

After 25 years of RICYT, what do we need to measure to foster “Knowledge as Our Common Future”?¹

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By the occasion of the 25th anniversary of The Network for Science and Technology Indicators –Ibero-American and Inter-American– (RICYT) and its role to support the Ibero-American States Organization (OEI), through the Observatory for Science, Technology and Society, I would like to argue for a more balanced approach to S&T statistics that includes various facets of science and knowledge in addition to the economic statistics currently being produced. This is because S&T statistics, including those driven by the OECD, have moved excessively towards capturing the “instrumental” value of S&T and innovation, STI, particularly in the Ibero-American landscape. As a result, they now have a strong bias towards linkages with economic dimensions, and a rebalancing is required to fully capture the “intrinsic” value of S&T and innovation. There is a need to open up and enrich the production of indicators to capture a diversified set of skills, supported by theoretical advancements regarding the use of indicators and the navigation through data sets.

In addition, any next generation of data should better guide new forms of international cooperation giving priority to science, education and mobility in the Ibero-American context. Data is also needed to foster the collective action of governments, public institutions and the private sector to promote the diversification of education and research systems leading to technological change, as well as a participatory approach to science and innovation.

In this regard, I would like to suggest RICYT four main sets of data that require further refinements: i) research assessment practices and scientific career developments, which call for a major action of RICYT, as well as the

OCDE, to characterize those processes and guarantee the adoption of best practices worldwide; ii) migratory flows of highly skilled human resources, which call for a collective action of RICYT at large, namely for the provision of data on forced displacement and including refugees, students and scholars who belong to communities and/or countries at risk in need of humanitarian assistance; iii) the recognition and characterization of practices and institutional intermediaries to help diversify research and education, including “professional practice based research” oriented towards professional development, as well as levels of institutional diversification and related risk-sharing mechanisms to foster skilled job creation; and iv) the need to better characterize participatory processes of R&D agenda setting to help engaging scientific structures with civil society in the Ibero-American context.

Overall, I would like to strongly emphasize the role that RICYT statistics plays in advancing our knowledge and understanding of STI and building the foundations of an “evidence based STI policy analysis” in the Ibero-American context.

Enlightening new insights for RICYT

Attempting to enlighten new insights about the need for new and better data to foster informed S&T policy making in the Ibero-American context, I suggest to focus on research and education and argue about the unique role of S&T statistics over the last twenty five years, although the number of indicators has exploded and the pendulum has swung excessively towards the economic dimension. In other words, S&T statistics have moved excessively towards capturing the “instrumental” value of S&T and innovation (i.e., STI) and a rebalancing is required to fully capture the “intrinsic” value of S&T and innovation. At the same time “the link between the measurement of national STI activities and their national economic impact (while always subject to debate, particularly within the context of

1. Con motivo de la conmemoración de los 25 años de la RICYT y de la realización del XI Congreso Iberoamericano de Indicadores de Ciencia y Tecnología en Lisboa, la coordinación de la red solicitó a Manuel Heitor, Ministro de Ciencia, Tecnología y Educación Superior de Portugal, este texto que reflexiona sobre la trayectoria de la RICYT y sus desafíos futuros.

small countries), has now become so loose that national STI indicators are in danger of no longer providing relevant economic policy insights”.²

It is clear the role of RICYT statistics and what governments and policy makers expect from RICYT and its network:

- One is the traditional role of articulation with OECD to define “measurement standards” (i.e., Frascati, Oslo and Canberra Manuals), which require continuous work in connection with education and skills statistics (e.g., “Canberra Manual” on human resources on S&T) in the Ibero-American context.
- The second role refers to the compilation of statistical information produced by national statistics offices in the Ibero-American context, based on those Manuals. This requires better addressing the basic issue of the jobs or employment of scientist and engineers to better understand knowledge production and absorption processes in the Ibero-American context.
- A third relevant task, and very important for future global and timely analysis is the role of RICYT in building an “indicators production infrastructure” in STI. By entering directly in “international data collection”, the RICYT statistics would gain additional relevance, to be supported in panels of “R&D and higher education managers”, “STI policymakers”, and “individual researchers”, making use of online survey techniques to get rapid responses to key questions and to monitor the changes over time in the Ibero-American context.
- Last, but not least, a fourth relevant task is the mission of RICYT of teaching and helping the users of indicators

in the Ibero-American context to better understand the differences between events and occurrences, or concepts and indicators, that usually measure the reality from a partial point of view.

So, I would expect, as a result of the emerging preparation of the 11th RICYT symposium (i.e., the “XI Congresso Ibero-americano de Indicadores de Ciência e Tecnologia”, September 2021 in Portugal) and in the time frame of the coming decade, a throughout revision of RICYT statistics with emphasis on unexplored but relevant areas of knowledge. In particular, the role of research and education beyond driving innovation for sustainable productive economic growth, particularly in association with a culture of learning and knowledge, as well as driving better public services, improving health, prosperity and the quality of life, and protecting the environment, should be emphasized by RICYT statistics.

Table 1 summarizes my main concerns in terms of the development of a next generation of research and education indicators in a way to help rebalancing and fully capture the “intrinsic” value of S&T, as already expressed in the context of the OECD. From the “production-side” of indicators, it is expected a debate on the need to open and enrich the production of indicators to consider contributions from a wider variety of scientific backgrounds to better reflect a complex web of impacts that go well beyond economic aspects. On the other hand, from the “user-side” of indicators, theoretical advancements in the theories that inform us how to safely navigate in existing RICYT data sets, beyond any further refinements, are also expected.

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Table 1. Summary of main concerns towards the improvement of existing research and education indicators in a way to help rebalancing and fully capture the “intrinsic” value of S&T

Indicators and their process	Theory behind the indicators	Scope for future innovations	Relevance to all OECD countries	Key competences	Work to be done	Impact for RICYT	Timing
Production-side of indicators	a lot of indicators available. Requires further theoretical advancements	Review existing practices of devising new indicators	Yes! Also, worldwide	Scientists, philosophers, psychologists, sociologists, and, finally, statisticians and economists	Review existing procedures and implement new processes	Conduct survey, discuss new processes and develop a user manual	Medium-short term
“user-side” of indicators	Requires new theoretical advancements	Design new practices of using indicators	Yes! Also, worldwide	Web-designers, psychologists, philosophers	Review existing procedures and implement new practices	Conduct survey, discuss new processes and develop a user manual	Medium-short term
GBOARD	Requires better comparability of public investment and competitive funding	Review existing practices of estimations	Yes! Also, worldwide	Policy makers, Scientists, and statisticians	Review existing procedures and implement new processes	Conduct survey, discuss new processes and develop a user manual	Medium-short term

2. Freeman, C. and Soete, L. (2007), “Developing Science, Technology and Innovation Indicators: The Twenty-First Century Challenges”, in OECD (2007), “Science, Technology and Innovation Indicators in a Changing World – Responding to policy needs”, pp. 271-284; OECD, Paris

In addition, I would like to argue that new data sets are required to opening-up science policies to multiple public and private agents in the Ibero-American context and stimulate the continuous adaptation of systems of competence building and advanced studies, among which promoting international research networks should be highlighted.

The RICYT statistics should consider the need to foster a non-hierarchical integration of formal policies and informal system linkages leading to knowledge-driven societies, including education, foreign affairs and immigration policies in the Ibero-American context. This requires new data because policy making needs a better characterization of new forms of international cooperation giving priority to science, education and migrations. And new data sets should be able to foster the collective action of governments, institutions and the private sector to promote the diversification of education and research systems leading to technological change, as well as a participatory approach to science and innovation in the Ibero-American context.

To achieve these objectives and help the discussion on the next generation of research and education indicators, four main sets of data that require further refinements, as summarized in **Table 2** and briefly described in the following paragraphs:

i) Research assessment practices and scientific career developments, which call for a major action of RICYT to characterize those processes and guarantee the adoption of best practices worldwide, including the type of incentives considered.

ii) Migratory flows of highly skilled human resources, which call for a collective action of RICYT at large, including for:

a. The systematic provision of official data on migratory flows of highly skilled human resources in the Ibero-American context (in comparison with world data, including intra-European data), in order to guide policy making to better balance brain circulation and migratory flows of skilled people, including the critical need to better consider and measure incentives.

b. The provision of data on refugees, students and scholars who belong to communities and/or countries at risk in need of humanitarian assistance, in order to stimulate policy actions worldwide to foster a Rapid Response Mechanism for Research and Higher Education in Emergencies.

iii) The characterization of practices and institutional intermediaries to help diversify research and education, including:

a. The adequate characterization of “professional practice-based research” oriented towards professional developments, in order to guide policymaking towards the advancement of professions, as well as training students for new jobs, which requires building distinct learning profiles and training practices that are increasingly problem-oriented and research-based in the Ibero-American context.

b. Official data on institutional diversification, together with data on connectivity, links and associations among public and private institutions and new institutional players and employers and related risk-sharing mechanisms to foster skilled job creation in the Ibero-American context.

iv) The need to better characterize participatory processes of R&D agenda setting to help engaging scientific structures with the civil society in the Ibero-American context.

Table 2. Summary of four main sets of data that require further refinements towards the development of a next generation of research and education indicators

Indicators and their process	Theory behind the indicators	Scope for future innovations	Relevance to all OECD countries	Key competences	Work to be done	Impact for RICYT	Timing
Research assessment practices and “open	Weak, but a lot of indicators available. Requires further science”	Yes, very strong, because it requires devising new indicators theoretical advancements	Yes! Also, worldwide	sociologists, scientists and, finally, statisticians	Review existing procedures and design new observation methods. Consider incentives	Conduct survey, discuss new indicators and develop a user manual	Medium-short term
Migratory flows, balancing brain circulation	Available indicators are not enough.	Yes, because it needs to go beyond launching new data collections based on established methodologies	Yes, although mostly European, but worldwide impact	Demographers, philosophers and statisticians	Review existing procedures, set up new surveys and design new observation methods. Consider incentives	Conduct survey, discuss new indicators and develop a user manual	short term
Professional Practice-based research and Institutional role of intermediaries	Requires new theoretical advancements	Yes, because it requires new ideas	Yes! Also, worldwide	Institutionalists, psychologists, sociologists, scientists and, finally, statisticians and economists	Define the very concept and the sources of information to build indicators	Conduct survey, discuss new theoretical advancements and develop a user manual	Medium-short term
Participatory processes for R&D agenda setting	Requires new theoretical advancements	Yes, because it requires new ideas	Yes! Also, worldwide	Institutionalists, psychologists, sociologists, scientists and, finally, statisticians	Define the very concept and the sources of information to build indicators	Conduct survey, discuss new theoretical advancements and develop a user manual	Medium-short term

The ultimate goal is to facilitate opening-up science and innovation policies to multiple public and private agents and promoting global research networks towards socio-economic resilience in the Ibero-American context. For example, promoting large international collaborative arrangements and related intermediaries should play an emerging role in job creation and forms of sustainable brain circulation. In addition, diversifying the research and education systems may promote the necessary absorptive capacity for Ibero-American regions to innovate.

This certainly requires evolving from national approaches to new collaborative policy frameworks in the Ibero-American context, which need to be driven by informed public debates and require the systematic characterization of levels of knowledge concentration and openness, in times of increasing uncertainty.

This is because, traditionally, RICYT statistics report at the “country level” comparisons and, more and more, there is a need to create resources and databases on “organizations” that could be compared. The “Community Innovation Survey, CIS” on firms innovation behavior is an example, but RICYT could encourage the creation of basic indicators at the level of other organizational actors (e.g. higher education institutions, or public research organizations across countries), that could really allow for comparison.

This is very relevant from the policy-making perspective, because governments need better data to assess institutional reforms, which do require an integrated view of skills, research and innovation to strengthen the foundations of an “evidence based STI policy analysis” in the Ibero-American context.