

GOVERNANCE AND CRITICAL FACTORS TO IMPLEMENT SMART
SPECIALIZATION STRATEGIES IN DEVELOPING COUNTRIES.
THE CASE OF THE STATE OF MEXICO, MEXICO

*GOBERNANZA Y FACTORES CRÍTICOS PARA LA EJECUCIÓN DE ESTRATEGIAS
DE ESPECIALIZACIÓN INTELIGENTE EN PAÍSES EN DESARROLLO.
EL CASO DEL ESTADO DE MÉXICO, MÉXICO*

José Luis Solleiro-Rebolledo
solleiro@unam.mx

Universidad Nacional Autónoma de México

Rosario Castañón-Ibarra
rosarioc@unam.mx

Universidad Nacional Autónoma de México

Laura Elena Martínez-Salvador
laura.martinez@sociales.unam.mx

Universidad Nacional Autónoma de México

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ABSTRACT

Smart specialization strategies (RIS3) have been implemented in the State of Mexico, one of the most important regions in Mexico, this framework was used to create state innovation agendas (SIA). Therefore, the main objective of this document is to analyze the experience of a project using the RIS3 methodology to build up an SIA as the basis to structuring a regional innovation system (RIS). We conclude that RIS3 in lagging countries face difficulties to be successful, especially if in the region there is a weak governance structure, an adverse institutional framework, and a lack of funding for innovation activities.

Keywords: Regional innovation system, smart specialization, Mexico.

RESUMEN

La estrategia de especialización inteligente ha sido implementada en uno de los estados más importantes del país, el Estado de México, este marco analítico fue usado para crear agendas estatales de innovación (AEI). Por lo tanto, el objetivo de este documento es analizar la experiencia de un proyecto que utilizó la metodología RIS3 para construir una AEI como base para estructurar un sistema regional de innovación. Concluimos que la RIS3 en países en desarrollo enfrenta dificultades para ser exitosa especialmente si en la región hay una débil estructura de gobernanza, adversos ambientes institucionales y se carece de financiamiento para innovación.

Palabras clave: sistema regional de innovación, especialización inteligente, México.

Clasificación JEL / JEL classification: R58, O31.

INTRODUCTION

Innovation has been accepted by both scholars and policy makers as a building block for competitiveness and regional development. Nevertheless, innovation does not occur in isolation, as it includes a wide range of relationships and knowledge exchange among different social actors. This has led to consider innovation systems as an analytical framework for policy design (Rózga & Solleiro, 2017).

There is growing awareness that economic growth and competitiveness at a regional level depend on the capacity by indigenous firms for innovation and interaction with their economic environment. For that reason, “offering the appropriate support to indigenous firms to become more competitive through innovation is a rising star on the regional policy agenda” (Cooke et al., 1996, p. 7). Considering the above, the European Commission (EC) launched the concept referred to as the Research and Innovation Strategy for Smart Specialization (RIS3) to enable the European Union’s (EU) Member States and regions to identify the knowledge specialization that best and accordingly matches their innovation potential. The EC provided incentives for implementing RIS3 across the various regions between 2014 and 2020.

Some developing countries in Latin America have adopted the RIS3 methodology to set up their innovation agendas. Nonetheless, the Latin American experience has not been analyzed in detail. This paper deals with the review of one case in Mexico.

In 2018, the Council for Science and Technology of the State of Mexico (or COMECYT in Spanish) conducted a project following the RIS3 methodology to structuring the state’s innovation system and to implement an innovation agenda. This state is the most populated one in Mexico and makes up for the second largest economy in the country. There was a previous project at this state, and in which a RIS3 approach was used to define an agenda to support technological development of small and medium size enterprises (SMEs) belonging to nine priority sectors (Solleiro and Gaona, 2012). This first experience was successful as it led to the implementation of a pilot program to provide economic support to innovative SMEs sponsored by COMECYT and the Inter-American Development Bank. Changes in the state government brought about other priorities, and the smart specialization approach was set aside during the 2013-2018 term.

The new exercise derived from the State Development plan, in which the building of a State Innovation System was considered as a strategy for economic development. The new RIS3 project departs from the selection of state priority economic sectors (Agri-food, chemical industry, plastics, the automotive sector, the aerospace industry, the pharmaceutical industry, and logistics). As presented in detail below, the project included the definition smart specialization areas for priority sectors, the identification of relevant actors within the state's productive system as opinion leaders, studies on the socioeconomic condition and the available scientific and technological capabilities within priority sectors, studies to identify global technological trends, consensus-building workshops, and a resulting priority project portfolio to boost the state's innovation system.

The main objective of this document is to analyze this experience in order to point out key factors and obstacles related to governance, institutional framework and funding for innovative activities. These factors are influential for the successful implementation of innovation agendas in countries with incipient innovation systems and little tradition when it comes to research. The methodology used is based on participatory-action-research (which integrates scientific investigation with action) because the authors of this paper played an important role on coordinating the activities to building the state's innovation agenda (SIA).

The first section of this paper deals with the theoretical framework that justifies the regionalization in innovation processes, the need for a governance structure when building up a regional innovation system, and the importance of government funding for innovation as a catalyst to the industry's involvement in R&D. The theoretical and methodological elements supporting RIS3 are discussed in this section as well. In the next section, the process followed in the State of Mexico is presented. Afterwards, we discuss the challenges regarding the application of the RIS3 methodology in regions with weak innovation capacities. Brief conclusions are presented at the end of the document.

1. LITERATURE REVIEW

For a country to achieve competitiveness, a national innovation system (NIS) should be shaped and launched. In this structure, relevant actors (industrial firms, R&D labs, universities, service suppliers, regulatory bodies and governments) interact across regions (Lundvall, 1992), creating agglomeration processes as the basis for cooperative learning that may lead to interactive innovation (Dutrenit, 2009). In the late 1980s, regionalization began to take significance in many countries due to the growing importance of territories for the generation of industrial innovations. Cooke, Gomez and Etxebarria (1997) identified that many innovative firms operate within regional networks, interacting with other firms such as suppliers, clients and competitors, in addition to research and technology resource organisations, innovation

support agencies, venture capital funds, and local and regional government bodies. Given that innovation involves a learning process, it is catalysed by the proximity of organisations because frequent interaction facilitates the spread of knowledge, information, and technologies. This gave rise to the concept of regional innovation systems (RIS) considering that each region has the potential to shape specific capabilities for innovation (Rózga & Solleiro, 2017). Within an RIS, there might be co-operation to drive the learning process towards local needs and opportunities (Cassiolato et al, 2013, Cooke et al 1997, Barca et al 2012).

Innovation systems also require to be funded. International evidence has determined that small companies face serious difficulties pooling the necessary capital to carry out their innovative projects (European Communities, 2002) and they depend greatly on government support (Planes et al, 2002). Government subsidies for innovation play a fundamental role in overcoming financial constraints, risk reduction and mitigation of market failures (Kim and Nelson, 2000). Public funding stimulates private investments in technological development and innovation (Wonglimpiyarat, 2011), therefore, regional public-private financing models used to generate dual benefits because projects would respond to regional needs and, concurrently, company, research and organization capacities are strengthened.

In this framework, RIS3 emerges in Europe under the premise that innovation strategies are often built on regional strengths, capabilities and knowledge forming the so-called smart territories (Nicolás, 2019). RIS3 is based on the smart specialization model, whose main objective is to develop methodological bases to facilitate a good analysis of regional competitiveness, identifying business and discovering initiatives to take advantage of related diversification (Del Castilli & Paton, 2013). However, the use of RIS3 methodologies requires considering regional specificity. In the case of regions with lower development levels, a sound governance structure for the implementation of innovation policies plays a fundamental role to integrate elements for collective participation. This requires extensive coordination within government spaces as well as with other relevant actors who should be active participants in policy development (European Commission, 2016).

At the same time, developing regions lack technological capabilities and innovation networks needed to maximize the effects of smart specialization (Barzotto et al. 2018). In such regions, efforts should be devoted to building capacities that are a necessary condition for innovation. In this regard, there is concern about the low level of investment in science, technology, and innovation of developing economies such as Mexico, whose GERD accounts for just 0.5% of its GDP (World Bank, 2018).

All these factors should be considered to adjust RIS3 methodology for specific regional conditions (Del Castilli & Paton, 2013: 20). In our case, RIS3 is used to build a state innovation agenda (SIA) trying to respond to specific conditions at a very heterogeneous local economy, in which advanced industries such as the automotive, aerospace, and pharmaceutical ones co-exist

with traditional sectors. An SIA generated under these conditions involves the participation of various actors to structure a list of priority innovation projects responding to specific demands and the available research capabilities. As there is little actual experience in designing innovation policies, the SIA includes recommendations to generate plans, policy instruments, and monitoring and evaluation instruments, all of which are essential components for the agenda's implementation.

Another essential factor is governance. Governance is understood as the integration of the bodies responsible for the fundamental decision making, and the relevant actors within the system, the latter of which are typically unrelated to the decision makers, these other actors must be exempt from corruption and must be responsible for the orientation of decision making (ONU, 2014). Hence, governance implies the ability to effectively exploit the innovation systems networks, an action usually hampered by the limitations of a government system, a fact which fails to consider the complexity of public policies. In this context, innovation system forecasting as well as an appropriate governance mechanism must be integrated into formulating operational policies for this to be effective (Aguirre-Bastos & Weberb, 2018).

With this in mind, the RIS3 methodology aims at administrative authorities, policy-makers, and professionals in regions, mainly seeking "a priority-setting process that takes place at the territorial level, for economic activities, scientific fields and technological domains that are potentially competitive and generators of new business opportunities" (Barroeta et., 2017: 19).

The RIS3 methodology is based on the nonlinear stages described below (Foray et al., 2012).

1. Analysis of the regional context and the potential for innovation: at this point, a characterization of the region and analysis of the territory assets are carried out. For this, it is useful to conduct case studies, interviews with key actors, surveys, regional profiling, and foresight studies (Sörvik, 2012).
2. Governance for promoting the participation, commitment, and collaboration of innovation system actors: at this point, a diagnosis carries out the identification of the relevant actors, their areas of action, and their interests. The identification of actors helps to define the best way to collaborate with a wide variety of actors. RIS3 is an exercise in which actors must consider local, regional, and national policies. These multi-dimensional policies mean that governance mechanisms need to include a number of stakeholders. Regardless of who is involved in the process, governance is interactive, regionally-driven and consensus based' (Foray et al. 2012: 35), but the most important actors that should be involved are those at the quadruple helix (public authorities, knowledge bearers, investors and enterprises, and the civil society (Arnkil et al. 2010).
3. Development of a collective vision for the region's future: this step implies the development of a shared vision of economic development

and the main direction of strategic projects. The bottom line is to engage decision-making actors, so they align projects with common benefits. This vision should be a realistic one, and bold enough to accommodate the various development patterns.

4. Identification of priorities: At this point, priority sectors with potential for specialization, growth or diversification are found.
5. Definition of coherent mixed policies and building of an innovation agenda. The innovation agendas are public policy instruments that promote investment in economically important sectors. Such innovation agendas are developed from the identification and selection of priority treatment areas and the definition of stages to articulate agents of an innovation system.
6. Integration of evaluation and monitoring mechanisms: At this point, the control and evaluation mechanisms are defined. While monitoring seeks to verify the activities which have been planned, the evaluation tools seek to gauge the effects of the actions carried out.

It is important to consider that these stages, whose performance are not linear, imply both feedback and ongoing efforts. Given the nature of the innovation itself, a broader and long-term vision is relevant.

2. METHODOLOGY

To analyze how RIS3 was applied in the State of Mexico as success factors as well as obstacles for building an innovation agenda are identified, the *Action-Research Methodology* proposed by Kurt Lewin (1946) was selected. Using this methodology is highly relevant for this research because the authors of this document played an important role on coordinating the SIA in the State of México. One of the specificities involving the action-research methodology is that the entity or actor conducting the research is also part of the change-building groups.

As part of the action-research approach, the researcher is constantly involved in the phenomena and participates in both the process and decision making (Lewin, 1946). The project coordinators convened state stakeholders to collect and analyze information around state problems and opportunities with the purpose of finding solutions and promoting social, economic, and political transformations (Balcazár, 2003). Therefore, derived from this research, the groups' needs, and priorities were identified, actors were organized, and the problem-solving process was planned.

One of the greatest results from these collective participation strategies is the development of awareness in the actors themselves, because contextual, historical, and circumstantial analysis is key. Likewise, the action-research methodology generated a spiral of knowledge and feedback, during the stages of discussion, synthesis and drafting of the agenda.

However, despite the usefulness that the action-research tool might represent, it is important to establish that there could be some bias during the systematization and analysis of the RIS3 experience. Thus, it is important to mention that one of the authors of this paper participated only as an external reviewer to identify key elements, in addition to analyzing and documenting the process.

With this in mind, a dozen interviews were carried out after the conclusion of the project in early 2019. These interviews were made to the main coordinator of the project, some technical and operative leaders, members of the consulting group who developed several cabinet studies and played an important role in achieving objectives, potential project end users, and a boundary spanner actor, who possessed interdisciplinary knowledge and experience interacting with several different types of organizations on this matter were interviewed. This boundary spanner facilitated new connections across sectors, thus helping to overcome sectorial divergences. Technical reports on the project were reviewed, too.

The interviews focused on identifying activities and roles from each actor and the scope of their participation, as well as the main challenges faced in terms of organization, the governance model, participatory strategies, information gathering, data analysis, and results management. On the other hand, questions were made about the main obstacles faced during the project's development, as well as further actions on project implementation.

3. RESULTS AND DISCUSSION

The state of Mexico is one of the 32 states that makes up the Mexican Republic, and is located at the center of the country, a strategic location for national and international trade.

The State of Mexico has a relevant contribution to the national economy (8.68% of national GDP comes from the State of Mexico) making it the second largest economy in the country. The State of Mexico's economic composition reflects a great deal of focus on companies and organizations in the tertiary sector (72.7%), nonetheless, manufacturing activities are of great relevance (especially the food industry, textile production, the automotive, paper and printing industries, petroleum products, coal, and plastics). Also, the State of México concentrates more than 14% of national population (INEGI, 2018) with the largest labor force in the country.

In this region, there is also a large educational and research system comprised of higher education institutions and public research centers. There is also an important industrial platform with SMEs and large companies and, as well as strong participation from foreign investors. In spite of its economic relevance, the State of Mexico ranks below average according to various competitiveness indicators (Solleiro and Gaona, 2012) and it is acknowledged that innovation is required to boost the state's competitiveness.

So as to build up a state innovation agenda and structure a innovation system, a project was designed by COMECYT, an institution outlined by the State's Law of Science and Technology, to be in charge of promoting "scientific research and technological development through a close link between the state public administration, the academic, scientific and technological communities and the research centers in the social and productive sector" (LCYTEdoMex, 2004).

An RIS3 exercise was decided to be conducted with the following activities: the analysis of the regional context and identification of technological capabilities available in universities, research centers and firms, sector-based studies on global technological trends, interviews with key actors for regional diagnosis, consensus-building workshops with representatives of innovative firms, industrial chambers and clusters, universities and research centers, and government agencies, the design of a priority project portfolio by sector, the definition of an innovation agenda including policy instruments, performance indicators and a model for monitoring and evaluation.

3.1 KEY FACTORS FOR BUILDING UP THE SIA

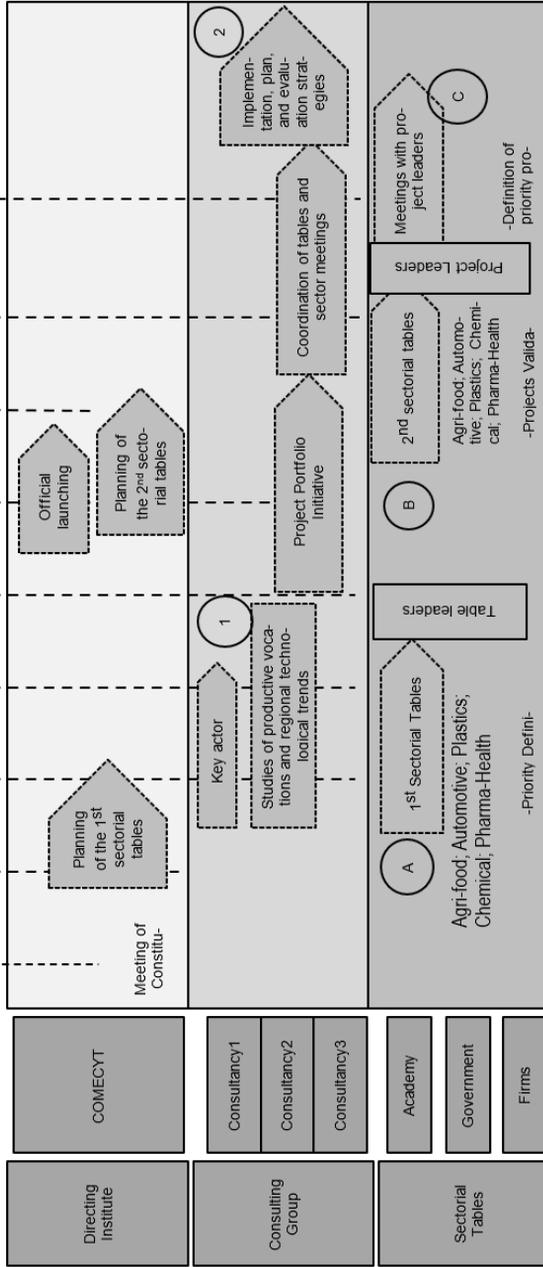
3.1.1. GOVERNANCE

The governance surrounding the SIA was based on different coordination mechanisms that were meant to render this process an engaging one. Interviews to stakeholders, visits to industrial firms, consensus-building workshops and the spread of information were key instruments to identify smart specialization areas, innovation projects and policy options (as seen in illustration 1).

It is important to underscore that the political level to launch the project was very high in that the SIA project was launched by the governor during a specific meeting in which main sector representatives participated. High expectations were created.

In a first stage, after the kick-off meeting in which representatives by the leading institutions at the triple helix participated, consultation mechanisms were determined to find out the sector priorities. The main tool for consultation was consensus-building workshops where sector's representatives (industry, the academia, the government and the civil society) analyzed the needs and opportunities making use of information provided by the coordination team (socio-economic-state by each specific sector, available STI capabilities, and technological trends). These were carried out in two phases: the first one was to agree on the goals and to designate a sector leader responsible for overseeing the discussions, and as a liaison officer with COMECYT. It is important to highlight that priority sectors were decided on by the State's government. This facilitated the initial efforts, but posed further difficulties since some people

ILLUSTRATION 1. GOVERNANCE MODEL FOR RIS IMPLEMENTATION AND SIA, STATE OF MÉXICO



Source: Authors' elaboration.



demanding areas with “greater potential” be included. Selectivity is always a difficult matter to deal with.

Sector leaders were carefully chosen based on their experience in innovation, their convening power, and their relations with the industry’s stakeholders. However, some problems appeared when some participants questioned their leadership and tried to replace the original leaders, mainly because there was a misconception related to the likelihood of leaders potentially influencing the allocation of funds for the resulting project portfolio. Political tension was a challenge in terms of governance and demanded careful attention by both COMECYT and the coordination team.

Once the initial list of priority projects was ready, project champions were identified and encouraged to undertake the building of full proposals so as to estimate financial and technical needs to implementing the agenda. The result was a complete project portfolio involving firms, academic institutions, financial agencies, and other think tanks. Appropriate budgeting for implementing the agenda was also in place.

A new project stage started in 2019, but early on, there was an unexpected change in the COMECYT’s direction. For almost six months, the council had an acting director who did not have the power to allocate project resources. The SIA’s coordination was assigned to another group. During the second half of the year, a new director was appointed, but, surprisingly, little was made to fund projects. Some sector’s leaders left the project and the governance’s structure was modified.

Those leadership changes have been an obstacle for the implementation of the agenda. Political changes often translate into priority changes or sharp delays in the decision and policy making. COMECYT had a positive experience implementing an SME agenda, and little changes were made because the IDB, as project co-sponsor, monitored progress and results (Solleiro & Sánchez, 2015).

The new project considered a more ambitious innovation agenda as part of the State’s Innovation System. The leadership by COMECYT¹ was favorable to convene high-level representatives from the industry and the academia, but that raised expectations in terms of funding for specific projects. The delay to fund programs has disappointed many of the participants, and so governance is threatened.

1 The leadership of COMECYT could be benefited from the extraction of good practices on institutional governance developed by European institutions (where the RIS3 approach has been implemented in a much intense way) such as the role played by the Regional Government of Auvergne-Rhône-Alpes in France to deploy an innovative public procurement strategy, or the development of manuals for entrepreneurial discovery done by the Regional Research and Innovation Council in Greece, or to identify innovative clusters to foster cooperation among universities, enterprises and communities, a plan developed by Regional Government of Friuli Venezia Giulia in Italy (European Commission, 2016: 15, 18,23) to name a few. All of these examples detail the relevance of having a governing institution and a accurate governance model to drive a successful RIS3 strategy.

3.1.2. INSTITUTIONAL FRAMEWORK

The RIS3 methodology must occur under a stable institutional framework, an element that was not present in this case study. As explained above, organizational changes generated great instability and confusion regarding the priorities, a fact which rendered the SIA initiatives blurred in the short term. Concurrently, the change in the federal government brought uncertainty on the STI policy in Mexico. Most of the programs and funds supporting technological development in the private sector companies were cancelled in 2019. Instead of growing, Mexico's GERD suffered cuts, and a new law on science and technology is under discussion. The policy environment is fragile and unstable, which is one of the greatest weaknesses of Mexico's innovation system. Concerning the Mexican states, their STI programs are highly dependent upon federal resources. For that reason, COMECYT lacks the financial support to implement the state's innovation agenda. This clearly shows that there should be a solid commitment by the federal and state governments to provide the bare minimum in terms of stability to the institutional framework².

3.1.3. FUNDING INNOVATION ACTIVITIES

Funding for innovation activities is a requirement to implementing innovation agendas. COMECYT used to be one of the few Mexican states managing a budget and specific STI programs. This budget was not increased in 2019³. This budget is low and quite insufficient because it just covers regular programs. There is not a special budget item that supports the implementation of the project portfolio resulting from the SIA. As mentioned before, federal funding programs for regional innovation are no longer available, because the new federal administration is not considering matching their funds with the state governments in the form of the so-called Mixed Funds (*Fondos Mixtos*). Given these precarious conditions of access to funding, it is necessary to explore new forms of private- public arrangements to invest in regional innovation. Technical international cooperation is another option to look at, bearing in mind that raising new funds calls for active management and building institutional capacities.

2 Ironically, the State of Mexico currently has, in a nominative manner, an Advisory Council on Science and Technology, an organism that finds its provisions in the State Science and Technology Law (especially in its Section V of Article 16, SIIICYT, 2019). However, in spite of the existence of this advisory council (whose objectives are "promoting the expression of the scientific, academic, technological and productive sector, for the formulation of proposals regarding scientific and technological research policies and programs"), this institution is neither formally installed nor in operation.

3 COMECYT's budget was of 269 million pesos (approximately 13.8 million dollars) (COMECYT, 2019).

4. CONCLUSIONS AND RECOMMENDATIONS

Identifying the main weaknesses is important to improve the RIS3 management. These are shown in Table 1.

TABLE 1. GENERAL CONSIDERATIONS AND RECOMMENDATIONS FOR THE RIS3 FOR BUILDING A SIA IN THE STATE OF MEXICO

	RIS3 stages	General considerations	Recommendations for improvement
1	Analysis of the regional context and potential for innovation	The selection of priority sectors was already defined by COMECYT, this might represent a constraint to including other potentially important sectors for the region. The coordination group conducted sector-based studies, but they were not fully considered to define smart specialization areas	'Zero base' analysis on regional context using statistical tools such as 'regional index' may be relevant to select genuine potential sectors for smart specialization. It is important to deliver S&T specialization analysis. Also, COMECYT should establish RIS3 objectives from the beginning, defining indicators to be achieved by the innovation agenda. SWOT analysis per priority sector require sound data and further analysis.
2	Governance	Ensuring engagement and ownership was partially achieved. Mechanisms to coordinate the RIS actors were achieved, nonetheless, building up a functional RIS has not been possible. A governance model to outline a 'systemic' perspective (aiming at the same development objective) has been absent. Institutional and organizational changes broke the governance structure	Good governance is needed in order to reach arrangements which ensure that stakeholder's participation is continuous, thus avoiding the project definition being hijacked by interest groups. New actors need to be included, e.g. farmers associations or advocacy organizations, to complete a quadruple helix model. Greater commitment by government bodies should be guaranteed for a longer-term vision
3	An overall vision for the region's future	Partially fulfilled, since the 'vision of the future' is limited because this perspective does not typically consider long-term planning. The State's Development Plan includes the commitment to developing a State's Innovation System, but its implementation requires better management and advocacy by COMECYT.	The SIA should be officially recognized as a government program, with clear budgeting and actions for its implementation. A cooperative agreement with the federal government and large industrial groups could set solid ground for longer-term planning
4	Identification of priorities	Fulfilled but perfectible. It was always not possible to reach consensus, in those cases, the COMECYT's director avoided conflict and promised to include "specialization areas" for political motives.	It is necessary to keep competitiveness and socioeconomic criteria as a basis for decision making.

5	Definition of a coherent policy mix, roadmaps and action plans	Partially developed. Policy frameworks for innovation in the State of Mexico were taken into account, and the needs regarding policy development and instrumentation were defined. But changes in authorities led to people abandoning proposals	It has been proved that a good RIS practice combines the adoption of strategies with an agreement on actions plans (Foray, et al 2012: 53), in Mexico, this could have happened if the SIA had been given a government program status. Cooperation and coordination among national-regional-local government levels should not be left out of the picture.
6	Integration of monitoring and evaluation mechanisms	The 2018 project contemplated a proposal involving monitoring and evaluation indicators, however, this proposal was brief and was not implemented. The new COMECYT administration made considerable changes to the agenda and the project portfolio, rendering indicators and M&E obsolete.	Some RIS3 monitoring and evaluation indicators during the design process could be performed, i.e. context indicators, output (immediate product) and impact indicators.

Source's: Author's elaboration.

This experience illustrates the greater emphasis that has to be given to achieve acceptable continuity in terms of the policies and programs derived from RIS3. The agenda's translation into feasible programs requires greater commitment by high-level policy makers in addition to granting resources to finance the project portfolio. The expected SIA outcome is disappointment from the innovation system actors. Great expectations were raised by the governor, but business remained as usual with COMECYT offering its regular programs to support scholarships, scientific awards, and some funds for small local SME projects.

It became clear that increasing the amount of resources needed for innovation requires that system's actors, particularly private firms, build stronger arrangements with the government to design and launch innovative financial mechanisms for innovation. If this does not happen it is quite sure that the local economy will remain relying their on traditional advantages in terms of location and low salaries.

The lack of awareness regarding the importance of sound and sustainable innovation policies shows that capacity-building is a critical factor for success. Therefore, COMECYT should organize high-level training on innovation policies and management addressed to the main actors in the innovation system.

Interaction is the foundation for system implementation and collaboration, as it allows for a collective learning process. The agenda's definition and the activities organized for the RIS implementation clearly illustrated that a new paradigm of participation is required. As mentioned before, some people participating in workshops tried to influence the interactive process during the workshops to prioritize their own initiatives. Such individualism is a threat for governance and for the project's implementation. It was also clear that economic incentives are required to foster collaboration among the actors of

the innovation system. Building an innovation system requires an organization with a stronger brokering role to help coordinating multiple players and facilitate partnerships and bonding.

The construction of flexible yet firm governance models is a priority to reduce the negative effects of administrative and policy changes that occur periodically and that jeopardize the continuity of priority projects and the sustainability of innovation systems. These governance models can enhance the strategically selected sectors if they are accompanied by a more robust STI institutional environment. This consideration can be materialized only if decisions are made to increase the state's budget for innovation projects, to build agreements with industry to launch joint initiatives to implement the project portfolio, and to involve of municipal authorities to incorporate a more precise regional focus. This involvement of micro-regions could lead to overcoming the innovation paradox (Muscio et al., 2015) in the sense that devoting resources to economic areas with the greatest potential could lead to deepening weaknesses of traditional sectors with lower economic performance but socially important.

Finally, it is important to consider that, as the RIS3 was "localized", the basic framework conditions and methodological gaps need to be taken into account. The relevance of this piece of research fundamentally rests in the analysis of difficulties and some strategies to overcome them. This experience can be useful for developing countries trying to develop their regional innovation systems and setting agendas based on their potential for competitiveness. However, the use of a smart specialization strategies is only one of the necessary tools to promote sound innovation policies.

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