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MED BRIEF

Forward Thinking for the EuroMediterranean region

October 2018 **Med Brief No 13**

The success pillars of a national innovation system in the Maghreb countries*

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Keywords *: innovation, regulation, financing, education, entrepreneurship*

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1. Abstract

The perspective of economic growth supported by innovation activity has now proved ineffective for Maghreb countries (Morocco, Algeria and Tunisia). Our analysis under the angle of the national innovation system emphasizes the main causes such as structural weaknesses and lack of time-consuming coordination among the actors of innovation. Our recommendations are based on proposing an appropriate systemic model of innovation that takes into account the specificities of these three countries. The pillars of success of this model are first "Structural": Setting up an effective «support structures» for innovation and entrepreneurship, offering appropriate tools and complementary services; Second, "Coordination": Coordinated coherent interactions between public and private actors of innovation in the development of new production methods and the dissemination of knowledge; And third, "Governance": The rehabilitation of the role of the Government in education, in ensuring and overall coherence of the actor's actions (regulation protecting innovation, financing of innovation, supporting scientific research activities and an education system favoring the development of a new generation of innovative entrepreneurs).

2. Sources of NIS dysfunction in the Maghreb countries

The systemic approach to innovation (Freeman, 1987; Lundvall, 2005) emphasizes the role of interactions among different categories of actors and institutions in an innovation process that promotes economic growth. This innovation approach is an essential element in the analysis of a national innovation system in a context of increasingly globalized economies. NISs have been especially recognized in response to the Washington Consensus[1] and were thus linked to public policy to explain how interactions among a range of institutions contribute to technological change and the emergence and diffusion of new innovations and thus to the performance of a country.

The actors that structure the NIS are (1) governments and related organizations that support innovation through regulation, standard setting, public-private partnerships, and funding for basic research; (2) sectors and industries, including

firms that generate commercial innovations through experimentation, R&D, and product improvement; (3) universities that do basic research and train a technical and scientific workforce; and (4) other public and private organizations engaged in directed education activities (Lundvall, 2005; Patel & Pavitt, 1994). Interactions among these actors are promoted through proximity structures, resources, and incentive mechanisms and institutions that can support innovation activities. Finally, the government, through its structural policy, must ensure the establishment of a global framework of incentive actions, as well as adequate sources of funding.

The application of this approach has been very uncertain and even less effective in the case of developing countries. Research focusing on the NIS of developing countries converges on an important point: that there is a lack of a national absorption capacity as well as a structural fragility of their national innovation systems (Ben Slimane, Zouikri, 2016; Djeflat, 2011).

The countries of the Maghreb—Morocco, Algeria, and Tunisia— certainly have different structural development models, but they share not only a common culture but also common geopolitical specificities and close ties with Europe, having strengthened the links and the politico-economic dependencies between them.

In the context of developing an innovation-based growth policy, these countries have had to simultaneously implement programs that are supported and sometimes imposed on by international institutions. The Maghreb countries were among the first signatories of the Barcelona Agreement (1995). Tunisia and Morocco had undertaken economic reforms, built a process of trade liberalization, and set up a financial incentive scheme. The countries have also begun a process of privatization, which has accelerated significantly since 1998 for Tunisia, followed by Morocco and Algeria in 1999, with the introduction of a program to upgrade enterprises. **How can these countries profit from such actions in the absence of a structural framework, learning opportunities, and clear and appropriate public policies?** Indeed, growth based centrally on the accumulation of capital must be combined with technical progress to improve not only the quantity of capital but also its quality. However, the growth of the Maghreb countries has been fundamentally based on the accumulation of physical capital related to foreign direct investment FDI activities. Privatization reforms in Morocco and Tunisia have helped to achieve growth focused only on the market and the inflow of foreign capital.

The institutional structure of these countries has also been disorganized and inadequate with regard to innovation, and even in the case institutional actors are created, a lack of coordination of the actors' actions affects the effectiveness of the system as a whole. This insufficient coordination also reveals a failure in structural investments, specifically investment in R&D, innovation, and human resources and equipment. The existing mechanisms are not «engines of innovation,» and classify Morocco and Tunisia as being in stage 2 in their development (Table 1).

Table 1: Classification by each stage of development

Stage 1: Factor-driven	Transition from stage 1 to stage 2	Stage 2: Efficiency-driven	Transition from stage 2 to stage 3	Stage 3: Innovation driven
	Algeria	Morocco		
		Tunisia		

Source: The Global Competitiveness Report (2017–2018) [2]

This lack of innovation development is especially observable in the case of Algeria, where investments in infrastructure do not allow development in favour of innovation. These include, for example, investments in education undertaken since 1990, which has not been accompanied by a simultaneous investment in access and use of ICT, investment in R&D, or collaborations between the educational and industrial spheres. This has, therefore, reduced the value of improvement in the educational industry, reflecting a weakness of interactions

between industrial players and the educational sphere, thus curbing the development of innovative activities. It may be noted that the export of high-tech manufactured products is still negligible in these countries—Algeria 1%, Tunisia 6%, and Morocco 4%[3] —and investment in innovation remains less than 5% of the turnover of companies (World Bank, 2014). Yet several institutions dedicated to innovation exist. But the lack of follow-up, long-term strategy, and coordination of programs have blocked the process of creation and diffusion of innovation in a dynamic perspective and thus limits competitiveness.

3. The development of an adapted NIS: Axes of action

Today, the challenge for the Maghreb countries is to establish an organized innovation policy, coordinated and sustainable. Achieving this goal requires appropriate action. To this end, we propose a model for the development of an NIS based on the management of resources and local capacities in which governance plays a central role.

The aim is twofold: first, the valorization of traditional knowledge and technological know-how and then the building of innovation capacities by improving the scientific, technical, and managerial learning capacities of all actors of innovation.

To this end, three adapted lines of action are proposed: structural, coordination, and governance. Their interaction in a sustainable perspective would enable a global coherence of actions for more-effective innovation systems in these countries.

The structural axis is based on the definition of the key components of the system as well as the mission actions to be achieved. The first step is to establish support and innovation incentive structures for businesses with adequate tools, including common projects with multinational companies (open innovation) as well as strengthening alliances to facilitate transfer. The international trade regime will allow for and facilitate this transfer. The presence of international organizations in Southern countries represents an interesting option to financially support local SMEs in an indirect way. Meanwhile, this axis must also take into account the establishment of an intellectual property regime that organizes the innovation environment and protects local innovations as well as foreign investors. In addition, investment in the education system aims to develop learning as well as the culture of innovation and creativity. In a more dynamic perspective, it would promote a better sharing of know-how and a reinforcement of skills and innovation capacities.

The coordination axis is dynamic. Its mission is to promote and facilitate the exchange among the different components of the system, such as supporting knowledge transfer, setting up collaborative projects, financing innovative projects, and evaluating the actions of different components. Indeed, the lack of performance recorded in Southern countries can be explained by a chronic lack of coordination of the actions of the various players in the system, thus preventing the effective valorization of the efforts of innovation actors. Therefore, even if the transfer and matching of facilitating institutions exist, they are not efficient and their mobilization is only punctual in time.

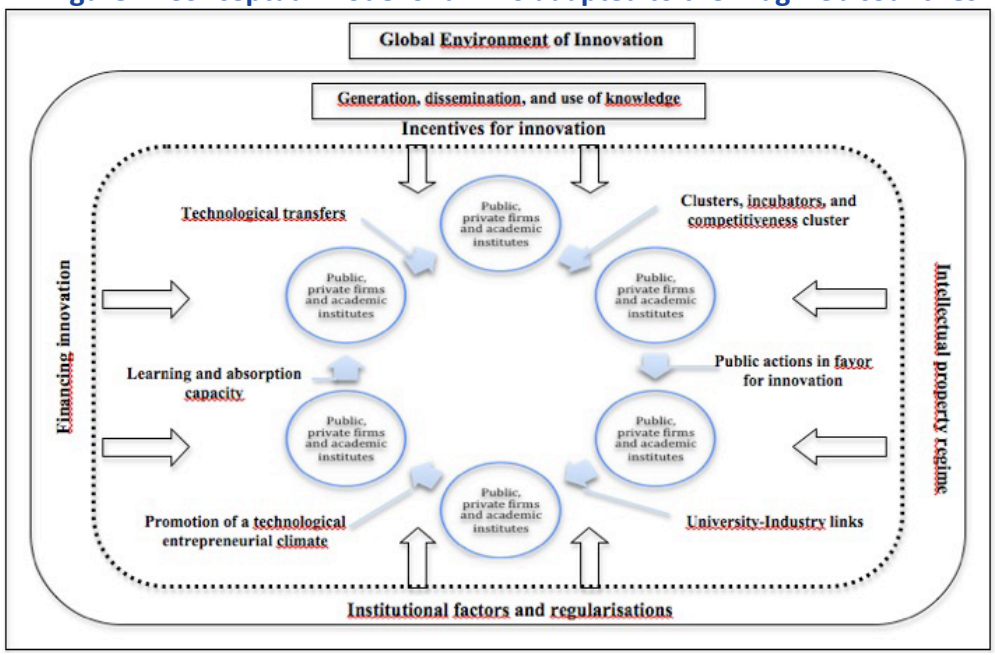
Note for example the facilitation of cooperation in the education system: this culture is very new in the Maghreb countries. The education system has remained static, and governments have not initiated strategies to innovate in this area by promoting university exchange programs, internships abroad, and collaborative research programs with companies. The only existing examples come from isolated initiatives.

The governance axis proposes to rehabilitate the role of the government in education and in the coordination among the actors (legal framework, institutional coherence). Indeed, it is the government that promul-

gates legislation, which establishes incentive mechanisms that define the national innovation policy or strategy, and has it applied by its representative institutions in the system of innovations. It is also the government that allocates public funding for innovation and facilitates access to businesses through incentive mechanisms for financing innovation. The government defines the education policy supporting innovation. Its intervention, when it is part of a long-term national strategy, would ensure the continuity of actions and put in place measures to monitor the effectiveness of actions. These axes begins to be considered in the literature of developing countries reflecting the potential growth drivers of these economies.

The combination of these three complementary lines of action would contribute to reinforcing learning capacity with a view to developing a capacity for innovation. These concepts can be represented in a preliminary conceptual model (Figure 1), which summarizes the axes to be prioritized in an adapted NIS and takes into account the specificities of the Maghreb countries in terms of existing links and partnerships with the euro zones and international institutions (WTO, EU).

Figure 1: Conceptual model of an NIS adapted to the Maghreb countries



Source: Authors; adapted from Parkey (2012).

4. Conclusion

This research attempts to initiate debates on the sources of failures of the NIS in the Maghreb countries and also to propose operational and applicable lines of action. This model is based on interaction among several actors and on the generalization, dissemination, and use of knowledge. The aim is to understand the real interaction among these actors to promote innovation, including identifying the role of technological infrastructure and public actions. This model integrates three dimensions, namely, structural, coordination, and governance. In addition, this work has focused on the public policy issue of correcting interactive processes given previous failures. In this sense, intervention of the state through policies makes it a key player in the NIS under construction in the Maghreb countries. This intervention is still necessary to create a favourable climate for the development of the NIS in terms of incentives for innovation structures.

It is not a question of reinventing the existing system but rather of organizing the actions and setting up the structures as well as the mechanisms of incentive for innovation by ensuring a follow-up and support within the framework of a national strategy in the long term. These countries must direct research and development

efforts toward product adaptation and thus foster technological learning. Relatively low intellectual property rights can also be put in place to help domestic firms more easily adopt and modify imported foreign goods and technology. FDIs and multinationals have been identified as key mechanisms in this strategy to transfer know-how and industrial technology between countries. With the right infrastructure and incentives, countries can make better use of these mechanisms.

While drawing inspiration from the conceptual model proposed in this study, the Maghreb countries should give priority to identifying the criteria for intervention of innovation policies that favour sustainable projects. This effort also implies linking a sectoral policy to an industrial development policy. The Maghreb countries must indeed break with the fuzzy development paths that have evolved from trends and crises. Another factor to be taken into account is the strengthening of cooperation among the Maghreb countries.

Based on our analysis of this research, we can make suggestions to improve the situation in the Maghreb countries. First, there is a need for increased coordination among existing stakeholders at the national level. Second, an institutional framework should be put in place, which will help the Maghreb countries foster a climate of innovation. Third, we suggest the establishment of a mechanism to reinforce innovation learning, especially for Maghreb companies.

** This brief is issue from a research that you can check with this link: https://www.cairn.info/revue-innovations-2017-2-p-105.htm*

Notes

[1] https://piie.com/publications/papers/williamson0204.pdf
[2] https://www.weforum.org/reports/the-global-competitiveness-report-2017-2018
[3] https://data.worldbank.org/indicator/TX.VAL.TECH.MF.ZS

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The policy brief has been produced with the financial assistance of the European Union within the context of the FEMISE program. The contents of this document are the sole responsibility of the authors and can under no circumstances be regarded as reflecting the position of the European Union.