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Tensions and challenges for research in middle and low income countries: A viewpoint

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Introduction

Currently, there is no doubt about the role of knowledge as a crucial factor for both economic and social development. However, the contexts for both its generation and utilisation in Low and Middle Income Countries (LMIC) differ from those in High Income Countries (HIC). Though the dynamics of knowledge production and utilisation has changed worldwide during the last decades (Gibbons 1994), the economic and social gaps between HIC and LMIC pose a major question about the particular circumstances that less developed nations must face to produce and use knowledge to foster development.

Roughly speaking, the gap in incomes and standards of living between HIC and LMIC is at least partly explained by the different national capacities to use knowledge as a factor for development. Moreover, according to Arocena and Senker (2003) the prevailing trends of technological and economic change nourish the gap between the centres of the knowledge-based and innovation-driven global economy and the other regions: The centres are the old and new advanced countries (the 'North') where most R&D is carried out and applied, where economic power is concentrated, and where the human development index (HDI) is higher; the other countries (the 'South') include highly differentiated regions, with high, middle, or low HDI. Most of these countries suffer from economic dependency and from their inability to use advanced education, science, and technology as engines for both economic and social development. Furthermore, many LMIC still confront dramatic problems for the satisfaction of basic needs such as access to food and water, primary education and healthcare, as well as democracy and social justice.

The purpose of this paper is to express a viewpoint about some of the tensions that many LMIC must overcome, and the challenges they must assume, to foster knowledge-based development in their societies. Due to the heterogeneity of this group of countries, these elements can be present to a greater or lesser extent in some nations than in others. However, the overall reflections expressed in this article apply to any of them. Since in most LMIC Higher Education Institutions (HEIs) are the main knowledge providers, I will refer to some challenges related to them.

Tension 1: Knowledge-based development vs Assistance-based development; Research policies vs research politics

Perhaps one of the questions that politicians and decision-makers in LMIC set forth when it comes to discuss the support to science and technology is *'Why should we invest resources in research?'* Though the answer to the question can seem self-evident, it is clear that the aforementioned socioeconomic contexts of LMIC demand the solution of urgent problems that compete with research for resources. However, the issues of making decisions about, let us say, the allocation of funds for water sanitation or research on biological pest control instead, is not related only to their availability, but to

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the development model that the country follows and the priorities, tacitly or explicitly set by the government. Besides this, knowledge generation for development is a process that generates results in a medium or long term. Thus, it is not 'politically profitable'. It also demands a national research capacity and infrastructure. This must be reflected in terms of public policies, investment of financial resources and the increase of the national human capital.

From the point of view of a researcher, one of the crucial issues that can generate tensions, and headaches, is the local position towards knowledge and its value, which in turn, generates a model of research governance. In LMIC, this philosophy can vary from highly supportive and enthusiastic S&T policies to relatively high indifference towards research, all intermediate possibilities included. The main actors here are governments (national and local), universities (in most cases, the main knowledge providers), the business sector and the civil society.

The type of governance in research represents one of the fundamental factors that determine other important aspects of research management, e.g. organisation of the research agenda, investment in S&T activities, human capital for research, ICT access, exchange with stakeholders, networking, etc. What is interesting is the outcome of the type of research governance. In countries where a result-based approach of research governance has been adopted, there are clear and effective research policies, an important investment in S&T, a retention, and even increase, of its research human capital, among other things. This adds to the generation of knowledge that, under appropriate conditions can generate a thrust to both economic and social development.

Within the research governance systems adopted in LMIC, an important issue relates to how genuinely S&T policies reflect a national consensus and how this agreement generates a truly national research agenda. In some countries, these policies and agendas are an adaptation of the same instruments that have been produced in more developed settings. While there is nothing wrong in learning from others' experiences and do some 'benchmarking', this must be approached as part of the inputs that can generate debate and discussions among stakeholders. A first approach to the phenomenon of legitimacy of governance points toward an association between rightful S&T policies and research development – the more genuine S&T policies are, the more effective research development is. The opposite is also true. This can explain, at least in part, the failure of S&T policies in many LMIC.

A similar phenomenon has taken place when it comes to the utilisation of knowledge. Many LMIC have focused its efforts in economic development by means of using relevant knowledge. In some cases, this process has been led by a national policy towards 'import substitution' (e.g. Mexico and Argentina in Latin America), in others, this has been part of an industrialisation programme (e.g. Malaysia). Other countries have opted, consciously or not, for neglecting local knowledge and use the externally generated one. Finally, some countries adopt a *'laissez-faire'* attitude towards knowledge utilisation in their developmental strategies. The tension arises in countries where the knowledge production capacities, or the absorptive capabilities for its utilisation, are precarious. In those countries a series of vicious cycles establish themselves – low economic development leads to poor investment in knowledge utilisation and generation, which, in turn, deepens the low economic development and so forth.

In many cases, governments in LMIC have tried to break the cycle through the creation of 'National Innovation Systems' (NIS). This is an *'ex-post'* concept, i.e. a concept built upon empirical studies that show similar patterns, generated from the experience of HIC (Lundvall 1992; Nelson 1993). It entails a complex structure of actors and their relationships. It also demands a capacity for knowledge generation, flow and utilisation. When this capacity is weak, which is the case of many LMIC, so are the actors and their relations tend to be more virtual than real (Arocena and Sutz 2005). This leads to isolation and tensions between what is expected from the elements of NIS and its overall performance. The important lesson here is about the awareness of national particularities and the need for developing indigenous research capabilities that will address such characteristics of the local setting.

Another strategy for breaking the aforementioned cycle has been to support the national capacity for knowledge generation. In LMIC this has meant, mainly, research capacity building in HEIs and governmental research organisations. Though the level of success, measured in terms of human resources, scientific production and patents can be high, it is now recognised that knowledge alone may be necessary, but not sufficient to ensure competitiveness and economic growth (Audretsch and Keilbach 2008). There is a need to create conditions for knowledge utilisation in production processes.

The creation of both consensual and regulatory instruments (policies and laws on science and technology, research agendas) is an urgent task for the alignment of efforts towards national development. Moreover, any national objective related to the utilisation of technology for the improvement of the country's economic performance demand at least a basic organisation of the national scientific and technological capacity. Research agendas, in particular, are important for the arrangement of both internal and external forces, relevant for research. This includes the role of international organisations and agencies that support research development.

Autonomy vs accountability: The need for a new social contract

When it comes to the definition of national research agendas, a tension emerges between the relative 'monopoly' that higher education institutions have maintained on research in LMIC and the process of 'socialisation' of science. For decades, HEIs have told the society what to do; now societies tell HEIs what they expect from them and what should be in their agenda (Nowotny, Scott et al. 2001). This is one of the major tensions, perhaps, that symbolises modern times. On the one hand, the existence of HEI has been characterised by academic autonomy, which, in practical terms, can be translated as the right to decide what to teach and research. On the other, this autonomy faces limits that are determined by a more demanding society. Here there is an interesting trend – the more educated and democratic the society, the more demanding it can be towards HEIs. Though in underdeveloped countries universities are considered institutions devoted strictly to teaching, in other LMIC universities are starting to play a more decisive role as knowledge producers.

At present, it is difficult to identify a single type of contract between universities in LMIC and the larger societies. National laws for higher education define the main tasks of universities and, in principle, all traditional university functions are mentioned in it. The problem is that, in many cases, either teaching, research, or both, but not development, are defined as the *social functions* of higher education institutions. Thus,

teaching and research become goals by themselves, instead of means for achieving a higher purpose. There is a certain need to renovate that contract and focus the attention of universities on national development. However, to focus a new contract strictly on some aspects of university duties would be a mistake. The aim of the contract must be to ensure the comprehensive contribution of HEIs to national development.

The main contradiction that must be solved through a new social contract is the following one: Knowledge is a crucial factor for economic and social development, however the only institutions that can generate such knowledge (universities) are not meaningful actors in the process of knowledge generation. They claim that governmental funds are not enough to carry out relevant research. However if the economy of the country does not improve, funds will be lesser than now in the near future. A definitive action is needed from governments to break this situation.

Universities are too bottom-heavy for evolving into more meaningful actors of development overnight. There are, however, three actions the government should consider to incentive the evolution of HEIs: 1. To define a new social contract between HEIs and the rest of society through an inclusive dialogue between all stakeholders (i.e. government, business sector, civil society and universities) that will lead to the reform of the current law of autonomy of HEIs and the implementation of a National Policy for HE. Both instruments shall be harmonised with their equivalents in science and technology and must include the main directions that will help to define the indicators to monitor and evaluate the performance of HEIs in LMIC. Will this mean the end of university autonomy? By no means. This will be the opportunity for executing the autonomy in a way that will serve a higher purpose – national development.

The lack of a solid national research and innovation capacity in an era of economic globalisation can be interpreted as a shortfall for many LMICs. However, this can also represent an opportunity for universities to become crucial actors for innovation and economic development. While in the industrialised world, the process of downsizing of firms to core competencies was determinant for the increasing role of universities as providers of innovations, in LMIC, the lack of this evolutionary process, while seriously affected the national knowledge infrastructure, can also be capitalised. Instead of debating about the research focus (basic vs applied), universities can elude what, in my opinion, is an unnecessary intellectual conflict by adopting a paradigm more similar to the proposed in the 'Pasteur's Quadrant', where the advance of knowledge is coupled with the solution of concrete problems, especially in the field of technological innovation (Stokes 1997).

The challenge of research capacity building relates not only to governments. It relates also to universities, the business sector and the civil society.

1. International cooperation for research capacity building has contributed to the creation of a national capacity for knowledge production, however, nation states have not assumed such a responsibility.
2. National research agendas, their importance in the alignment of both internal and external forces.
3. Brain drain + low rates of PhD training. A consequence of the paucity of public policies on S+T+i
4. The lack of national systems for research
5. Challenges: organisational capital, information capital, human capital
6. performance: from bibliometrics to development
7. Research management model
8. Fragmentation and isolation
9. Economic performance has been an important motivator to increase GERD
10. There is a gradient of utilisation of knowledge for economic development
11. the inclusion of S&T in governmental plans does not necessarily imply an increase in the GERD.

The scarce allocation of resources for knowledge generation in LMIC is a symbol of one of the main tensions that arises at present between research

Although a relation of co-operation between government and universities can sound idealistic, it is the basis of different models aimed at fostering economic development, e.g. the 'Triple Helix' model (Etzkowitz and Leydesdorff 2000), or the 'clusters' model (Madgett, Belanger et al. 2005)

while in the industrialized world, higher education entrepreneurship is associated with knowledge production for economic development ('Mode 2'), entrepreneurial universities in the context of developing countries may just be finding their way to the academic, disciplinary mode of research (Bernasconi 2005).

The new academic identity

There are different views on the 'new' identity of HEIs in a knowledge economy. Some authors, for instance, consider, among other things, intellectual property as part of the 'seeds carried within the development of academic research capacities' (Etzkowitz and Leydesdorff 2001). This is an example of how, the new roles of HEIs can easily lead to realms that have been traditionally located in the business sector. Intellectual property is more a market-like behaviour. Traditionally, universities have not been actors that aim at intellectual property. This is a recent conduct, part of what Slaughter and Leslie call 'academic capitalism' (Slaughter and Leslie 2001).

'The change in emphasis from a sole concentration on the production and dissemination of knowledge to technology transfer and the formation of firms places the university in a new alignment with the productive sector.' How does this new task affect the others (teaching and research)? How can we avoid negative effects and potentiate positive

ones? Is it possible to achieve a balance between tasks? The research capacity is still incipient (just count the amount of publications and patents we produce per year). So, the task for transforming universities into relevant actors for economic development (not only growth) is manifold: first, it is needed to create a real knowledge-producing capacity, second, we need to incorporate applied research and the generation of a potential for innovation as part of the university agenda, third, we must ensure the incorporation of this task as a natural scenario for knowledge production and dissemination. By this I mean that both researchers and students must become learners within this scenario.

Universities can not become sole instruments of economic growth. As knowledge-based institutions, they have the obligation of becoming the 'critical conscience' of society. In practical terms, this means, that they should devote their efforts not only to the creation of wealth, but to propose models of development based on the harmonisation of economic and social development. They must be the place where ideas must be generated in this regard and the fora to discuss them.

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