RIS3 in the Context of Northern Mexico: Lessons Learned in the Process of Drafting State Innovation Agendas

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Abstract--**Research and Innovation Strategies for Smart Specialization (RIS3) methodology has been tested in Europe for the development of agendas for territorial economic transformation. In 2014 RIS3 was adapted in Mexico to define innovation agendas for each of the 32 states of the country. This process was promoted by the National Council for Science and Technology and the authors of this paper participated in the development of the agendas of seven states in northern Mexico. Based on this experience, this paper analyzes the process carried out to develop these agendas, which included the following main stages: identification of the areas for Smart specialization; integration of governance bodies and advisory groups; organization of consensus – building workshops to identify priority innovation programs and roadmaps to achieve their objectives.**

This paper describes the process in detail, recognizing the main stakeholders participating in the process and the main factors favoring or hindering it. The role of government, academic and industrial sectors' representatives is evaluated under specific circumstances of access to critical information, political motivations and a short–term vision. Based on this analysis, the lessons learned are presented and recommendations for further work in innovation policy are drafted with the intention of enriching this process in countries with little tradition of defining smart specialization sectors.

I. INTRODUCTION

Foray, David and Hall [1] identified that "the phenomenon of smart specialization is not at all new; what is new is the analytical description of the phenomenon which generates a few insights and directions concerning policy making". Therefore, the concept of Smart Specialization represents an evolution of previous ideas from a range of areas of economics, business, geography and regional development, all of them generated to strengthen policy making. Regions, especially when they have developed clusters and appropriate infrastructure and policy frameworks for supporting innovative enterprise, represent more meaningful communities of economic interest, define genuine flows of economic activities and can take advantage of true linkages and synergies among economic actors. "Regions have to seek competitive advantage from mobilizing all their assets including institutional and governmental ones where these exist, or press for them where they do not" [2]. In fact, 'smart specialization' could be defined as a type of innovation policy based on theory of regional innovation systems [3].

The importance of regions as support to develop innovation systems has recently been recognized by different authors. Krugman [4] refers to economic geography as the study of the location of factors of production in space as an analytic platform to developing economic policies and strategies based on agglomeration and specialization as well as their relationship and interaction.

Porter [5] developed a model departing from the idea that innovation and competitive success of industries are influenced by clusters which are geographic concentrations of interconnected companies and institutions operating in a particular field. "Clusters encompass an array of linked industries and other entities important to competition. They include, for example, suppliers of specialized inputs such as components, machinery, and services, and providers of specialized infrastructure. Clusters also often extend downstream to channels and customers and laterally to manufacturers of complementary products and to companies in industries related by skills, technologies, or common inputs. Finally, many clusters include governmental and other institutions—such as universities, standards-setting agencies, think tanks, vocational training providers, and trade associations—that provide specialized training, education, information, research, and technical support". With this framework, Porter states that location acquires a new dimension to foster competitive advantages.

In the case of regional innovation systems, innovation is seen as being fundamentally a geographical process where innovation capabilities are being sustained through regional communities that share common knowledge bases. Cooke [6] remarks the importance of cultural factors influencing innovation at regional level. He refers to these as the superstructural issues which are the mentalities among regional actors or the 'culture' of the region. 'Culture' appears at two levels: institutional and organizational (for firms and governance) level. He states, that together these help to define the embeddedness of the region, its institutions, and organizations or the extent to which a social community operates in terms of shared norms of co-operation, trustful interaction, and 'untraded interdependencies'. Opposite to these are competitive, individualistic, 'arm's length exchange', and hierarchical norms. A cooperative culture, associative disposition, learning orientation, and quest for consensus are typical to a region displaying systemic interactive innovation at both institutional and organizational levels. Within this framework, the concept of a regional system of innovation helps public authorities to focus on their present industrial strengths and to develop a strategy for the future based on those strengths.

II. MEXICO'S PROGRAM OF INNOVATION AGENDAS.

The National Council of Science and Technology (CONACYT) conducted, during 2014, the project entitled

"State Innovation Agendas" (SIAs) as a mechanism to define public innovation policies with an accurate approach to address the specific needs in each of the 32 states of the country, trying to make the most from their productive vocation and innovative capabilities.

For the elaboration of the SIAs, the RIS3 methodology was utilized, which has been employed in various regions of the European Union and whose purpose is to use resources more efficiently promoting consensus among the various stakeholders in the innovation process.

The concept "smart specialization" is based on the identification of the specific characteristics of each country or region, capitalizing on the competitive advantages of each territory in face of other regions, all of which is inserted in a process of prioritization that gathers the stakeholders involved along with innovation and the resources available around a vision of their future to reach objectives of excellence and competitiveness [7]. A commitment to Smart specialization strategies can promote greater diversity of areas of knowledge and expertise within the system, thereby rendering the entire economy more able to enjoy the benefits of distinct local agglomeration economies and less vulnerable to both supply and demand shocks emanating in global markets.

The RIS3 methodology conceived by the European Union is structured around the following six stages [8]:

Stage 1. Analysis of the regional context and the potential of innovation
Stage 2. Governance: to ensure the participation of the various stakeholders (companies, clusters, universities, technological centers and government bodies)
Stage 3. Development of an overall vision on the future of the region
Stage 4. Identification of priorities
Stage 5. Definition of a coherent policy, technology road maps and action plans
Stage 6. Integration of control and evaluation mechanisms

In the process of execution of the SIAs, the RIS3 methodology was adopted without properly considering its adaptation and adjustment to the national and regional environment, which as a result caused setbacks and limitations that reflected on the outcomes and perspectives.

Undoubtedly, the issue of governance was one of the most critical aspects of the process given the novelty of the concept in the national public administration and the deteriorated credibility of governmental innovation programs.

It was also observed that despite the existence of numerous studies regarding productive vocations and innovative capabilities at state level, there is still a resistance to setting priorities based on these factors, or even considering any other.

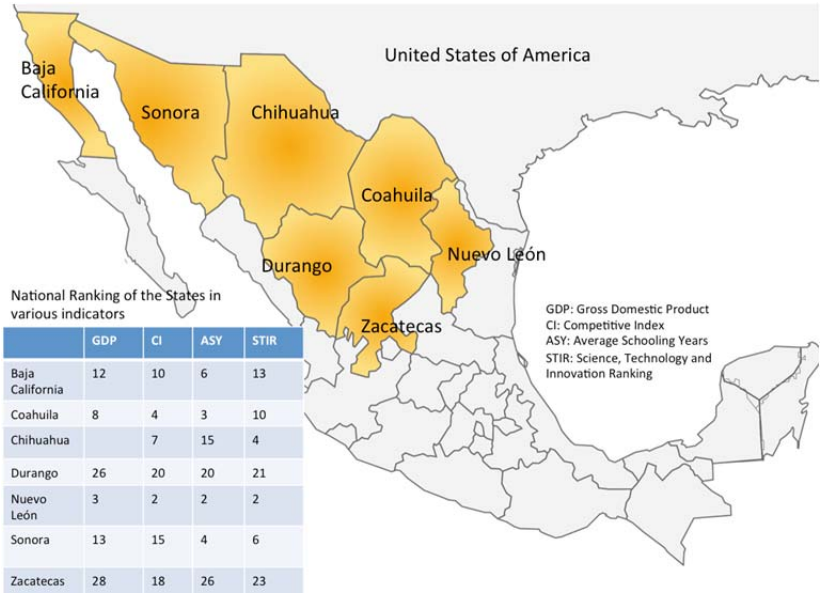
Nevertheless, in spite of the limitations found in the application of RIS3 methodology, there were positive results among which it is worthwhile mentioning the following: 1) generation of discussion spaces among the stakeholders of the triple helix (government – companies – universities); 2) centering innovation agendas on the entrepreneurial needs as a driving force to invigorate the economy and society; 3) definition of lists of strategic projects for specific sectors in the different states; and 4) linking public innovation policy making to the main clients (the companies).

Thus, this document intends to make an analysis of the implementation of RIS3 methodology in seven states of Mexico, all of them located in the north of the country; to derive lessons learned and generate proposals to improve its application in the national context. In order to do this, the first part of this article presents the socio-demographic characteristics of the seven states considered for this analysis as well as the general considerations of RIS3 implementation; the second part analyzes the results produced after applying RIS3; the third section addresses the lessons learned and the adjustments suggested to execute RIS3 methodology in such a country as Mexico to finally present our conclusions. Selection of these seven states for our analysis is due the direct involvement of the authors in coordinating the process of development of these agendas and another covering the region. CONACYT assigned the distribution of the states among four institutions.

III. IMPLEMENTATION OF RIS3 METHODOLOGY IN SEVEN STATES OF MEXICO

RIS3 methodology was applied in the 32 Mexican states, however, for the purposes of this analysis, seven processes are reviewed for the following states: Baja California, Coahuila, Chihuahua, Durango, Nuevo León, Sonora and Zacatecas. The reasons to focus on these are: 1) the authors of this article participated as facilitators in the application of RIS3 in such states; 2) being active participants of the process, there is detailed information regarding the participants in the process, the role of each of them, the way in which consensuses were reached, as well as the integration of governance bodies; 3) there is information concerning the participation of the promoter of the initiative (CONACYT) during the entire RIS3 implementation process; and 4) interviews with the stakeholders that participated in it were obtained after the implementation of RIS3.

The seven states together comprise a territorial area that encompasses 46% of the national territory as it includes the country's largest states. In them, the weather is mostly dry and very dry with high temperatures and scarce rain (Fig. 1). Table 1 shows that Zacatecas and Durango have a lesser development than the other states, from all the variables considered they are below the 16th place. These are the only two states that do not share the border with the United States, which certainly exerts some influence on innovation mainly because a great number of final-assembly firms is located near the border. Besides this commercial, academic and cultural exchange with the neighbor country has an impact on foreign direct investment and technology transfer, and therefore on the performance of the states. From the indicators considered, the one that outstands is the one



	GDP	CI	ASY	STIR
Baja California	12	10	6	13
Coahuila	8	4	3	10
Chihuahua		7	15	4
Durango	26	20	20	21
Nuevo León	3	2	2	2
Sonora	13	15	4	6
Zacatecas	28	18	26	23

Figure 1. States selected to analyze the application of RIS3

TABLE 1. RELEVANT ECONOMIC INDICATORS OF THE STATES CONSIDERED IN THE ANALYSIS OF THE APPLICATION OF RIS3

Indicator	National Value	State						
		Baja California*	Coahuila*	Chihuahua*	Durango*	Nuevo León*	Sonora*	Zacatecas*
GDP per capita[1] (2012) [9]	8334.15	8628.28 (12)	11514.13 (5)	7454.54 (15)	6780.05 (19)	14700.13 (3)	10074.6 (9)	6052.3 (23)
Competitiveness index (2010) [10]	66.2	71.8 (10)	79.8 (4)	73 (7)	62.1 (20)	90.1 (2)	68.4 (15)	65.7 (18)
Economic units (2014) [11]	5701947	118,320 (18)	108337 (21)	130871 (15)	76227 (26)	161,661 (11)	116,157 (19)	85,822 (24)
Average schooling years (2010) [12]	8.6	9.26 (6)	9.47 (3)	8.8 (15)	8.58 (20)	9.8 (2)	9.42 (4)	7.9 (26)
Position in science, technology and innovation capabilities [13]		13	10	4	21	2	6	23
Business infrastructure {13]		3	5	7	20	1	9	26

[1] Dollars (Exchange rate used was 13.26 pesos per dollar corresponding to the average interbank exchange selling rate in 2014).
* The number in parentheses refers to the position the states hold in relation to the country's 32 states.

regarding the average schooling years; five out of the seven states on which we worked are in the first places nationwide. In general terms, there is a maquiladora industry in those states inserted in high-tech sectors such as aerospace and automotive, to mention a few, and this is an influencing factor too.

With respect to the capabilities of the states in terms of science, technology and innovation, the different indicators that are evaluated by the Advisory Forum on Science and Technology to determine the ranking, show that Baja California, Sonora, Chihuahua, Coahuila and Nuevo León are among the most developed states (Table 2).

Regarding RIS3 methodology, it is worthwhile mentioning that at first, it was executed following the same procedure in the seven states considered in this analysis. As it has been pointed out, the methodology followed substantially the provisions of the Guide for the elaboration of research and innovation strategies for smart specialization (RIS3) [8], the features of each stage in the context of the seven states is shown in Table 2 and Fig. 2 in which the main steps of the work are illustrated over the one-year period of the project.

TABLE 2. METHODOLOGICAL CONSIDERATIONS CONDUCTED IN EACH STAGE OF RIS3 WHEN APPLIED TO SEVEN STATES OF MEXICO

Stage of methodology	General considerations
1. Regional and potential context for innovation	Review and analysis of previously generated documents and S&T assessments in the states by governmental agencies such as the local Ministries of Economic Development, the state councils of Science and Technology, CONACYT, as well as studies carried out by universities. Identification and contact with business groups (clusters and industry chambers)
2. Governance	Led by state authorities (mostly the Ministries of Economic Development); an active participation of industry was achieved, which was mostly represented by the directors of the clusters. In such industries where the figure of clusters did not exist, it was decided to incorporate industry's opinion leaders. The triple helix approach (government-industry-universities) was implemented to legitimate the consultation process. For the governance two decision-making bodies were constituted: 1) the **Management Committee:** responsible for the decision-making and implementation steps related to SIAs. 2) Advisory Group: in charge of advising the Management Committee in key decisions such as the selection of smart specialization areas, validation of priority projects for each sector and validation of the final SIAs.
3. Vision of the future in the region	Generated in virtue of previous work related to the state development plans, STI and business public policies. Organization of consensus-building workshops with representatives of industry, academia and local governments
4. Key stakeholders involved in consultations and consensus-building workshops	Top-ranked officer named by state's governor as local coordinator Managers of local firms belonging to priority sectors Leaders of local industry chambers and associations Higher authorities of local universities and public research centers Coordinators of federal government's programs to support innovation, exports and industrial development (Ministry of Economy, PROMEXICO, Ministry of Agriculture, Mining Council, etc.) Opinion leaders
5. Identification of priorities	The discussions dealt with establishing a small number of priority economic sectors (four to six) as well as specialization areas within those areas. The sectors had to be made in terms of the local specialization index[1] as well as socio-economic considerations to generating jobs and adding value locally.
6. Priority projects portfolio, technology policies and road maps	Each Agenda includes a list of projects, an estimation of investment and recommendation on policy instruments to implement them A technology roadmap for the priority projects identified, including the possible participants and sources of funding
7. Control and evaluation mechanisms	Elaboration of a dashboard to define compliance indicators of established goals.

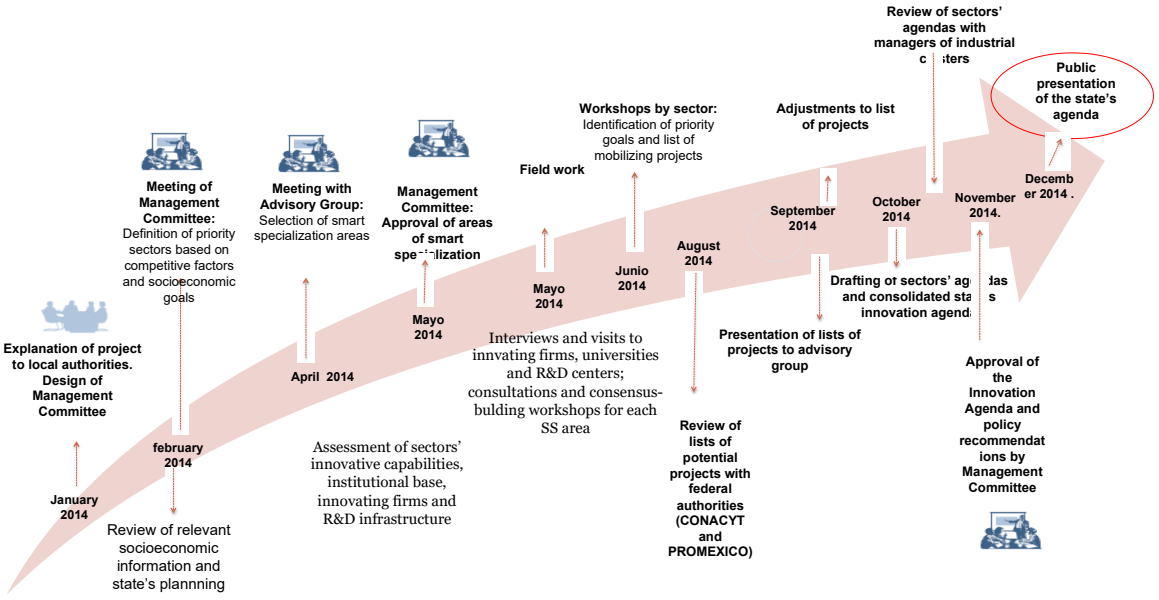


Figure 2. Steps of the methodology to develop a State's Innovation Agenda.

[1] This index integrates criteria of the contribution that the economic activities had in state GDP, in its growth rate in the past ten years as well as their participation in national GDP.

As it can be observed, we have made some adjustments to the original methodology, mainly in the first stages because a lot of previous work had to be made to achieve agreements with local governments (not always with the required rigor) because it was not politically correct not to consider their inputs to the process.

We had foreseen that some conditions were not possible to be met to fully comply with the RIS3 Guide, but in practice the deviations were more numerous than expected. In fact, before discussing this with more detail, it is convenient to highlight that stages five and six were addressed very briefly, especially because of the limitations of time so as to conclude the project (the application of RIS3 was conducted in twelve months, which included from the stages of organization and preparation of the work, visits to companies, workshops, review of previous documents and basic statistics, integration of partial and final reports, among other activities). Sponsors of the project were under pressure to present the results and the development of policy recommendations and indicators did not receive enough attention by state governments. We faced changes in local authorities and official contact person in four out of seven states, which represented considerable delay in making key decisions on the agendas.

It is important to provide some information concerning the manner in which the work was structured and the concrete activities to cover the stages indicated in Table 2.

In relation to the teams, it was fundamental to hire local consultants at each of the states, to take advantage of their knowledge of the local socioeconomic, geographic, cultural, scientific, technological and political environment. In addition, it was deemed appropriate that said team had wide networks of useful contacts with stakeholder groups. In order to comply with these requirements, in each state a team of at least three people on average was formed.

With regard to the activities carried out by the consulting teams in the states, they included following packages: 1) search, recovery and analysis of socioeconomic and technical information; 2) identification of potential members of the governance organisms and their formalization; and 3) fieldwork to conduct workshops and report on their outcomes. Details of the relevant aspects comprising each group are presented as follows.

a) Search, recovery and analysis of information

Elements considered: Information on selected economic sectors of the states; studies about productive vocations, review of technological and innovation capabilities of universities and research centers (RC); identification of successful innovative companies; assessment of global technological trends that impact those economic sectors. It is worth mentioning that it was difficult to find up-to-date information on sectors[2]. It was also common that state authorities referred that all relevant information was available, but the fact is that such information was superficial and incomplete.

Concerning the assessment of research capabilities, little could be obtained apart from the list of ongoing research projects or the number of faculty, and education programs. In terms of the identification of technological trends, we realized that managers of clusters and industrial chambers as well as research personnel are not fully aware of the relevant scientific, technological and economic literature. This forced us to elaborate various studies to identify relevant trends in industries such as aerospace, automotive, information technologies, mining, agri-food, tourism and advanced manufacturing. The resulting documents were very useful reference to conduct the sector-based consultation workshops.

b) Structuring of governance bodies

This was a difficult and demanding task because local authorities are very unstable and reluctant to enter into a priority-setting process. The expression “nobody should get out of the game” was very common. To create the two bodies to assure governance of the process demanded negotiations with government officers. At last, those bodies were in place and they were very influential in arriving to results playing an important role of advocacy. Being integrated by opinion leaders of industry, academia and government offices, the Advisory Group gave legitimacy to the process and exerted some pressure on government officials to have greater involvement in this process.

Various meetings were held with the governance bodies and in general members were willing to participate and contribute to strengthening the agenda by recommending projects and the involvement of key people; however, there were some factors that discouraged a better performance, among them, a political component, which in some cases involved not contravening the authority.

Dealing with the Management Committee was more complicated because it was integrated by high- ranked officers of local governments and we had to face many changes of representatives because they leave. That brought lack of continuity and the need of re-negotiate agreements. This problem remains for the process of implementation of the agendas. In two states, a new government took the lead, with brand new staff members who have very little commitment with the agenda.

Fieldwork

Consensus-building workshops were organized in different cities of the states with participation of

[2] The most detailed official statistics available at the moment corresponded to the Economic Census of 2009.

representatives of firms, clusters, universities and research centers. A methodology was followed to identify problems and opportunities, industry's needs and, based on this, to select the specialization areas per sector. Analyzing technological trends and available resources an outcome of the workshops was the proposed list of priority projects. Field work included also visits to companies, cluster facilities and research labs to get to know closely their technological and innovation capabilities, as well as their expectations of the agenda. This work was very important because people fell better to share their views on the best way to fund and organize the projects and how the firms could adopt innovations.

In general, there was a good participation of the companies even though some of them are subsidiaries of multinational firms and staff members are reluctant to share their views.

It was very difficult to convey the message that the motivation of the entire process was to trigger projects with a collective impact, that is to say, not to privilege projects that benefit one single company but instead a group of them. It was confirmed that Mexicans are not used to cooperate to develop innovations and that represents an obstacle to manage agendas.

IV. ANALYSIS OF RIS3 IMPLEMENTATION

A. Regional context and potential for innovation

All the states analyzed have abundant natural resources, consolidated industrial sectors and a rapid growth. Foreign direct investment has been important in the past years, generating jobs and the need for trained personnel. Nonetheless, some of the industries that foster growth in these states are *maquiladoras* (particularly the advanced manufacturing industry that encompasses automotive, aerospace, electronics and medical devices). These industries import virtually all their components and assemble them in order to export them subsequently [14] and therefore they are not interested in engaging in innovation as all their guidelines come from abroad. In the case of the mining sector, which is very important in the region, innovations are introduced by equipment suppliers. Thus, it may seem obvious that in the process of elaborating the SIAs there should be a higher participation of Mexican innovating firms; however, it was difficult to locate and get them involved. This introduced some difficulties to focus the analysis on innovation and not in simple measures to expand production capabilities (investment, acquisition of equipment, etc.)

These states have good infrastructure for higher education and research in government centers. Nevertheless, it was apparent that there is little linkage between the stakeholders of the triple helix. The industrial culture of investing in innovation and collaborating with other institutions is in its early infancy.

On the other hand, with regard to the institutional framework to give support to generating and integrating innovation capabilities, all the states have created laws on science and technology, they have a body in charge of managing the scientific and technological activities of the states, S&T Programs and even technological development plans to generate wealth. Nonetheless, the reality is that the state innovation system has very few resources and there is a great degree of dependence upon federal funds.

B. Governance

The concept of governance is associated with the direction of society transcending the governmental action, since the governments, in order to reconstruct the possibility for their societies not to become decadent and to reach their goals in the economic and social areas, had to integrate to their deliberation and action independent economic and social agents whose actions by the way do not adhere to political ideologies [15]. Governance has been understood as a way in which a society behaves and also as a way of organizing collective action to achieve common objectives where both public and private stakeholders participate.

Reference [16] defined governance as ""the exercise of economic, political and administrative authority to manage a country's affairs at all levels. It comprises the mechanisms, processes and institutions through which citizens and groups articulate their interests, exercise their legal rights, meet their obligations and mediate their differences." The core idea is that governance transcends the State and includes civil organizations and the private sector.

Undoubtedly, at the beginning of application of RIS3, we had the idea of applying the concepts of governance as it has been indicated above; however, the reality was very different. To begin with, the processes to convene the participants as well as to validate the results of the process heavily depended upon a governmental agency. In none of the states was it possible to conceive the process without the influence of political interests. Additionally, the decision process occurred with little participation of the civil society. This fact has various explanations, the first one is that in general in Mexico, there is not a culture to create civil groups that engage actively in decision-making related to innovation; the second has to do with the fact that the educational level of the population is still low, and therefore it is difficult to find groups with solid arguments to strengthening a planning process focused on innovation.

C. Vision of the future of the region

Future scenarios were structured based on the current state development plan which normally centers on economic growth with improvements in the population's social conditions. All the stakeholders coincided to pointing out these axes as the guidelines for structuring SIAs; nevertheless, no elements are contemplated in the evaluation

and monitoring process to assess if innovation agendas yield results impacting those desired scenarios. This is a pending matter for the implementation and impact assessment of the agendas.

D. Priority identification

According to RIS3 methodology, there most be a focus on selecting a small number of economic sectors (three or four). The results of the SIAs show that while socioeconomic and state development criteria were considered, it was practically impossible to select just a few sectors. Smart specialization is difficult when decision makers rather respond to political interests. Table 3 shows the sectors considered as priority for each State.

The case of Durango is remarkable because nine priority sectors were set; this circumstance is grounded on the fact that "no one can be left out" of the benefits of a public or innovation promotion policy, not seeming to understand that this is not the intention of smart specialization.

Additionally, what can be observed in Table 3 is that it was inconsistent how some states defined an "economic sector" since in some cases what is defined as a sector rather corresponds to technological fields such is the case, for example, of biotechnology, which has potential applications in the agro industrial, mining and medical devices sectors but it is not an economic sector. This reflects a poor conceptual comprehension and this will influence in the identification of stakeholders and proposed projects tend to be very academic.

E. Definition of policies and technological maps

This activity focused on the construction of roadmaps that will indicate the main actions to undertake, the technology inputs and competences required to achieve sound goals as well as the actors who should participate in innovation projects. A roadmap was built for each of the 127 priority projects.

In addition, funding needs for the realization of the projects in the portfolio were estimated, as well as likely funding sources and the main actors (leader and participants) that should get involved in the development of the project. This information was delivered to CONACYT to estimate the minimum resources necessary to implement the agendas.

TABLE 3. PRIORITY SECTORS SELECTED PER STATE [1]

	Baja California	Coahuila	Chihuahua	Durango	Nuevo León	Sonora
Agro-industry	X	X	X	X	X	X
Aerospace	X				X	X
Biotechnology	X				X	
Renewable energy	X			X	X	
Advanced manufacturing[2]	X	X	X			
Nanotechnology					X	
Automotive		X			X	X
Electronics			X			
Medical devices	X				X	
ICTs[3]	X	X	X	X	X	
Environment		X		X		
Conventional energy		X	X			
Mining			X	X		X
Electronics	X		X			
Metal-mechanic				X		
Tourism				X	X	X
Wood				X		
Health				X	X	
Interactive and entertainment media					X	
Sustainable housing					X	
Logistics and transport					X	

Own elaboration based on information contained in [17]

1. Due to space, the sector is only indicated without further details regarding the specialization niches that each of them comprises.
2. In the case of Chihuahua, advanced manufacturing included the automotive, aerospace and metal-mechanic industries.
3. It includes software (with multiple applications), hardware, embedded software, among others.

F. Monitoring and evaluation mechanisms

General aspects were considered to assess the progress in the implementation of the SIAs, which are shown as follows:

- Total investment to carry out the projects of each SIA.
- Proportion of private funding / public funding for the execution of SIA's priority projects
- Total resources allocated per priority sector
- Number of strategic projects being implemented
- Number of participants in ongoing strategic projects
- Number of companies participating in strategic projects

As observed, no specific indicators for monitoring and control were identified.

V. LESSONS LEARNED

The effort to identify areas and projects for smart specialization corresponding to sectors in which the states have competitive advantages is relevant but it is clear that this process must be planned and executed carefully. The experience using RIS3 methodology in the Mexican context has left various lessons to generating better results in future exercises. The most relevant aspects to consider are listed below.

- Priority-setting as a result of top- down instruction from an authority tends not to be well accepted. This situation worsens if the federal government leads the process without the convincement of state's governments. There was a perception that RIS3 and the elaboration of agendas was imposed to the states. Therefore this process must be legitimized in advance among the stakeholders and it must be a previous step to the six stages of RIS3.
- Participation of industry in the RIS3 process was influenced by aspects such as the origin of capital and the sector to which firms belong. The critical mass of local Mexican companies should be involved as active actors of innovation because they are suppliers of larger firms. But it is very important that firms understand the nature of a planning exercise and that the benefit they can realize is linked to their participation in projects of the portfolio.
- Regarding the selection of sectors, there must be a more "neutral" process, that is to say, not being influenced by the dominant opinion of government officials. Following a Delphi-like consultation where the opinions concur anonymously might help to develop the initial list of areas for smart specialization.
- Also related to the issue of selecting sectors, socioeconomic criteria play and important role, but the manner in which the sector is structured should be considered too. For example, in the case of the mining industry, while there has been substantial investment in recent years, it has come from transnational companies, which bring their technologies and are not interested in making innovations locally nor developing innovative local suppliers. It is not to expect that these mining firms will invest in the project portfolio of their sector.
- Addressing economic sectors and enabling technologies that nourish the sectors from the same perspective is a mistake. Firstly, because it is not feasible to compare them using the same criteria; secondly, because in the case of enabling technologies it is difficult to draw economic boundaries.
- The integration of local consultants to implement the methodology in the states is very important. Facilitator teams are fundamental since they have the knowledge and the relations at local level. But we have great difficulty in finding the proper team participants and leaders. It is important to mention that the capabilities and abilities of the facilitators must include technical competencies, a good level of communication, a wide network of local contacts, and group management skills.
- The studies on technology foresight are relevant input that positively nourish the organization of workshops, technical discussions, and generation of feasible projects. However, their elaboration requires time and additional economic resources.
- The issue of governance understood as engaging the state, private sectors, academia and society in the decision-making process is, in the Mexican context, a good wish. There are not the minimum required elements to achieve this. Thus, a less ambitious but more practical governance model should be defined. In practical terms, it is recommendable to consider a decision body with fewer members as what is required is not quantity but quality and representativeness.
- The role of CONACYT must go beyond granting the resources; it must be play the role of facilitator agent before state's authorities and become more active in the process.
- Making a division regarding the geographic borders does not necessarily provides a regional approach. It is necessary to include other factors. For example, in the case of the states we analyzed, the automotive industry was a priority sector. If a more efficient pattern of resource allocation is sought, one should avoid thinking of repeating the same process and the same projects for every state. A regional/sector approach would be more rational.

VI. POLICY ISSUES FOR THE IMPLEMENTATION OF THE AGENDAS.

Implementing the large list of projects deriving from the agenda is a complex task. CONACYT has the main instruments to promote such implementation through two specific funds: FOMIX, specific funds to address technological needs at the state level combining federal and state resources; and FORDECYT, a specific fund to support projects in which several states cooperate to address common

problems. Currently both funds are being applied to support agendas' priority projects. The problem is that decreasing oil prices are impacting negatively budgets. State governments and industry are very reluctant to invest in those projects.

It is therefore that a new set of incentives has to be created to motivate firms, clusters and local governments to finance priority programs. These policy instruments could include tax incentives, subsidies to firms locating R&D activities in science and innovation parks, special funding for clusters investing in new research facilities, and more attractive funding for firms investing in activities to integrate themselves to global value chains.

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