

# THE AGE OF MISSIONS

Addressing Societal Challenges Through  
Mission-Oriented Innovation Policies in  
Latin America and the Caribbean



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# Foreword

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The literature has shown, by numerous perspectives, that innovation is the main engine of economic growth and well-being due to its contribution to improving productivity and competitiveness of companies, increasing the emergence of more dynamic jobs, and addressing social and environmental challenges. Innovation policies are tools in which we can overcome major global challenges and help revitalize economies. These policies can lead to an increase on social and economic wellbeing in the long term and are considered a mechanism for improving the productivity and competitiveness of countries.

Recent technological advances and their new business models have brought with them an unprecedented speed of change with cross-cutting impacts in all sectors of the economy and in society. As a result, innovation policies are now expected to be much more ambitious, comprehensive, and complex in terms of design, scope, interaction with other public policies, implementation instruments, monitoring, and evaluation, than policies that impact innovation in the strict sense.

To some extent, innovation policies are expected to embody and be accountable for much of the aspirations of the United Nations Sustainable Development Goals, including ending poverty and reducing inequality in all its forms around the world, promoting inclusive and sustainable production and consumption systems, and tackling climate change. That is, how to use science, technology, and innovation to meet social needs, address sustainability problems and at the same time contribute to increase the productivity and competitiveness of companies.

In this context, the conceptual framework of mission-oriented policies and institutional capacities required by the public sector, written by Mariana Mazzucato and Caetano C. R. Penna is inspirational and at the same time challenging to all Latin America and the Caribbean countries, considering the obstacles encountered to increase innovation. By themselves, they justify the implementation of more ambitious, transformational, inclusive innovation policies that create opportunities for society as a whole.

From the Competitiveness, Technology and Innovation Division of the Inter-American Development Bank, we invite you through this policy brief to not only deepen the debate on the importance of strengthening innovation policies in our region, but also to incorporate inspirational visions into them. These policies can provide long-term directionality with challenging but feasible missions, that are formulated in more specific objectives, allow accountability, and are accompanied by financial instruments adjusted to the intrinsic characteristics of innovation activities. Lastly, they can also be accompanied by solid institutional capacities in the complete cycle of its implementation, in order to meet the objectives of long-term economic development in a more inclusive and sustainable manner, that also creates opportunities for all. Enjoy your reading.



**Vanderleia Radaelli**

Science and Technology Lead Specialist  
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# Preface

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## **Mission-Oriented Innovation Policies in Latin America and the Caribbean: Lessons from Six Case Studies**

Countries in Latin America and the Caribbean (LAC) face the challenge of finding new growth engines that allow them to achieve and sustain high levels of economic and social development in the long term. Social development implies that the objective is not to grow for growth's sake, but to achieve a certain type of growth that goes in a certain direction, that ensures improvements in the standard and quality of life of people. In this context, mission-oriented policies (MOPs) can be key to directing investment in innovation toward solving the main challenges that countries face. MOPs have been implemented in some LAC countries, obtaining different results and lessons learned. Nevertheless, there is still plenty of room to improve and strengthen the institutional capacities of the public sector, a key element of implementing a mission-oriented approach to innovation.

In a two-year project, the Inter-American Development Bank (IDB) led research that assessed the level of institutional capacity to implement MOPs in Chile, Colombia, and Mexico. Through six case studies, the project sought insights into how the institutional capacity of the public sector in a selection of LAC countries should be strengthened to enable implementation of a mission-oriented approach to innovation policy that can help the country to achieve smart, inclusive, and sustainable long-term growth.

The six case studies were

1. Mining as a Platform for Virtuous, Sustainable, and Inclusive Development (Chile)
2. National Fiber Optic Plan (Colombia)
3. Monterrey as an International Knowledge-City (Mexico)
4. Solar Energy as an Enabling Factor for Innovation-Based Development (Chile)
5. Medellin, The Most Educated (Colombia)
6. National Strategy for Control and Prevention of Overweight, Obesity, and Diabetes (Mexico)<sup>1</sup>

This document conceptualizes and characterizes mission-oriented innovation policies, and offers criteria to select missions and challenges. Then, it presents the key results and lessons from the six case studies, highlighting their dynamics of implementation and outcomes. Finally, it provides conclusions and recommendations for policymakers.

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<sup>1</sup> An extended analysis of the case studies will be published separately.





# 1. From Supply-Side to Mission-Oriented Innovation Policies in Latin America and the Caribbean

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LAC is facing growing urgency to find new engines of growth and to address structural constraints that are preventing its countries from closing the gap with more prosperous economies, which undermines its ability to catch up and to take a leap forward toward achieving economic and social development. To promote long-term growth, these countries can learn from the experiences of some developed countries regarding the implementation of strategies aimed at addressing the challenge of achieving economic growth that is smart (innovation-led), inclusive, and sustainable (Mazzucato and Penna, 2016). Their agenda is to simultaneously promote innovation activity while dealing more assertively with societal challenges (or missions) such as climate change, aging, and epidemics, many of which are global in scope and require deep behavioral and systemic changes (Mazzucato and Perez, 2015).

MOPs use challenges to drive innovation policy across many sectors and thus can be defined as systemic public policies that draw on frontier knowledge to attain specific goals, or “big science deployed to meet big problems” (Ergas, 1987). In this sense, a mission-oriented approach to innovation policy is a powerful systemic policy initiative that combines demand-side with supply-side instruments and thus enables the public sector to promote the development of specific technologies that are both shaping the modern economy and contributing to addressing societal challenges (Mazzucato, 2017).

Given the pervasiveness of supply-side policies in LAC, demand-side policies<sup>2</sup> constitute a fundamental shift from the common view about the role of the state: from one in which the government is expected to simply fix markets whenever they fail to one in which the public sector actively encourages the innovation process by shaping and creating technologies, sectors, and markets (Mazzucato, 2016). In fact, when dealing with societal challenges, market forces alone fail to generate enough investment effort and innovation outputs to address them (Mazzucato and Penna, 2014; Mazzucato, 2016). Consequently, the public sector needs to take on an active and leading role that goes beyond mere market fixing to translate societal challenges into concrete missions, define directions, and promote the development and diffusion of relevant technologies needed as part of an effective, smart, innovation-led growth strategy (Mazzucato, 2016).

A mission-oriented approach to innovation policy explicitly posits a link between (i) the rate of growth and (ii) its direction. This connection is fundamental to understand the linkages that can be built between a fiscal stimulus program (designed in a country’s ministry of finance) and innovation policy (designed in a country’s ministry of science and technology). It also means re-orienting a country’s financial institutions to provide patient, long-term strategic capital to facilitate this transformation. It is the mission-oriented perspective on policy (in infrastructure, finance, and innovation) that can help steer smart, innovation-led growth across these various dimensions (Mazzucato and Perez, 2015).<sup>3</sup>

Mission-oriented initiatives have been implemented in some LAC countries. One example is Brazil, which has conducted mission-oriented policy experiments, some of which have been relatively successful, like its technological strategy for its health sector.<sup>4</sup> Still, there

<sup>2</sup> As with supply-side measures in innovation policy, there are different instruments to promote innovation through demand: systemic policies, regulation and standard setting, public procurement, and stimulation of private demand (see taxonomy in Edler and Georghiou, 2007).

<sup>3</sup> Different countries and organizations are already adopting a mission-oriented approach to innovation and industrial policies (<https://www.ucl.ac.uk/bartlett/public-purpose/commission-mission-oriented-innovation-and-industrial-strategy-moiis>) and in their programs in support of public-value driven innovation (<https://www.ucl.ac.uk/bartlett/public-purpose/partnerships/mission-oriented-innovation-network-moin>).

<sup>4</sup> According to Mazzucato and Penna (2016, p.10), “Brazil’s health strategy is a well-developed state-led policy that has been able to mobilize a range of public and private actors to develop science- and technology-based innovations. Unlike other sectors, the health sector has been able to foster partnerships between government, business, and academia. It can be seen as a systemic mission-oriented strategy, with the use of regulation and public procurement complementing public investments and public-private partnerships in health innovation.”

are some other experiences that have been unsuccessful that call for strengthening Brazil's institutional capacity in different dimensions. A recent study by Mazzucato and Penna (2016) analyzed the strengths and weaknesses of the Brazilian Innovation System, identifying key challenges to be addressed if a mission-oriented approach is to be implemented. In the conclusion of the report the following areas were considered possible areas in which to define, direct, and nurture concrete missions in Brazil that could involve multiple sectors:

- ▶ **Urban, suburban, and interurban infrastructure**, which would help improve the quality of life in cities and improve productivity.
- ▶ **Public service and public infrastructure**, which would help address the inefficiencies in public services and also improve productivity.
- ▶ **Agribusiness and family agriculture**, which would help create a stronger link between sustainable growth and manufacturing policies, with potential technological spillovers to services.
- ▶ **Energy and the environment**, which would draw on biodiversity and natural resources and place energy and its links with areas like biotechnology at the core of a country's innovation agenda.
- ▶ **National security and digitalization**, leveraging the dual use of technologies developed for military purposes.
- ▶ **21st century health care and life-sciences**, linking ambitions related to inclusive growth and capacity building in the national health care system to innovations in diagnostics, surgical treatments, drugs, and new research on lifestyle.

Even though there is some experience in the region on mission-oriented initiatives, there is still plenty of room to improve and strengthen the institutional capacities of the public sector to assure a permanent commitment to initiatives that can help countries pursue innovation-led smart growth. In fact, implementing a mission-oriented approach to innovation policy requires the development of talent and expertise within the state such that it can effectively fulfill its role of coordinating and providing direction to private actors when formulating and implementing policies that address societal challenges through innovation (Mazzucato, 2016).

Crucial to implementing a mission-oriented approach to innovation policy is the need to revitalize and reinvigorate capacity building, competencies, and expertise within the state (the developmental and networked entrepreneurial state referred to below). The state's different organizations need to be able to effectively fulfill their roles in coordinating and providing direction to private actors when formulating and implementing policies that address societal challenges through innovation (Mazzucato, 2016). As Kattel and Mazzucato (2018: 8) detail:

*What we miss in both scholarly and policy debates is a better understanding of institutional and political ramifications of MOPs: What kind of political factors are conducive to*

*generating missions with socioeconomic acceptance and political legitimacy? What kind of variety of organizational configurations and capabilities are needed to develop, implement, and evaluate missions properly? What kinds of forms of democratic engagement best help form legitimacy around mission? To put it most simply: do century missions require 21st century policy design and implementation processes?*

In the past two years, the IDB has led a research initiative that sought to assess the level of institutional capacity in Chile, Colombia, and Mexico to implement MOPs.<sup>5</sup> The general objective of this research project was to understand how the institutional capacity of the public sector in a selection of LAC countries should be strengthened in order to enable implementation of a mission-oriented approach to innovation policy that can help the country achieve smart, inclusive, and sustainable long-term growth. In so doing, the project contributed to advance our knowledge in regard to the questions raised by Kattel and Mazzucato (2018).

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<sup>5</sup> The research initiative was coordinated by Vanderleia Radaelli (Science, Technology, and Innovation Lead Specialist at the IDB) and carried out by local research teams led by Nunzia Saporito (Chile), Iván Hernández (Colombia), and Gabriela Dutrénit (Mexico), who received expert advice from the authors of this policy brief.





## 2. Defining Mission-Oriented Innovation Policies

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This type of broad-based innovation policy has been called “mission-oriented” for its aim to achieve specific objectives (Ergas, 1987; Freeman, 1996). It does not merely facilitate innovation by leveling the playing field with horizontal policies that prescribe no direction. On the contrary, by definition such policies give explicit technological and sectoral directions to achieve the mission. At the same time, to be successful they must enable bottom-up experimentation and learning (Rodrik, 2004). Examples of such direction-setting policies abound, including different technology policy initiatives in the United States (Chiang, 1991; Mowery, 2010), France (Foray, 2003), the United Kingdom (Mowery et al., 2010) and Germany (Cantner and Pyka, 2001).

These policies were implemented by mission-oriented agencies and policy programs: DARPA’s military research and development (R&D) programs (Mowery, 2010); the National Institutes of Health (NIH) (Sampat, 2012); grand missions of agricultural innovation (Wright, 2012); and energy (Anadón, 2012). In such cases, it was the organization that had to make choices on what to fund: tilting the playing field rather than leveling it (Mazzucato and Perez, 2015). Thus the picking-the-winner problem, which continues to dominate the industrial policy debate, is static and creates a false dichotomy: what is crucial is not whether choices must be made but how intelligently can picking directions be performed (MOIIS, 2019).

While the literature has focused more on MOPs in developed countries, there are even more opportunities in developing countries because of the greater challenges they face. Indeed, MOPs can be a way for the natural resource curse to be approached as natural resources would no longer be seen as belonging to a sector but as being part of a solution to a greater mission. What are the missions that innovations in precious metals can help address? What are the missions that innovations in biotech and agribusiness can address? How can a green growth strategy help address innovations in traditional sectors that must lower their material content (Mazzucato and McPherson, 2019)?

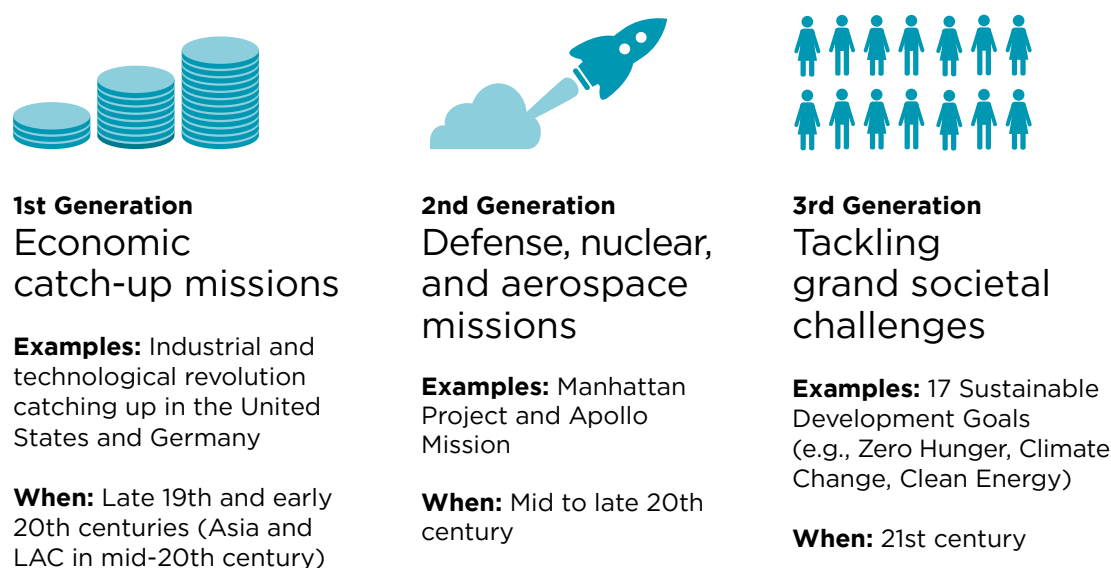
One of the most pressing contemporary challenges, particularly for countries in LAC facing high and rising inequality, is the need to include vast portions of the population (and of entire regions) in the innovation process and the socioeconomic system as a whole to tackle the issue of inequality. Therefore, where feasible, missions should be designed in a way that contributes to tackling inequality. Some will do this directly, others indirectly. In some cases, complementary investment in infrastructure and skills will be required if innovation policies are to effectively address inequality. A mission-oriented policy agenda would increase the effectiveness of innovation policy and also has the potential to help rebalance public finances, not by cutting expenditures—as in the prevailing austerity agenda (which often affects the most vulnerable parts of the population)—but by increasing strategic investments that, due to the higher multiplier effect, would increase future revenue.

Systemic MOPs must be based on a sound and clear diagnosis and prognosis. This not only requires the identification of missing links, failures, and bottlenecks—the weaknesses or challenges of a national system of innovation—but also the recognition of the system’s strengths. Foresight is necessary in order to scrutinize future opportunities and to identify how strengths may be used to overcome weaknesses. This diagnosis should be used to devise concrete strategies, new institutions, and new linkages in the innovation system (Mazzucato, 2016). It may also be necessary to tilt the playing field in the direction of the mission being pursued rather than leveling it through such means as technologically neutral policies (Mazzucato and Perez, 2015).

MOPs can therefore be defined as systemic public policies that draw on frontier knowledge to attain specific goals or “big science deployed to meet big problems” (Ergas, 1987, p. 53). The archetypical historical mission is NASA’s man on the moon mission (the moonshot as a model or framework for climate change approaches is discussed in Mazzucato [2019]). Contemporary missions aim to address broader challenges that require long-term commitment to developing many technological solutions (Foray et al., 2012) and “a continuing high rate of technical change and a set of institutional changes” (Freeman, 1996, p. 34). The current active role of the public sector in tackling renewable energy investments can be seen as a new mission in relation to the green economy (Mazzucato and Penna, 2015; Mazzucato and Semieniuk, 2017). Other new missions include addressing such grand societal challenges as the aging/demographic crisis, inequality, and youth unemployment

(European Commission, 2011; MOIIS, 2019). In fact, these challenges—which can be environmental, demographic, economic, or social—have entered innovation policy agendas as key justifications for action, providing strategic direction for funding policies and innovation efforts.

Figure 1. **Mission-Oriented Innovation Policies: Three Generations**



**Source:** Kattel and Mazzucato (2018).

Kattel and Mazzucato (2018) identify three generations of MOPs, which, they argue, represent three different types of MOPs:

1. The first generation is represented by the economic (industrial and technological) catch-up missions from the late 19th and early 20th centuries in the United States and Germany. Such missions were emulated in the mid-20th century by East Asian and LAC countries, with varying results.
2. The second generation are the classic defense, nuclear, and aerospace missions of the mid to late 20th century, epitomized by the Manhattan and Apollo Projects.
3. The third generation is the current, still nascent round of MOPs to tackle the so-called grand societal challenges.<sup>6</sup>

<sup>6</sup> The United Nations 17 Sustainable Development Goals can be seen as a summary of the contemporary grand challenges.

To characterize each generation of MOP, Kattel and Mazzucato (2018) developed the idea of dynamic capabilities in the public sector by merging the concept of the dynamic capabilities of the firm (from the Schumpeterian business administration literature and practice) with that of the capacities of the state (from the Weberian public administration literature and practice). The results of this synthesis are the notions of state capabilities, policy capabilities, and administrative capabilities (q.v.).

The idea that MOPs can be differentiated in terms of capacities was also developed in Mazzucato and Penna (2016). Based on their analysis of the Brazilian mission-oriented innovation program Inova Empresa, they identified six types of capacities (loosely defined) that seemed necessary for the internal consistency and effectiveness of MOPs:

1. **Scientific-technological capacity:** an appropriate scientific and technological knowledge base in the subsystem of education and research.
2. **Demand capacity:** latent or effective (public or private) market demand, in terms of both purchasing power and need.
3. **Productive capacity:** an appropriate business base (e.g., existing firms or entrepreneurs willing to take risks to establish an innovative firm) in the subsystem of production and innovation.
4. **State capacity:** appropriate knowledge inside the public organizations formulating and executing the policies about the problem and solution being targeted and/or knowledge about who-knows-what-and-how.
5. **Policy capacity:** appropriate supply-side and demand-side policy instruments (strategically deployed), supported by complementary policies.
6. **Foresight (or technical-administrative) capacity:** a fine-tuned diagnosis of the problem and solution, including an analysis of the current situation and future prospects for targeted technologies and sectors, formulated in terms of a well-defined mission and vision.

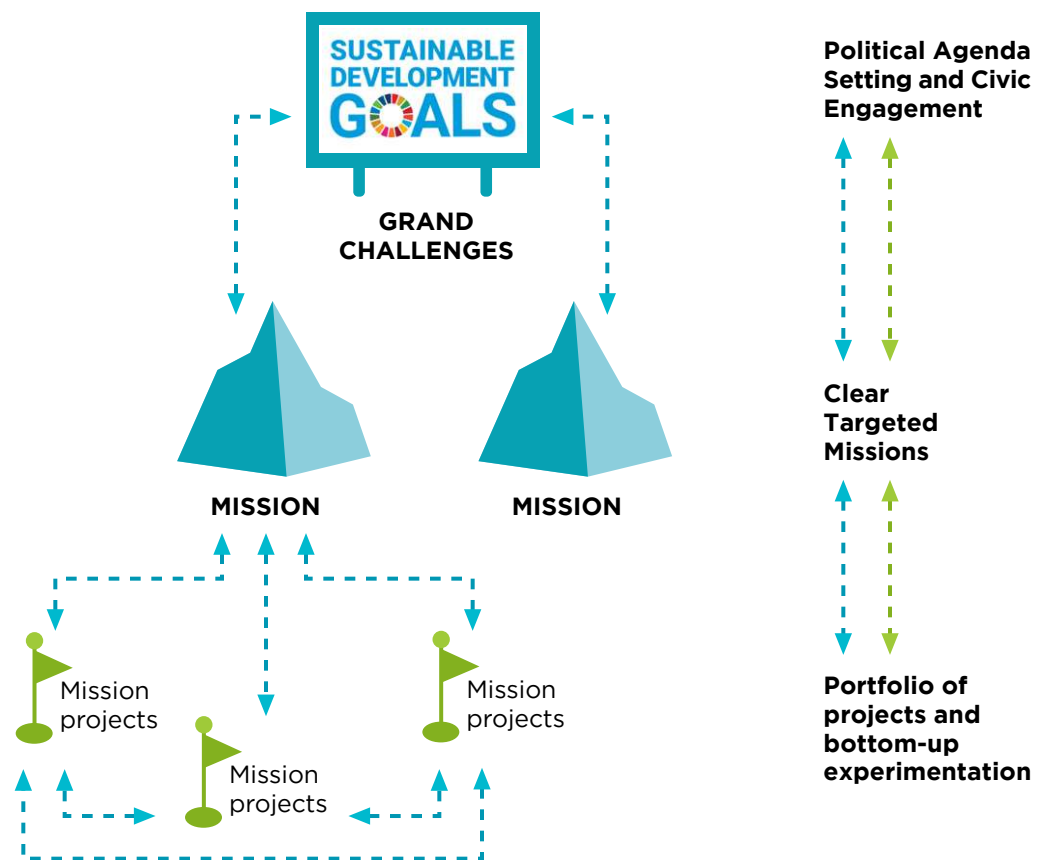
Mazzucato and Penna (2016) maintain that mission-oriented policy experiments require all six capacities to achieve success. They also argue that three mechanisms would facilitate the creation of capacities during the mission-oriented policy process itself: mechanisms of cooperation, mechanisms of competition, and mechanisms of evaluation and accountability.

An important caveat of the mission-oriented policy literature (besides ignoring developing countries) is that it has not integrated empirical insights to provide a full-fledged theory that can replace the orthodox view of direction-less policy. In recent works, Mazzucato (2016, 2017, 2018), Kattel and Mazzucato (2018), and Miedzinski, Mazzucato, and Ekins (2018) sought to address this gap by integrating empirical insights into a new framework for designing and implementing MOPs, including in response to the United Nations' Sustainable Development Goals. In a European Commission report, Mazzucato (2018, p. 11)



offered a practical definition of missions, differentiating them from challenges and projects: missions are what connect societal challenges to specific projects; they “set clear and ambitious objectives that can only be achieved by a portfolio of research and innovation projects and supportive measures... Missions should be broad enough to engage the public and attract cross-sectoral investment and remain focused enough to involve industry and achieve measurable success. By setting the direction for a solution, missions do not specify how to achieve success. Rather, they stimulate the development of a range of different solutions to achieve the objective.” Figure 2 illustrates Mazzucato’s mission-oriented framework.

Figure 2. **From Grand Challenges to Missions and Projects**



Source: Mazzucato (2018: 11).

An important issue for policymakers is how to identify and select challenges and missions among the vast array of problems faced by a country. To this end, Mazzucato (2018) offered five criteria to guide the selection of missions:

1. To engage the public and secure social legitimacy, missions should be **bold and inspirational, with wide societal relevance**.
2. Missions need to provide **a clear direction and be targeted, measurable, and time-bound** in order to allow continuous evaluation of mission-oriented projects and assessment of the success (or failure) of the whole initiative.
3. Missions need to be **ambitious but lead to realistic research and innovation actions** to challenge actors to take risks and free their imaginations to attempt what they otherwise would not. This is a matter of calibration, as overly ambitious missions may alienate actors, while easy, unambitious missions will neither inspire (first criterion) nor trigger risky efforts.
4. Missions should be **cross-disciplinary, cross-sectoral, and allow for cross-actor innovation**, which means they are not deterministic in terms of solutions or specific technologies.
5. Finally, missions should lead to **multiple, bottom-up solutions** because addressing societal challenges requires the development of *systemic* innovations, both technological and non-technological (e.g., social or behavioral innovations).

Figure 3. *Mission-Oriented Policies: How to Select Innovation Missions?*

## Missions should



**1.** Be bold and inspirational, with wide societal relevance



**2.** Provide a clear direction and be targeted, measurable, and time-bound



**3.** Be ambitious but lead to realistic research and innovation actions



**4.** Be cross-disciplinary and cross-sectoral and allow for cross-actor innovation



**5.** Lead to multiple, bottom-up solutions

Source: Mazzucato (2018).

Against this conceptual background, the IDB research project looked at six policy initiatives in Chile, Colombia, and Mexico (two cases each) that were directed at solving pressing societal challenges with innovation, and thus presented (some) characteristics of MOPs.<sup>7</sup> These case studies will be published as three policy briefs (one for each country) discussing the following aspects and questions:

- ▶ **The relationship between the societal challenge being addressed and the missions and projects focused by the initiative:** What was the relationship between the broader societal challenge and the analyzed missions? Considering the five criteria for MOPs proposed in Mazzucato (2018) (see Figure 3 above), which were fully, partially, or not met by the selected policy? What are the implications in case a criterion was not met? Should the policy have adopted such criterion?
- ▶ **The dynamics of making and implementing the policy initiative:** How was the policy-making process implemented? What public agencies and private actors were involved? What were the policy instruments used to implement the policy? What were the key mission-oriented projects? How were the portfolio of projects managed?
- ▶ **The main outcomes and results (to date):** What were the results achieved by the initiative? Were the missions accomplished? Is there evidence of policy impacts on economic growth? Is there evidence of additionality, that is, of increased private sector activity (e.g., investments) that are related to the challenge/mission?
- ▶ **The types of institutional capacities mobilized and created through the initiatives:** In terms of institutional capacities, what were the key strengths and weaknesses unveiled by the analysis of the case? Did the case lead to capacity building? Can the strong capacities be used for new policies? What type of capacity should be reinforced or created before establishing a new MOP?

These questions are addressed in the case study reports, which we recommend reading. In what follows, we discuss some of the key findings. First, we briefly present an overview of the analyzed cases and subsequently discuss highlights and lessons. In the concluding section, we draw implications and recommendations for how LAC (and other developing) countries should go about designing and implementing new MOP initiatives, considering their level of institutional capacity.

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<sup>7</sup> It is important to note that none of the six cases analyzed were designed from their inception as mission-oriented, which created the risk of trying to fit reality into the theory, something that the research team was aware of and tried to minimize. This risk was minimized, first, by selecting cases that aimed to address societal challenges with directed industrial and innovation policy; and, second, by adopting a research strategy that sought to identify what elements were aligned with or deviated from the mission-oriented policy concept. All six cases can be understood as critical to accessing the level of institutional capacity in each country—the focus of this research project—meaning that if the level of institutional capacity to implement these cases was low, then the country's institutional capacity for implementing real MOPs is insufficient and needs to be improved.



### 3. Case Studies: Mission-Oriented Policy Experiments in Chile, Colombia, and Mexico

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## Overview of Cases

The six cases of MOPs in Chile, Colombia, and Mexico sought to address two types of challenges that are very common in LAC (and developing) countries. None of the cases are “pure” examples of each type of challenge, as they sought to achieve both economic and societal objectives to a certain degree. But their specific motivations allow us to ascribe them to one of those categories.

Figure 4. ***Mission-Oriented Innovation in Latin America: Analysis of Six Cases Studies***



## Techno-economic Challenges

The first type of challenge is *techno-economic*, which are designed to transform and upgrade industrial structures or to improve productivity and achieve innovation-based growth. Mining as a Platform for Virtuous, Sustainable, and Inclusive Development (Chile), National Fiber Optic Plan (Colombia), and Monterrey as an International Knowledge-City (Mexico) are techno-economic challenges and more akin to those from the so-called first generation of MOPs in the Kattel and Mazzucato (2018) typology.

The Chilean mining case was motivated by the ambition to foster innovation all along the mining value chain while promoting the adoption of green technologies. Technological solutions were to consider the scale of the Chilean mining sector and country-specific strengths. This case represents a kind of mission-oriented policy common in natural-

resource dependent countries, aiming to transform a core sector of the economy by boosting innovation and technological development and creating new markets and sectors around it. This policy initiative established missions oriented toward achieving the following goals:

- ▶ Increase production (to 8.5 million tons)
- ▶ Increase productivity (80 percent of production in first quartiles of industry costs globally)
- ▶ Increase number of national suppliers (250 world-class suppliers)
- ▶ Increase exports (US\$4.0 billion in exports of goods and services)

Some of the most ambitious research, development, and innovation projects carried out under the initiative were the development of new technologies to monitor and map existing tailings, for zero-waste mining technologies, for a dual hydrogen–diesel combustion system for mining extraction trucks, and for climate smart mining.

The Colombian fiber optic strategy was part of a broader mission-oriented policy initiative called *Plan Vive Digital* (Live Digital Plan), which aimed to boost the mass use of the internet to increase socioeconomic welfare. This initiative was guided by five basic principles:

1. Promote the development of the private sector to expand infrastructure.
2. Incentivize supply and demand of digital services to reach a critical mass.
3. Reduce regulatory and tax barriers to facilitate deployment of infrastructure and offer of telecommunications services.
4. Prioritize state resources in capital investments.
5. Set an example through governmental action.

The National Fiber Optic Strategy was a mission-oriented policy experiment that aimed to connect 788 municipalities that did not have access to fiber optic to generate adequate conditions for the telecommunications sector to increase its coverage.

The Mexican strategy to promote the city of Monterrey (and the state of Nuevo León) as a knowledge hub reflects a mission to address a regional economic problem, with explicit social impacts. This strategic program seeks to position the city and state in terms of competitiveness, productivity, quality of employment, and social welfare based on knowledge and innovation. The strategy seeks to achieve the following goals by 2030:

- ▶ Increase investments in R&D as a percentage of GDP to 1.5 percent.
- ▶ Increase GDP per capita to US\$35,000.
- ▶ Increase value added and productivity to US\$55,000 per worker.
- ▶ Diminish the GINI index to 0.298.
- ▶ Increase the number of R&D staff to 25,000 workers.
- ▶ Increase the number of R&D labs to 200.

## Social and Environmental Challenges

The second type of challenge seeks to address societal issues, including those related to socioeconomic inequality and environmental sustainability. Solar Energy as an Enabling Factor for Innovation-Based Development (Chile); Medellin, The Most Educated (Colombia); and National Strategy for Control and Prevention of Overweight, Obesity, and Diabetes (Mexico) are social and environmental challenges and more akin to those from the fledgling third generation of MOPs (Kattel and Mazzucato, 2018).

The Chilean strategy for the solar energy sector, set up by CORFO (the Chilean economic development agency) in 2016, aims to foster innovation, develop technologies and skills, and reduce carbon emissions, with a roadmap toward 2025. Its quantifiable goals are as follows:

- ▶ Establish 100 Chilean companies in the solar industry value chain.
- ▶ Level the cost of energy produced with photovoltaic technologies at US\$25/MWh.
- ▶ Reduce emissions from energy production to 4.5 million tons of CO<sub>2</sub>eq/year.

Projects developed under this initiative included developing technologies to produce energy from high solar irradiation areas (i.e., the Atacama Desert), new storage and distribution solutions for solar energy, a solar oven for copper production, and solar technologies for mobility.

Colombia's Medellin, The Most Educated MOP experiment aimed to guaranty the right to education and improve the skill levels of Medellin citizens, especially the youth, as a way to help mitigate other social problems, such as criminality. Qualitatively, the program sought to offer a quality public education from primary to secondary schools, reduce dropout rates at all educational levels, and increase access to higher education. The long-term objective was to generate significant changes in the quality of life of citizens to diversify the economy, reduce the social gap, and develop skilled labor. Some of the policy's quantifiable goals were as follows:

- ▶ Increase the coverage of the "transition degree" to 80 percent (60,014 children).
- ▶ Reach enrolment of 364,269 students in basic education (100 percent coverage).
- ▶ Increase the gross coverage rate to 80 percent in secondary education (55,927 students enrolled).
- ▶ Lower attrition to 6 percent and repeaters to 3 percent.
- ▶ Offer 5,000 new spaces for illiterates, adults, and strangers.

Mexico's National Strategy for Control and Prevention of Overweight, Obesity, and Diabetes was clearly aimed at addressing a pressing societal challenge, as diabetes mellitus is the second highest cause of death in the country, with high social and economic costs. This

mission-oriented strategy was based on explicit pillars: research and scientific evidence, co-responsibility, mainstreaming, intersectorality, accountability, and impact assessment of the promoted actions. The following are some of its quantifiable goals:

- ▶ Achieve coverage of diabetes mellitus detection in 33 percent of the population aged 20 years and over, annually.
- ▶ Reach the coverage of patients under follow-up with glycosylated hemoglobin (Hb Ale).
- ▶ For 2018, reach 33 percent of patients with type 2 diabetes controlled with glycosylated hemoglobin (Hb Ale) below 7 percent.
- ▶ Reach 90 percent of first level care units with timely and sufficient supply of medications and supplies for diabetes control.
- ▶ Ensure that 100 percent of food and beverages contain nutritional information on their front labeling.

The initiative also sought to reduce advertising in mass media of drinks and food aimed at children at specific times and to influence the population's consumption habits.

## Highlights and Lessons

Presenting all results from the case studies is beyond the scope of this policy brief.<sup>8</sup> In this section, we discuss lessons related to two aspects of designing and deploying MOPs in LAC and other developing countries:

1. The importance of creating new or transforming existing policy instruments and programs to break up institutional inertia and foster state capacity.
2. How multiple sectors and diverse stakeholders were mobilized, particularly in order to transform resource-based industries.

Indeed, these issues are interrelated, as governing multiple sectoral interests and stakeholders may require the deployment of new or transformation of old policy instruments.

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<sup>8</sup> The case study reports will be available at [publications.iadb.org](http://publications.iadb.org).



## Instruments and Programs for Mission-Oriented Policies

One of the key issues when designing and implementing MOPs is what instruments to use and how to use them to achieve particular goals. The Chilean solar energy program employed multiple types of instruments, including an open innovation platform to facilitate the emergence of bottom-up solutions, creation of technical standards tailored to desert conditions, and the establishment of a new technology institute to facilitate collaboration for clean technology development. One problem that hampered the full deployment of this MOP initiative was that its financial structure was locked in the Chilean budgetary system. This led to a lack of coordination between R&D projects, which in the end had to compete for resources. Thus, the open innovation platform and technology institutes emerged as an important way to coordinate and mobilize diverse stakeholders from multiple sectors (see next section).

Notwithstanding, the Chilean solar energy program was vulnerable to a kind of institutional inertia that affects the proper use of instruments for MOPs. The political cycle resulted in a reprioritization of budget previously allocated to the program. Consequently, even though the ambition of the roadmap on which the mission was based was multi-sector, multi-actor, and multi-disciplinary, eventually the program narrowed its scope. The failure in addressing the multidimensional nature of the mission was the result of the scarce commitment to the program at the governmental level (especially in financial terms), which in turn resulted in lack of complementarity between the policies implemented by the diverse ministries and agencies. The lack of coordination at the ministerial level resulted in a relatively narrow policy mix to support the program. The mix includes support for R&D initiatives; promotion of technological development, human capital, and skills creation; improvement of the quality of infrastructure; and creation of new standards and laws.

In terms of R&D projects involved and total budget estimated to execute the program, Chile's mining industry program was really ambitious compared to previous initiatives. However, the reduction in the expected budget during the first year of implementation implied a significant reduction in the size of the portfolio of projects and had a negative impact on the program's potential in terms of research and innovation. This lesson highlights the importance of patient, long-term committed finance at an appropriate level from the beginning of a mission-oriented initiative (Kattel and Mazzucato, 2018; Macfarlane and Mazzucato, 2018).

The Mexican MOP to address the country's challenge with diabetes, overweight, and obesity shows the importance of using a "carrot and stick" approach to create an incentive structure conducive to innovation. While initially there was resistance from the food and beverage

industry, in the end the companies adapted to the new special tax on sugary drinks and high-calorie foods and the mandatory front labeling of food and non-alcoholic beverages. This ultimately resulted in the introduction of incremental product innovations (e.g., smaller sizes for existing products or new products with lower calorie content) and in a change in the sector's marketing strategies (marketing innovation).

Other instruments and public actions were also created to deploy this mission-oriented initiative:

- ▶ The Mexican Observatory for Non-communicable Diseases (OMENT), created in 2014, is an information system to monitor the behavior of non-communicable diseases (e.g., type 2 diabetes mellitus, hypertension, and dyslipidemias) as well as overweight and obesity.
- ▶ The National Health and Nutrition Survey (ENSANUT) is conducted every six years to monitor advances in health and subsidize decision-making.
- ▶ A study to estimate changes in household beverage purchases during 2014 was conducted by the National Institute of Public Health.

All in all, these public instruments and actions are key for designing, implementing, monitoring, and evaluating MOPs. Indeed, solid and detailed diagnosis and roadmaps (prognosis) are key for a well-designed MOP.

In the Medellín MOP, which sought to improve education levels and skills acquisition, the key form of intervention was establishing new organizations. For example, Tecnova is a center for the convergence between the supply of applied research of universities and the demand for technologies of companies. Also, Ruta N's mission is to articulate and energize the innovation ecosystem in Medellín by contributing to innovation and the competitiveness of the region. Establishing dedicated, purpose-driven—or mission-oriented—organizations is an important form of implementing MOP initiatives (something well documented in the literature about industrial catching-up in LAC and Asia). Indeed, one way to foster trust and cooperation between the private and public sectors is through semi-independent organizations, or organizations with embedded autonomy (Evans, 1995).

## Mobilization of Sectors and Stakeholders in Mission-Oriented Policies

Mobilizing multiple sectors and stakeholders is a key feature of MOPs (Mazzucato, 2018; MOIIS, 2018). This is the case even in policies that seem to focus on single sectors, as, for example, the Chilean solar and mining cases: fulfilling the ambitions of these missions would require coordination of efforts in diverse areas of the economy. To facilitate coordination between different actors and sectors, two new instruments were designed: (i) an open platform to facilitate co-creation and information sharing and (ii) a clean technology institute to foster cross-disciplinary research for the solar case and pilot centers for technology transfer for the mining case.

It is worth highlighting the use of the open platform, which allowed for a bottom-up participatory process that, in the solar case, led to the development of a shared vision. Those platforms also lead to increased trust between the state and private stakeholders and to identifying technical and economic challenges that warranted public support. The bottom-up participatory process behind building the shared vision for mining in the future was essential to involving the private sector in the initiatives. The process that began more than 10 years ago has led to defining common strategies and priorities. The existence of a shared development vision for the future of mining is one of the most successful results of this experience.

Another recurring structure for coordination is the establishment of multi-stakeholder committees. In the Chilean solar case, CORFO, the Ministry of Economy, and the Ministry of Energy created a public–private entity—the Executive Committee—made up of the main stakeholders of the solar and energy sectors. The committee’s goal was to better capture stakeholder demands in the solar industry and to better identify the mission and technological opportunities. The committee was responsible for the program’s strategic orientation and technical management and was presided over by the Ministry of Energy. It included representatives from the science, technology, and innovation; energy, and public ecosystems. The committee analyzed the solar sector, identifying the main challenges to be tackled and the technological opportunities to be exploited given the particular characteristics of the Atacama Desert. Ultimately, this type of committee contributes to creating technical and administrative capacity so the state can implement the MOP.

In the Monterrey case, similar solutions to disperse capacity and competences were adopted: strategic sectoral clusters were created and a technology park (Parque de Investigación e Innovación Tecnológica, or PIIT) was built. The strategic clusters, which were based on a government–academy–industry model with high involvement and leadership from the private sector, were thought of as a solution to the dispersion of skills

and talent in the region. The operations were financed by public and private funds. Each sectoral cluster proposed a long-term strategic plan and a strategic agenda. They operated with committees specialized in human resources, investment and growth, and innovation. A demonstration effect was generated, leading to the creation of new clusters: 8 between 2003 and 2009 and 11 between 2009 and 2015, with 13 proposed since 2015. Among the expected results of the clusters were new products, processes, services, and solution for problems of public interest. The expected impacts were higher competitiveness, better productivity, superior quality of employment, and improved social welfare. The PIIT is a scientific-technological infrastructure project that began construction in June 2006 with 70 hectares and began operating in 2007. In 2018, 35 R&D centers of universities, public organizations, and companies are located in the PIIT, 28 of which are in operation. The establishment of such shared facilities through sectoral clusters or technology, while not innovative in itself, is an example of how to combine and explore diverse competencies oriented toward solving pressing challenges. They are a different mechanism to coordinate private stakeholders that may not need central coordination from the state.

Two lessons stand out from the Colombian cases. First, they show the role that organizations such as chambers of commerce and non-government organizations can play as intermediary actors, trainers, and connectors in building trust among stakeholders in the ecosystem. Second, in mission-oriented initiatives, when initial efforts and investments—patient capital—come from the public sector, private sector confidence builds up, leading to new investments in the different mission-oriented projects.



## 4. Conclusions and Recommendations

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In recent years, MOP reemerged as a way to address pressing societal challenges with science, technology, and innovation. A mission-oriented approach to innovation policy is a powerful systemic policy initiative that enables the public sector to promote the development of specific technologies that both shape modern economy and contribute to the solution of economic, social, and environmental problems. While missions are a key theme in science, technology, and innovation policy agendas of developed countries, mission-oriented initiatives have been implemented in some LAC countries as well.

In the past two years, the IDB led a research project that assessed the level of institutional capacity in Chile, Colombia, and Mexico to implement MOPs. Through six case studies, the project sought to understand how the institutional capacity of the public sector in a selection of LAC countries should be strengthened in order to enable implementation of a mission-oriented approach to innovation policy that can help the country to achieve smart, inclusive, and sustainable long-term growth. In this policy brief, we highlighted key results and lessons from these case studies.



The implications from this analytical exercise are vast. In this document we discussed the importance of establishing appropriate instruments in order to break up institutional inertia and to govern and align diverse interests. One such instrument that is key for MOP initiatives seems, however, to have been missing from all the cases under study: a monitoring and evaluation structure. While in some instances an open innovation platform was created to design the MOP initiative and coordinate projects, no formal monitoring mechanisms of progress in the implementation of projects and fulfillment of the mission was created. Developing such mechanisms is strongly recommended to evaluate progress and facilitate internal learning mechanisms to re-tailor objectives and expected results.

The creation of a monitoring and evaluation mechanism requires the development of a framework (including policy and technology roadmaps) of the mission, which should, from the beginning, establish the link between science, technology, and innovation projects and the goals of the mission. The commitment from the state must be made explicit through such a framework, in which the challenge is diagnosed and missions are established, accompanied by instrumentation or implementation actions and key indicators that allow detailed monitoring of strategic projects.

The analysis also emphasizes the importance of patient, long-term committed financing. Absence of such financing or the sudden removal of financial commitments likely results in the failure of the MOP initiative. Thus, the state should make a firm commitment to allocate resources and indicate a schedule for diminishing its commitment to make room for private financing and investments. Such a strategy can also help address criticisms of crowding out by incentivizing the crowding in of private resources from the beginning. Another alternative is establishing investment funds, financed and managed by both private and public sectors, dedicated to mission-oriented projects.

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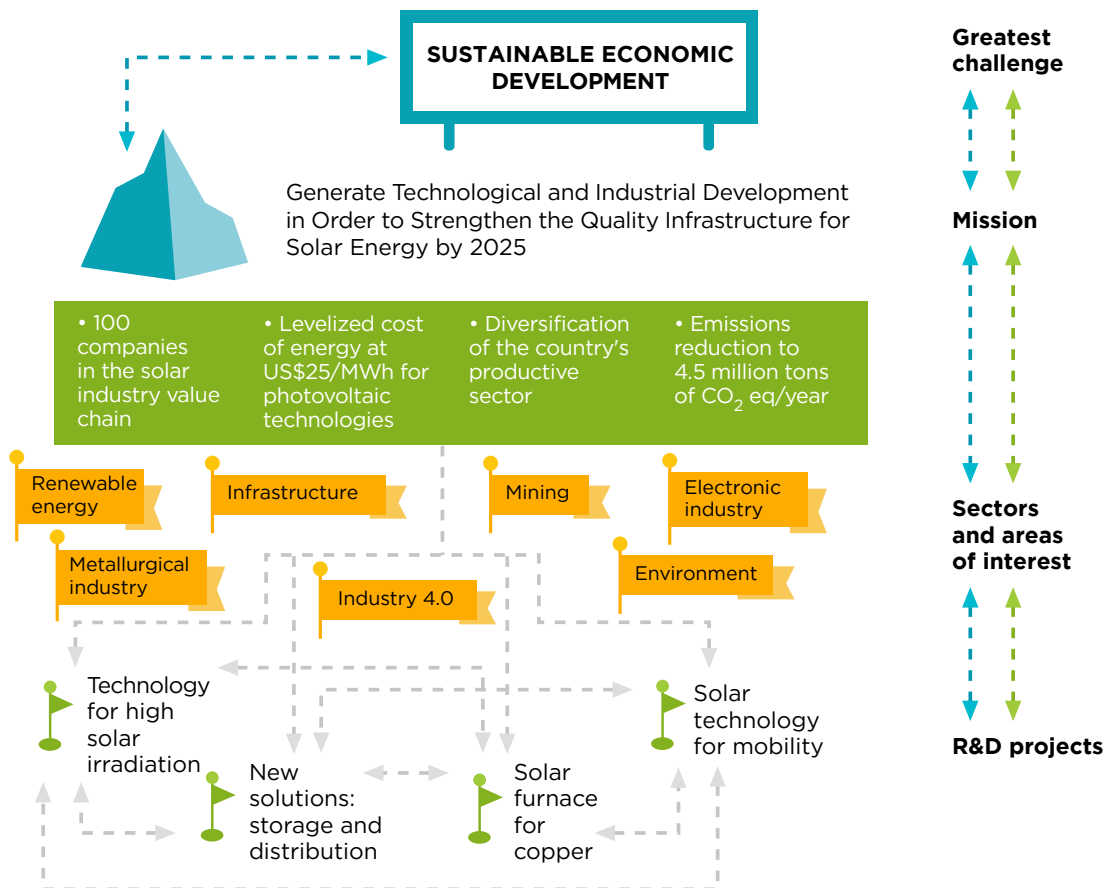
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# Annex:

## Characterization of the Case Studies in Chile, Colombia, and Mexico

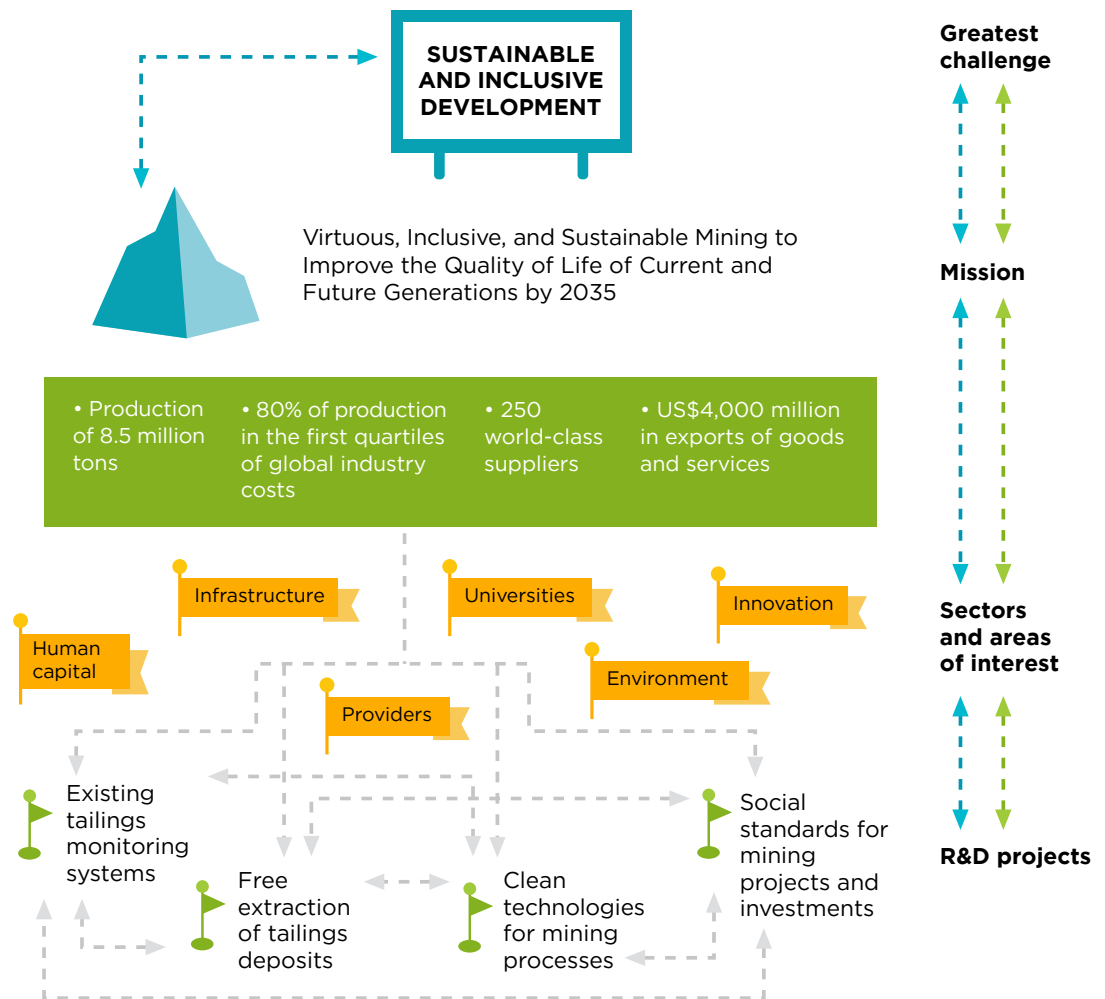
Figure A1. **Chilean Case 1: Characterization of the Solar Industry Program as a Mission-Oriented Policy**



Source: Saporito, Moreira, and Radaelli (forthcoming).

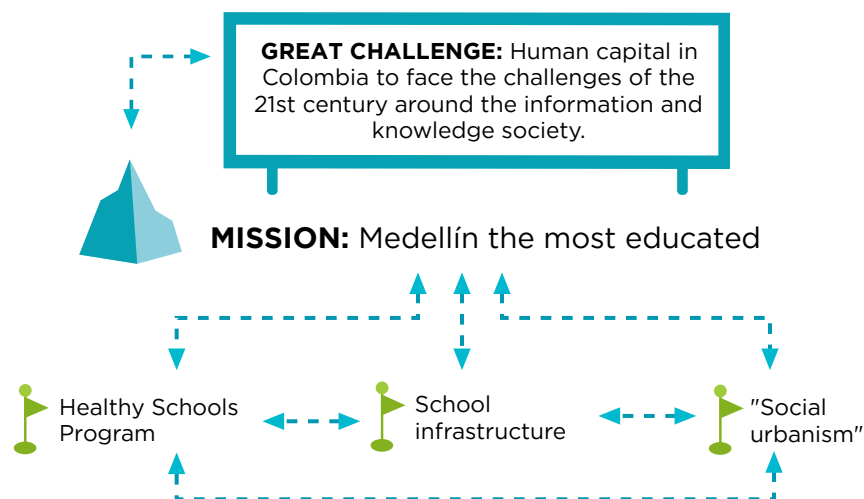


Figure A2. **Chilean Case 2: Characterization of Mining Innovation Policies as Mission-Oriented Policy**



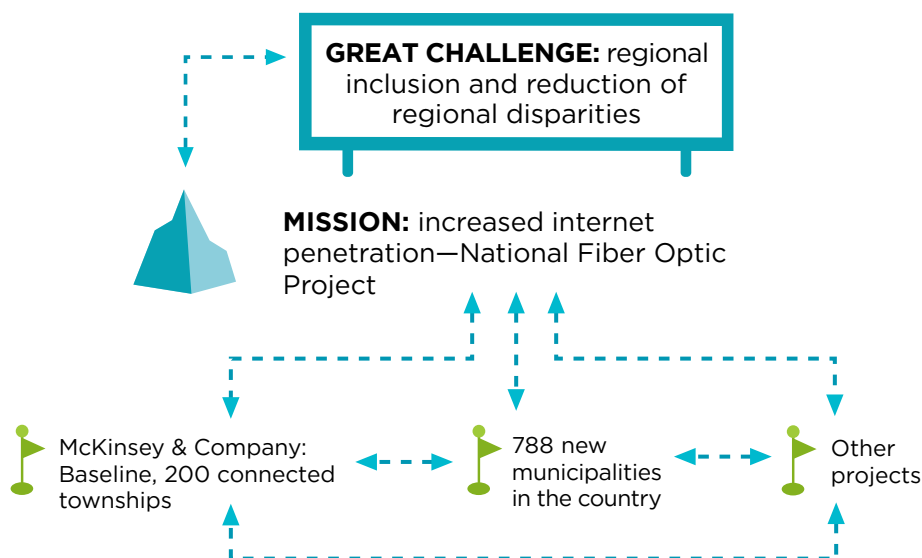
**Source:** Saporito, Moreira, and Radaelli (forthcoming).

Figure A3. **Colombian Case 1: The Medellín Program, the Most Educated as a Mission-Oriented Policy**



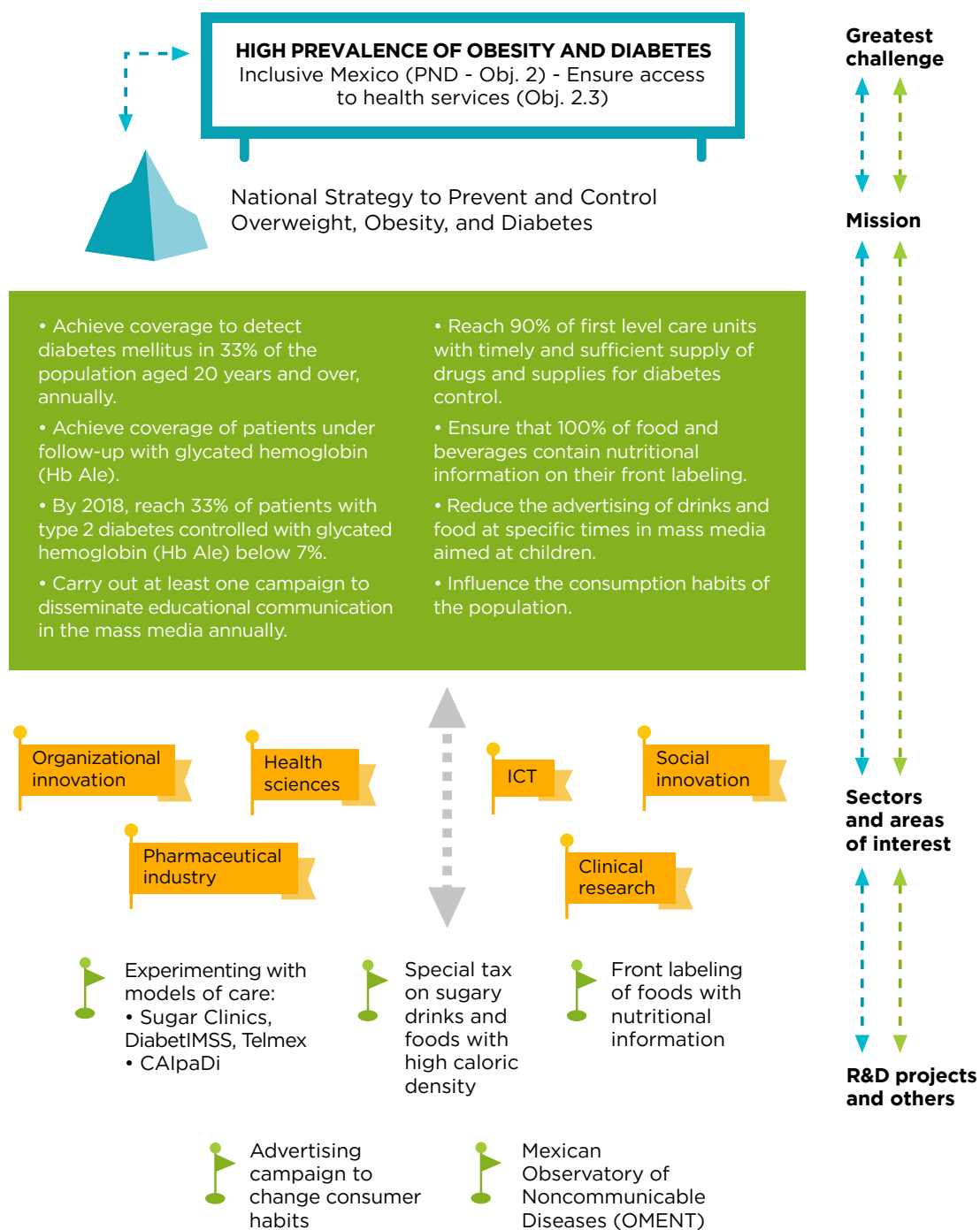
Source: Hernández et al. (Forthcoming).

Figure A4. **Colombian Case 2: National Fiber Optic Project as a Mission-Oriented Policy**



Source: Hernández et al. (forthcoming).

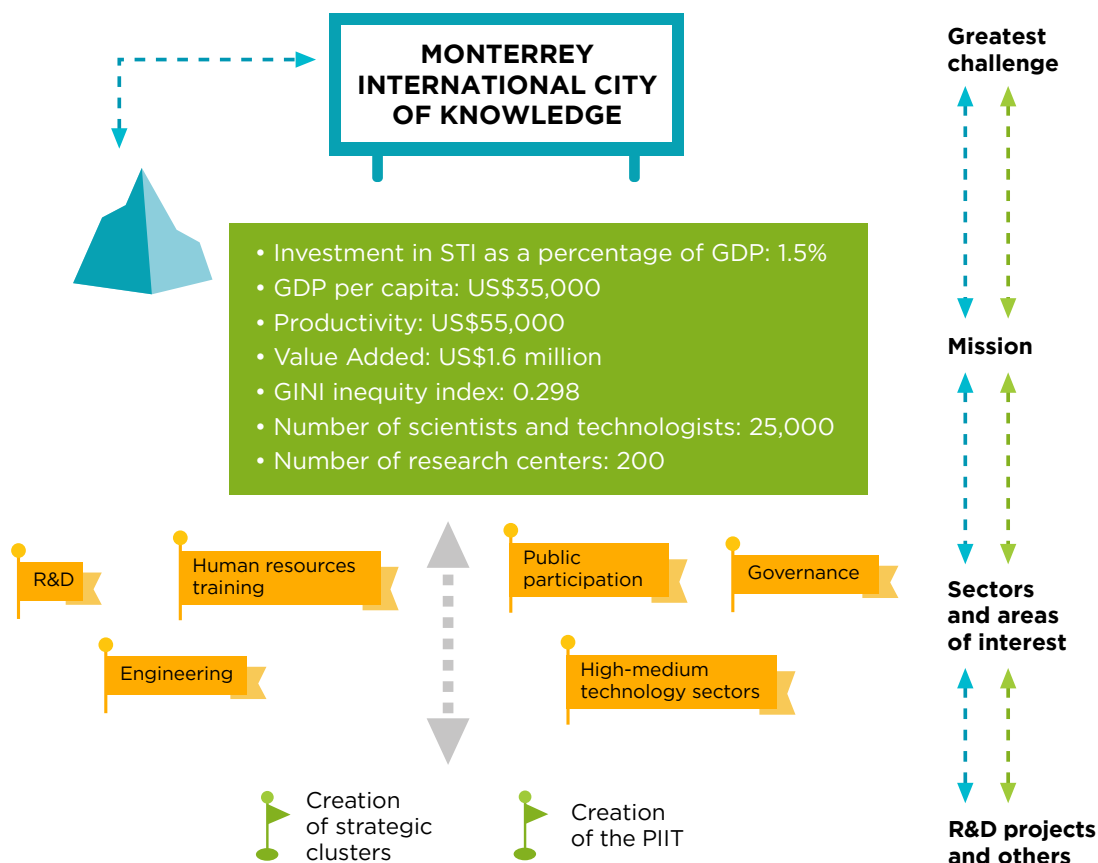
Figure A5. **Mexican Case 1: Mission-Oriented policy for Obesity and Diabetes**



**Source:** Dutrénit et al. (forthcoming).

**Note:** DiabetIMSS: diabetic patient care program of the Instituto Mexicano del Seguro Social; CALpaDi: Center for Comprehensive Care for Diabetes Patients.

Figure A6. **Mexican Case 2: Mission-Oriented Policy for the Monterrey International City of Knowledge Strategy**



**Source:** Dutrénit et al. (forthcoming).

**Note:** DiabetIMSS: diabetic patient care program of the Instituto Mexicano del Seguro Social; CAIpaDi: Center for Comprehensive Care for Diabetes Patients.

