buyers, supply chain development officials, public officials, engineers or even politicians. In our experience, these problems are often related to public infrastructure and can be used to foster new forms of interaction between technical experts in the public, private and academic sectors.

In conclusion, a bottom-up approach to innovation systems and industrial policy should consist of an exploration of knowledge users and knowledge carriers. It is important to find ways to increase the absorptive capacity of industries and institutions. Instead of seeing behavioural patterns in firms as problems to be solved, attention should be given to the broader system that allows firms and individuals to solve problems and experiment with different solutions. Using local problems or resource constraints could provide a starting point for experimentation and confidence building.

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