

The Transformation of Research in the South : An introduction

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What indications are there of notable transformations in low and middle-income countries, how and why do research systems transform, what are the consequences? The title of this book derives from a conference that invited academics, practitioners, and policy makers to share their insights and analysis on such questions, with an emphasis on the organizational and institutional changes that are shaping and supporting research in the South. Following decades of neglect, and in the aftermath of the 2008 financial crisis, government research policies and programs appeared to be charting new positive directions across Asia, Africa and Latin America. Given the important contribution of higher education and research to supporting knowledge-based growth and development, signals that governments were rethinking their support for research merited further attention.

Researchers rightfully celebrate the universality of the scientific enterprise. In our digital age, research outputs are increasingly borderless, and open science is facilitating international collaboration in new and beneficial ways. But public funding for public research does not trespass borders, except under exceptional circumstances. For far too long, government support for research production has been highly unequal across countries. The preface to the World Science Report 1993 by MGK Menon characterized this geographic divide as follows : “the distribution of scientific and technological capacity, and of its fruits, remains very uneven from region to region and from country to country. Over four fifths of research and development activities are concentrated in just a few industrialized countries. In 1990 expenditure on R&D as a percentage of the gross national product was 2.9% for the industrialized world as a whole, whilst many developing countries could barely manage one tenth of this level.”

This global distribution of investment in research has been long running with cumulative effects. Science has flourished in Europe, North America and Japan, commented Menon, because its foundations were steadily nurtured since the Industrial Revolution. Prior to that investment, Menon remarked there were only “bursts of scientific activity without any consistent self-sustaining growth process.”¹ At the time of his comments, a parallel could be drawn to the state of research in low and middle-income countries : bursts of creativity in the face of systemic challenges. “Islands of competence” was a similar characterization by the Brazilian sociologist Oliveira to underscore uneven capacity within national research systems.² The formation of scientific communities in the South was difficult to promote, particularly where research professions were not socially valued and recognized, and publicly supported by national governments.³ Facing the constraints posed by underinvestment in the South, many researchers and graduate students left their countries of origin and migrated to high-income countries. For much of the 20th century, this migratory brain drain from the South was symptomatic of the cumulative impact of geographically skewed government investments and a general disinterest in supporting research systems.⁴

Signs of change in the South emerged early in the 21st century. The ‘innovation agenda’ became a pervasive public policy narrative that pinned future growth and development to the formation of a knowledge society and an endogenous capacity for science, technology and innovation. This new development consensus became common place in national development plans and regional pacts like the New Economic Partnership for Development in Africa. With varying emphasis, these roadmaps underlined the need for tertiary education, business innovation and public research capacity.⁵ Such drivers for change broke the silence and inaction that had long characterized political discourse and budget allocations in many low and middle-income countries.

The 2008 financial crisis brought this transformative moment into global perspective. With tighter budgets, high-income countries’ share of global government expenditure on R&D started to decline. This was not a case of collapsing research budgets in North America and Europe. On the contrary, in constant dollar terms high-income countries registered year over year increases in R&D expenditure. Rather their declining world share was due to proportionally higher investments from countries like Malaysia, Mexico, India, Brazil, China, Turkey, and other large middle-income countries. According to UNESCO data, in 2007, high-income countries accounted for 80% of global R&D investment but by 2013, this share dropped to under 70%. During this period, every other income grouping (upper middle, lower middle, low income, and least developed country groups) increased their share of world expenditure on research. The North-South divide was narrowing.⁶

1. UNESCO 1993, 2.

2. Oliveira 1985.

3. Many examples were examined by Gaillard, J., V.V. Krishna and R. Waast (éds.). 1997.

4. Van Noorden. R. 2012. Research by Weinberg (2010) concluded that of the most highly cited scientists from 1981 to 2003, one in eight of which were born in developing countries but subsequently, four of five had relocated to a high-income country to conduct their research.

5. Mouton, J. and Waast, R. 2009. The synthesis report with regional overviews of the 54 middle-income countries is available at <http://academic.sun.ac.za/crest/unesco/data/Synthesis\%20report.pdf>

6. UNESCO 2015, Table 1.1.

In the meantime, international research cooperation – at least as measured by co-authorship in articles – grew to unprecedented levels.⁷ The emerging geographic patterns of co-authorship broke with past practices as we witnessed the formation of entirely new networks that went hand in hand with this new global distribution of research activity. Implicit in this changing pattern of scientific collaboration is the nature of participation and leadership of researchers from the South. The increase in South-South collaboration, for example, was driven by the strengthening of national scientific communities and their increased capacity to design and develop research programs. Increased domestic funding also played an important role in these regards. With more national governments establishing new funding agencies or reforming existing ones, this created opportunities for researchers to co-fund or finance their own research and collaborations.

Another transformative catalyst is the rise and significance of private foundations. These new actors are so numerous, their financial impact is so important that one could talk of the ‘research for development’ paradigm as supported by official development assistance being supplanted by global philanthropy.⁸ The new coexistence of numerous philanthropic agencies working alongside or in partnership with public funding bodies to support research has transformed the post-war institutional framework. There is no easy characterization of how global philanthropy is transforming research in the South as there is no common approach such agencies adhere to. That said, global philanthropy has made a mark by funding numerous large-scale global research programs that link local and global research and national and international actors, and they have done so by introducing new ways of prioritizing research programs and selection processes, by expanding eligibility criteria for who participates in research, and how they support and communicate research programs. In this expanded and more diversified research landscape, accountability pressures and measuring research effectiveness or assessing impact is ever present. Methods and ways of demonstrating the value of science have become more complex, giving rise to numerous frameworks and sophisticated methods that have developed into a field of its own.⁹

To probe the potentially transformative nature of the institutional, organizational and financial changes beginning to emerge, we invited researchers, practitioners and policy makers to make sense of the changing research landscape in their countries and organizations. If substantive changes were occurring, what were the consequences in terms of building scientific capacity and the broader application of results from scientific research, and what were the emerging lessons for public policy and research management?

7. Gaillard, J. 2010.

8. See, for example, Vessuri, H. 2017.

9. The topic of the value of science has been fiercely debated in many fora. See, for example, Science Europe’s 2017 ‘Position Statement on a New Vision for More Meaningful Research Impact Assessment’ (https://www.scienceeurope.org/wp-content/uploads/2017/07/SE_PositionStatement_Impact.pdf) which calls for a more diversified assessment of research outputs. Zenda Ofir, see chapter in this book, was involved in the development of IDRC’s RQ+ framework, which is an assessment tool that explores the broader impacts of research, Lebel, J and R. McLean. 2018.

To encourage comparison across countries, we highlighted themes of particular interest to the foundational support, operational performance and assessment of research systems. The following serves as a high-level introduction to the five themes.

Developing Research Policy Frameworks – There is considerable interest and debate on how countries prioritize, organize, fund and evaluate their investments in research. Many important changes have emerged in recent years like opening research to new actors, increasing private funding, developing international collaborations, and modifying the way research is funded. These actions imply transformations in professional values, professional careers, management practices, international collaboration, mobility and exchange of information, and policy-making processes, all of which are commented on by the contributing authors. There is a need to understand these changes, how they came about, how they are formulated in strategy documents and specific policies, and points of departure from previous policy frameworks. Taken together, what significant policy transformations are emerging for research and for development strategies more broadly? Increasingly, research and innovation are prominent features of national development agendas but their contributions have received little attention. The contributors in this section analyse national and supranational experiences in developing research policy frameworks, the design of new and reforming existing institutions, and evaluations of those policies.

Strengthening Academic Research – In most countries, public science is synonymous with university-based research. While many universities still struggle with delivering quality education, some countries are experimenting with new ways of strengthening their scientific capability. Incentives for researchers, national programs to establish research chairs or centres of excellence, prioritizing and funding research programs of national interest, mobilizing the international scientific diaspora, and supporting research infrastructure are some contemporary examples. Typically, such efforts favour natural and life sciences and raise questions about the balance and breadth of a country's science base, in particular when comparing these disciplines to the humanities and social sciences. The papers in this section examine government efforts to improve research management at universities, schemes that improve the skills and linking potential of faculty and students, survey findings on the perceptions of the next generation of researchers, and the influence of community-driven research in shaping research priorities.

Expanding Public and Private Participation in Research – Traditional distinctions are blurring between who generates and who utilizes research results. The scientific method is no longer the unique source of legitimate knowledge, as knowledge emerging from non-scientific groups or populations (also known as “indigenous” or local knowledge) is progressively gaining acceptance. By actively dismantling barriers to participation in science, public policy is redefining (explicitly or implicitly) the social contract between science and society. Public research institutions are being encouraged to work more closely with industry, or with societal / not for profit organizations to drive commercial and social innovation. Contested knowledge and new lines of research have been generated in the process, and further interactions with actors from both academic and non-academic backgrounds is becoming the rule rather

than the exception. Some policies encourage this expanded participation in science by designing 'open innovation' platforms that promote collaboration and accelerate problem solving in technical and social domains. The contributions to this section explore national agenda-setting and capacity strengthening initiatives to promote academic/non-academic collaboration, and tensions that can emerge.

Assessing Research Performance and Impact – Research performance and impact have until recently been measured and valued almost exclusively in terms of the knowledge production validated in the scholarly environment (peer reviewed publications, citations, journal impact factors and more). Many quantitative indicators do not accurately capture the significant qualities of research, such as the anticipated societal impacts to which research is expected to contribute. In the wider interaction between public and private actors, and between different constituencies, the "traditional" measures of research impact are increasingly being questioned by researchers themselves. Private and public research organizations, as well as funding agencies, are seeking to demonstrate the value of public investments, and need new assessment tools, both to validate their own strategies and to evaluate the effects of research on society.¹⁰ The contributions in this section make a call for rethinking current methods and to suggest new frameworks. A bibliometric analysis comparing different databases, illustrates their biases as a tool for accounting for research evidence and steering future research. The papers proposing new methods for assessing research quality and impact make novel contributions to the pressing need to better understand the multiple pathways of research impact and its measurement.

Transnational cooperation in research – While numerous countries have long-standing interests in promoting international scientific cooperation, far fewer can point to sustained initiatives even though international mobility for training or research is known to be a major contributor to building research capacity. There is, however, a shift occurring, with middle-income countries playing a leading role in designing and funding international research cooperation. As the research capacity of these and other countries have strengthened (institutions, research groups, universities, and private or NGO R&D), governments and research institutions have utilized scientific cooperation agreements and policy tools to support their own strategic objectives. This has led to a proliferation of bilateral science-based programs with North American and European countries, as well as a range of new South-South and so-called triangular cooperation programs. Through these diverse partnership arrangements, countries seek to advance a range of interests including strengthening scientific expertise, acquiring technology, promoting diplomatic relations, and tackling shared challenges like pollution, water scarcity, climate change, biodiversity, or disease prevention and control. Contributing authors explore how domestic capacity can be strengthened through international collaboration, and the strategies and rationales for international collaboration. The topic of South-South collaboration is explored in the Asian and African contexts to examine government-led and researcher-led initiatives, their challenges and contributions.

10. An interesting academic endeavour on this topic is the work done by the Manchester Institute of Innovation Research on evidence on the effectiveness of research and innovation policy (<http://www.innovation-policy.org.uk/compendium>).

Organization – The chapters in this book are shortened versions of longer conference papers and presentations. We introduced guidelines during the editing process so that we could include all the contributions in a reasonably sized manuscript. This imposed constraints on the authors that the editors take responsibility for. In general, we minimized theoretical and conceptual discussions and privileged empirical contexts and findings. As many contributions provided insights for future research, research management and public policy, we created space for the authors to draw out their observations and recommendations. Finally, we eliminated extensive bibliographies, opting instead for key reference and where available, references to related publications for the interested reader.

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Scientific editors

Rigas Arvanitis and David O'Brien

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