



**PALGRAVE STUDIES IN DEMOCRACY, INNOVATION,
AND ENTREPRENEURSHIP FOR GROWTH**

SERIES EDITOR: ELIAS G. CARAYANNIS



Policy and Governance of Science, Technology, and Innovation

Social Inclusion and Sustainable
Development in Latin América

Edited by

Gonzalo Ordóñez-Matamoros ·

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Palgrave Studies in Democracy, Innovation, and
Entrepreneurship for Growth

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ISSN 2662-3641

ISSN 2662-365X (electronic)

Palgrave Studies in Democracy, Innovation, and Entrepreneurship for Growth

ISBN 978-3-030-80831-0

ISBN 978-3-030-80832-7 (eBook)

<https://doi.org/10.1007/978-3-030-80832-7>

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This Palgrave Macmillan imprint is published by the registered company Springer Nature Switzerland AG

The registered company address is: Gewerbstrasse 11, 6330 Cham, Switzerland

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Policy and Governance of Science, Technology and Innovation for Sustainable and Inclusive Development in Latin America

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Prior to the COVID-19 pandemic, academic and international policy circles were very active debating about the importance of—and ways for—designing and implementing effective innovation policies for sustainable development and social inclusion across the globe. Consistent with the “paradigm shift” characterizing STI policy and governance in Europe

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Switzerland AG 2021

G. Ordóñez-Matamoros et al. (eds.), *Policy and Governance of Science, Technology, and Innovation*, Palgrave Studies in Democracy, Innovation, and Entrepreneurship for Growth,
https://doi.org/10.1007/978-3-030-80832-7_1

and the United States since 2010 (see, e.g., STEPS, 2010, Macnaghten et al., 2014), scholars and policymakers in developing countries have also been holding heated debates on the subject (see discussions in the framework of Globelics (<http://www.globelics.org/>) and LALICS communities (<http://www.lalics.org>) in the Latin American region, and Kuhlmann & Ordóñez-Matamoros, 2017). The need for an instrumental STI policy for sustainable and inclusive development has arisen from STI policy studies by the scientific community across the globe. The current sanitary global crisis has accelerated the visibility of such necessary role for STI policy.

Indeed, pre-COVID-19 growing interest has sought links between development and STI through approaches such as “Grand Challenges,” “Sustainable Development Goals,” “Inclusive Innovation” (Alzugaray et al., 2011; Arocena & Sutz, 2012, 2016; Bortagaray & Ordóñez-Matamoros, 2012, Cozzens & Sutz, 2012; Dutrenit & Sutz, 2014; Heeks et al., 2014; Planes-Satorra & Paunov, 2017), Innovation for the “Base of the Pyramid” (Cholez, et al., 2012; Prahalad & Hart, 2002), “Responsible Research and Innovation” and others not so new such as grassroots innovation (Gupta, 1995) and frugal innovation (Bhatti, 2012) whose origins are attributed to the “Global South,” in contexts such as India and Brazil, among others.

These approaches represent a diversity of perspectives on how to address social and environmental challenges from the STI stance (e.g., focusing on “the poor” as a new market for multinationals or thinking about generating spaces to foster the creative and endogenous capacities of the same grassroots communities such as small-scale farmers, indigenous knowledge, among others), where these discourses share a concern about the high and growing inequalities in the world, the massive challenges facing all societies concerning social and environmental issues (e.g., global warming), and the hope that the role of knowledge and

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STI (defined broadly) help to resolve these problems (Cozzens, 2009; Cozzens & Kaplinsky, 2011).

One among these emerging perspectives referring to the role of STI policy for sustainable and inclusive development is that of “transformative innovation policy” proposed by the so-called TIP Consortium. It suggests that historical STI policy frameworks have not been adequate to meet these challenges and we need to adjust or complement the ways of understanding and responding to them with new ways of thinking and acting on STI policy (Schot & Steinmueller, 2016).

Among the proposals of this new transformative innovation policy framework is the issue of inclusion and the recognition of the importance of supporting niches (e.g., spaces for experimentation in grassroots innovation, social innovation, etc.) that allow to respond to diverse contexts in a manner more adjusted to such environments. In this context, a key challenge is to make policies flexible enough to accommodate different perspectives or motivations (also known as “framings”) that may have different initiatives and that involve actors such as social movements and multinational companies (Fressoli et al., 2014; Smith et al., 2016).

From the Latin American region, the LALICS Network (<http://lalics.org>) has made several statements about the relevance of STI policies concerning the pre-COVID challenges that humanity was experiencing, especially in Latin American and Caribbean countries. This is backed up by the long tradition of the Latin American School of Science and Technology, which since the 1960s concerned itself with inequities related to STI issues and their close links with development, among others (Varsavsky, Vessuri, Sábato, Herrera, etc.). Furthermore, it concerns relevant and participatory research (Fals Borda) that has somehow been reborn recently (Vaccarezza, 2004; Sagasti, 2005; Arond et al., 2011; Crespi & Dutrenit, 2013; Dutrenit & Sutz, 2014; Bortagaray & Gras, 2014). Along such line, the 2017 LALICS Declaration (LALICS, 2014) points out the importance of seeking a “new generation” of STI policies that responds to the challenges of “social inclusion, citizenship, gender equity, climate change and productive development,” among others.

This book aims at contributing to the current understanding and development of innovation policy and governance for social inclusion and sustainability in Latin America. The innovation policy section includes five chapters discussing different perspectives of the overarching role of governments in promoting innovation in general, particularly in Colombia.

Valdivieso, Uribe and Ordonez-Matamoros aim at contributing to a better understanding of the challenges and opportunities related with public innovation as a condition to innovation policy. In so-doing, they propose a typology of public innovation with four possibilities: “eccentric,” “discrete,” “flat” and “transformative” innovation and explain them through examples of recent practices, including some associated with the response to the COVID-19 pandemic. While not proposing a theory of Public Innovation, the chapter allows for the advancement in the exploration of causal connections within both dimensions of public innovation (novelty and scope). The conceptual relations between Public Innovation, on the one hand, and the literature on the Entrepreneurial State, mission-oriented innovation and inclusive development, on the other hand, are also addressed.

In connection to mission-oriented policy (MOP) for innovation, Hernandez, Castellanos, Gómez, Bermeo and Bautista discuss how this type of policies lead to action within a bold framework of wide societal relevance and clear direction, targeting at ambitious innovation activities and beyond the simple formulation and design of policies, since it also supports their implementation, execution and evaluation. According to the authors, this form of public policy design has a wide presence in developed countries and is already showing signs of adoption in Latin American countries, including Colombia. In consideration of this tendency, the authors add, this study bases on the a priori approaches defined in the theoretical focus of the MOP in order to validate, a posteriori, two Colombian cases of public policy guided by a mission and mediated by innovation processes in a broad sense. In so-doing, they analyze two cases: the National Optical Fiber Plan (NOFP) and the regional program of Medellin The Most Educated (MTME). Product of these cases are the lessons of interest to public policymakers and implementers.

The chapter by Bortagaray and Aguirre-Bastos focuses on STI policies as drivers of sustainable and inclusive development in the context of the Central American countries. The work is part of a larger “action agenda” aimed at building capabilities for STI policy design and implementation by the national STI organizations in the region. It scans the horizontal and vertical policy instruments, their goals and linkages with broader developmental challenges. The paper discusses the national development and STI plans, when available, and the specific STI policy instruments and governance systems in place in Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras and Panama.

As for innovation policies under the Transformative Innovation Framework, as addressed by Garzón and Pamplona, the aim of the policies is to transform socio-technical systems, where production and consumption patterns should satisfy human needs, the authors claim and be oriented by sustainable development and inclusive goals. Differently from earlier innovation models, the authors add, transformative innovation aims at articulating new problems and actors neglected by existing innovation policies. As an illustration of the ways the Transformative Innovation Framework has been considered for regional policies in Colombia, the authors studied the National Science and Innovation Policy for Sustainable Development, the Green Book 2030. From this perspective, they analyze the (mis)alignment between theory (the transformative innovation framework), Science, Technology and Innovation (STI) policies at the regional level and practices implemented by policy actors, universities and civil society organizations.

According to the authors, these three components create the governance of the transformative innovation policy in Colombia, where their theoretical approach focuses on the territorial perspective to investigate regional innovation policy. Their chapter aims, therefore, at discussing how the Transformative Innovation Framework has been assumed by policy actors and what possibilities and limits this Framework brings at the level of the provinces in Colombia. To do so, they implemented a qualitative approach in which data collection covered 31 semi-structured interviews with actors involved in STI regional policies, including government officers, university faculty members and researchers, and members of the civil society.

According to Ordonez-Matamoros, Centeno, Andrade-Sastoque and Pinzon-Camargo, the notion of transformative innovation policy (TIP), which has gained much attention as part of growing debates on the role of innovation for environmental and societal challenges, particularly in the global North following the narratives triggered by the UN Millennium Goals and continued by the narratives on the UN Sustainable Development Goals, the European agenda on “Grand Challenges” and on “Responsible Research and Innovation”—among others—has been operationalized in emerging economies ignoring key challenges related to political and stakeholders’ will (or the lack of it thereof), despite the good intentions of government officials and scholars. They demonstrate this claim using the Colombian context.

Last but not least, along the line of the debates proposed by the authors in the previous chapters, Pinzon and Ordonez-Matamoros' text aims at contributing to a better understanding of innovation policies in emerging economies from the path-dependence perspective. In so-doing, they assess the extent to which innovation policies, as implemented in Colombia between 1990 and 2018, are in a lock-in situation. Following the path-dependence framework, the authors show how a lock-in situation keeps governments from harnessing a diverse portfolio of orientations, missions and innovation practices to be accomplished in the country. Through document analysis and their own interpretation of key events, they conclude that innovation policies implemented in Colombia are in a lock-in situation characterized by a policy focused exclusively on industrial productivity, competitiveness and, therefore, in economic growth, making difficult any attempts to approach innovation policy towards social inclusion in the country. To conclude this, the authors ensemble a heuristic using concepts from governance and policy studies, the path-dependence model from Sydow, et al. (2009) and the four self-reinforcing mechanisms studied by Pierson (2000). Results lead to reflect on the governance-related challenges of a new generation of innovation policies in Colombia capable of fulfilling legitimacy claims and making workable and effective contributions to social inclusion in the country.

The second section of the book brings up six contributions on the governance of science, technology and innovation (STI) in the Latin American context. Centeno's text asserts that policy instruments give way to operational policy networks which impact governance at the operational level of policy implementation, where actors' roles may be differentiated in emerging economies such as Colombia.

Meanwhile, Fernández's "Regional diversification, technological trajectories and policy approaches. The case of Argentina's satellite industry" studies the relationships between diversification strategies and technological trajectories and their consequent impact on mission-oriented technological policies by focusing on the case of the space industry in Argentina.

On their side, Cevallos and Merino, in their "Structure and Operation of the National Policy Councils for Science, Technology and Innovation: the cases of Chile and Spain," focus their efforts on the study of how STI national policy councils have gained traction as key actors by enhancing STI coordination and strategy in different national contexts despite growing complexity and expectations.

Hernandez's et al. "*Mission-Oriented Innovation Policies: An Approach to Two Colombian Cases*," instead, tackles the application of the Mission-Oriented Policy concept in Colombia and Latin America by examining two cases of public policy guided by a mission and mediated by innovation processes "in a broad sense": one in the telecommunications infrastructure industry and another in the education sector. The authors assess the outcomes and offer policymakers some recommendations.

In a similar direction, Montenegro's "Adequacy of governance of science, technology and innovation in developing countries: the Colombian case" examines how STI governance may help break a "vicious circle": a weak demand for knowledge, which does not legitimize knowledge generation and implies low though dynamic scientific production that, in turn, maintains an economy/society stagnated. So, the author contends, appropriate changes in STI governance may spark cultural change and ignite major societal transformations based on knowledge generation and usage as drivers of social and economic progress.

Finally, Sierra's "Innovation financing: a proposal to strengthen the Colombian setting" concentrates on an under-rated aspect of STI governance. As a matter of fact, the Colombian case serves to illustrate how traditional financial models do not explain the funding problems of innovation, nor contribute relevant solutions. Hence, an alternative explicative model is proposed on the basis of two considerations: (i) the matching environment and mechanisms that grant the meeting of funds supply and demand; and (ii) the conditions under which project owners and investors interact and reach an agreement. In this framework, a number of articulated proposals are advanced in order to improve and strengthen the funding of innovative projects in the context of the Colombian system of science, technology and innovation.

1.1 LESSONS LEARNED FROM COVID-19 AND NEW/REVISED STI POLICY AND GOVERNANCE CHALLENGES FOR SOCIAL INCLUSION AND SUSTAINABILITY IN LATIN AMERICA

The global crisis unleashed in March 2020 due to the COVID-19 pandemic¹ is serving as a laboratory to build new hypotheses and theories and to test existing ones around the challenges and opportunities for effective innovation policy and governance in favor of the said political agenda in emerging economies, in general, and in Latin America, in particular. This is because the pandemic-related crisis has forced society and governments to consider the need to redefine priorities around the problems to be addressed with the help of Science, Technology and Innovation (STI), and the risks associated with such activities.

The need to further explore and understand the role of STI policy for tackling societal challenges, the ethical dimension and issues implied in that relationship, the need to revisit and discuss about the distributional consequences of STI policies, both at the national and at the global levels, the modalities and dynamics embedded in the relationships among scientists, policymakers, the STI policy community, and the wider society are only some of the issues at stake that the COVID-19 crisis has made extremely visible.

Furthermore, in this process the installed local capacity and the “strength” and “health” of the National Science, Technology and Innovation Systems (NSTIS) as a whole has been put to test, making the need to review it more urgent, in particular what has to do with the ability to provide effective responses to these and new/emerging problems. Actually, the relationship between science, innovation, politics and society has also been reshaped in this new context not only because of the novelty of the challenges ahead, but because of the whole new meaning of scientific and innovation endogenous capabilities.

The current COVID-19-related pandemic requires both State bodies and civil society organizations to mobilize resources and political support typically “dormant” and reluctant to strive for greater social inclusion and environmental protection in Latin America, where new challenges have grown and new opportunities have emerged. Then, a new conception

¹ This chapter was written at the end of the “first peak” of the pandemic.

of governance beyond the idea of simple coordination between public and private actors—including civil society—is needed to understand the complexities related to the deep socio-technical transformations that are taking place in the virtualization scenario and the new realities affecting the conditions under which jobs are being re-defined.

In the name of the advancement of science, the automation of several systems in the economy has created an even broader gap between employment and social inclusion. Some of the transformations revolve around the “new world” of work, but many others regard also topics such as the way to think about medicine (e.g., vaccines) in terms of local capacities to manage the pandemic and other connected issues that need to be addressed urgently.

Moreover, some worthy lessons of the improvised reaction in Latin America in the face of the pandemic actually show that actors in different spaces of society possess untapped capabilities and resources that have proven useful to create unimagined responses to the emerging situation. Companies, scientists, universities, government agencies, NGOs and other players have interacted, cooperated and produced outcomes unthought of before. This shows that under certain conditions, the “systemic approach” can be made more effective than usual and can successfully beget fruits that the typical formal system has eventually failed to bear. This is a space for opportunity and hope.

The current crisis has, thus, meant a potential “seism” in the NSTIS architecture as well as in STI policy and governance. Yet, it is still not clear whether, as a consequence of this “new reality,” the final outcome will be more/less inclusive and/or more/less coherent with sustainable development. It is still not clear, either, that the said resistance to change is or not stronger and more entrenched than the opportunities arising in the new scenario.

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PART I

Innovation Policy



Toward a Typology of Public Innovation. *Eccentric, Discrete, Flat and Transformative Innovation*

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and Gonzalo Ordóñez-Matamoros*

2.1 INTRODUCTION: A WORLD OF PUBLIC INNOVATIONS

Today, “innovation” is one of the most recurring terms in discussions on Public Administration. In all the corners of the world, the governments seek to reinvent themselves. They have created offices dealing with the promotion of public innovation in far-reaching contexts such as those in Argentina, Australia, Brazil, Indonesia and South Korea (OECD, 2019b) and of course, in Colombia (DNP, 2019a).

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Switzerland AG 2021

G. Ordóñez-Matamoros et al. (eds.), *Policy and Governance of Science,
Technology, and Innovation*, Palgrave Studies in Democracy, Innovation,
and Entrepreneurship for Growth,
https://doi.org/10.1007/978-3-030-80832-7_2