P02 / Science, Technology and Innovation Policies in Metropolitan Regions

Topic : SCIENCE, INTERNET AND TECHNOLOGY POLICY

Chair : Michele Gonzalez Galindo (Secretary of Science, Humanities, Technology and Innovation (SECIHTI))

Second Chair : Moises Israel Iraheta Avila (CIDE Centro de Investigación y Docencia Económicas A.C.)

GENERAL OBJECTIVES, RESEARCH QUESTIONS AND SCIENTIFIC RELEVANCE

Metropolitan regions have characteristics such as economic dynamism (Henderson, 2010; Storper, 2013; Tomàs, 2020, pp. 28–29); air and land connectivity (Hoyler et al., 2008; Thierstein & Lüthi, 2013; van Winden et al., 2007); ethnic, cultural and creative diversity (Florida, 2002; Graizbord & Santiago, 2019; Jacobs, 1961/1992; van Winden et al., 2007); and a strong presence of high-quality universities (Geenhuizen et al., 1997), research centers and human capital (Chapple et al., 2004). All these elements are linked to knowledge, science, technology and innovation. In addition, metropolitan regions are characterized by more pluralistic local governments (Ostrom, 1972).

The economic engine of these regions is related to industrial and service activities (Black & Henderson, 1999; Glaeser et al., 1992; Storper, 2013), and in recent decades, activities associated with the Knowledge Economy (Brinkley, 2006). In this sense, the metropolitan regions of high-income countries have been the first to most successfully arrive at a knowledge-based economy (Lever, 2002; Scott & Storper, 2015, p. 5). However, the national and local governments of middle-income countries have also gradually incorporated scientific and technological development as part of their public policy objectives: They have created a legal framework, designed programs, incorporated institutions and allocated resources, as well as the use of policy mixes (Hood, 1983; Hood & Margetts, 2007; Howlett, 2019; Howlett & Rayner, 2007), to achieve the benefits of the knowledge economy, but at the same time, they have faced their own particular problems when promoting these policies, such as institutional weakness, corruption, little care for the environment, resistance to change in the economic model, resistance from business organizations (unions), lack of investment ecosystems, economic and social inequality, etc.

Given the characteristics of middle-income countries compared to high-income countries, we believe that valuable science and technology policies lessons can be learned by reviewing and comparing these different contexts. In addition to the differences and peculiarities that the metropolitan regions present for the design of public policies that promote technological innovation, policy makers are facing many problems in making the policy related to the innovation system (Howlett, 2014; Peters et al., 2018), one example is the impact of the pandemic derived from Covid-19. The health emergency changed the way science and technology policies are designed, prioritizing specific issues and immediate needs.

The general objective of this panel is to discuss –from a theoretical and empirical point of view- the different challenges that metropolitan regions face in the design and implementation of science, technology and innovation policies. Also, to identify lessons that can be drawn from the successes and failures, and outline some policy suggestions for metropolitan governments, particularly, we stress lessons from middle-income countries that intend to enter, or are in the process of entering, the knowledge economy.

The principal questions to guide the discussion are: How have science and technology policies succeeded or failed in metropolitan regions? What lessons can we learn in the design and implementation of science and technology policies in metropolitan regions?

CALL FOR PAPERS

In this panel we seek to address the main challenges, changes and perspectives of science policies in metropolitan regions. The design of effective policies to promote technological innovation will also be addressed, considering the challenge of new needs in health, environment, transportation and entrepreneurship. And finally, we are interested in the role of actors in metropolitan regions in the design and implementation of policies related to science and technology. In this context, both empirical and conceptual contributions are welcome, but mainly comparative or single case studies related to these topics:

I. How is the design or implementation of science policies in metropolitan regions? What are the strategies that follow for the design of policies that promote technological innovation?Are there specific patterns in

science, technology and innovation policies in metropolitan regions? What could be the differences of the metropolitan regions between middle and high income countries for the design and implementation of science and innovation policies? Do metropolitan regions focus on local technology sectors or national science policies?

II. What was the impact of the Covid-19 health emergency on the design of science and technology policies in metropolitan areas? Have the actors of the innovation ecosystem been strengthened or weakened in metropolitan regions? Do the designers of public policies obey the demands of the international market or do they focus on the needs of the metropolitan region?

III. What are the main challenges for public policy designers on issues of technological innovation in metropolitan regions? What is the short- and medium-term outlook for metropolitan regions to deal with health, national security, food, transportation and logistics emergencies? And what will be the role of public policy decision-makers in science and technology issues?

Contributions from any scientific background are welcome, but with a particular interest in the literature and/or knowledge of public policy studies, public policy design, science, technology and innovation, local governments, governance in metropolitan regions, and related topics.

The best proposals can be considered for a joint project that can be reflected in the publication of a book.

The format of the panel will be onsite.

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Session 1

Tuesday, June 27th 13:30 to 15:30 (KHW375)

Science, Technology and Innovation Policies in Contemporary Uruguay. Problems of coordination and regulation functions

Camila Zeballos Lereté (Universidad de la República)

Marcelo Castillo (Instituto de Ciencia Política - Facultad de Ciencias Sociales - UdelaR)

The objective is to analyze the role played by the functions of coordination and regulation of the Science, Technology and Innovation (STIp) policies. To do this, be part of the
Recognition of the State as a key actor when promoting a national STIP strategy
to the extent that it possesses the capacities and incentives, to develop a systemic view and long-term, capable of transcending sectoral expectations. It is assumed that the construction of technical and political capacities to lead this process, for example, from regulatory policies and/or the implementation of spaces for inter-institutional coordination, are not attributes inherent to the institutions state, but are a political construction. In both cases, it is management instruments designed to facilitate the achievement of political objectives, and not ends in themselves. It is for this reason that such activities should be supported and sustained by technical and economic resources and political support.
The time frame of the analysis covers the years 2005-2021. There are included the three periods of government of the Frente Amplio (FA) (2005-2020) and the first two years of government of the Coalición Multicolor (CM) during 2020 and 2021. Although it does not seek to carry out a exhaustive comparison between governments, the analysis concentrates on the modifications of the functions of regulation and coordination of the STIPs.
The methodology is qualitative. It took as reference the analysis of official documents of the STIPs, government reports, proposals of political parties in electoral competition.

From Smart Cities to Smart Regions: regional innovation and digital infrastructure development in Niagara

Nathan Olmstead (Brock University)

Charles Conteh (Brock University)

The fabric of the Canadian city is increasingly fibreoptic. Across the country, policymakers are investing in technological innovation and digital infrastructure to address their nascent challenges. However, while cities have tended to understand these developmental shifts as a primarily local phenomenon, in the context of so-called smart cities, there is a tension between this perspective and contemporary scholarship on innovation more generally. More specifically, this contrasts with existing research into innovation ecosystems, which establishes innovation as a primarily regional, and inter-regional, phenomena, emerging from economic, technological, and cultural networks that vary in composition and resiliency. With that in mind, this project explores the potential for a more regional approach to digital infrastructure development in Canada. Using the Niagara Region as a case study, it explores the relationship between innovation and technology adoption across the region. Drawing on a mix of archival and interview-based research, we highlight the role of intermediary institutions in serving as key drivers and coordinators of innovation. We argue that these intermediaries serve as key interfaces between the state, market, and society in the development of sustainable innovation policy. The paper thus concludes by arguing that regional innovation policies have the capacity to produce more embedded and sustainable forms of innovation that respond directly to the specific challenges that regions face.

Smart Cities in Metropolitan Regions - Analyzing strategies and funding schemes in the Ruhr Area, Germany

Anne Goldmann (Universität Duisburg-Essen)

Jana Baum (Center for Advanced Internet Studies Bochum)

Mennatullah Hendawy (TU Berlin)

Public policy decision-makers of metropolitan regions around the world are dealing with new needs in health, transportation, administration, and environment in the light of pandemics, climate change and digitalization. One answer to these increased challenges is that cities turn into Smart Cities. By doing so cities themselves become part of their own technology and innovation policy. Instead of designing and implementing policies to enhance the local knowledge economy, the cities, their administration and finally their policy decision-makers are themselves affected by the technological innovation process.

In our explorative study we investigate the biggest metropolitan region in Germany – the Ruhr Area – and its development in recent years to create various Smart Cities. With a population of over 5 million, the region includes 53 towns and cities. As a historic industrial region, the Ruhr Area has experienced several transformations within the last decades. One of the newest in recent years is the development to create various Smart Cities within the region. On the one hand, the goal of a smart city is to overcome given challenges, for example, by becoming more efficient, more ecological or more socially inclusive with the help of new technologies in a unified concept. On the other hand, Smart City projects lead to new challenges. In our paper we want to identify and discuss the challenges decision-makers of Smart City projects are facing. We do this by analyzing policy documents and conducting semi-structured expert interviews.

One of the challenges we see in the Ruhr Area is that there is no real communication at the regional level. Although the cities are geographically very close, they are at completely different points in their Smart City journey. The strategies vary in quantity and quality with respect to the implementation of technological innovations. The realization of planned projects is also at very different points. Overall, a rather uninformed coexistence can be observed. We suppose that the whole region could benefit from the cities seeing themselves more as part of a unit, as the special geographical conditions of the Ruhr Area give rise to many cross-city issues.

Another challenge both the cities and the region are facing is the financial resources which are needed for transforming historically grown cities and well-established city administrations into Smart Cities. As most of the cities in the region are regarded as relatively poor cities, they depend on external funding opportunities. In general, those funding opportunities exist on different federal levels but tend to focus on cities rather than whole metropolitan regions. This leads to the fact that cities of one metropolitan region compete for the same funding. Additionally, the question of sustainability is raised as the current funding calls address the initiation and creation of Smart Cities but not their maintenance. Again, we see that instead of a situation where cities work together as a whole region, there is a division that ultimately leads to each city trying to tackle challenges individually, oftentimes having to start from scratch.

Overall, we conclude that the rise of different smart cities initiatives in the Ruhr Area does not contribute to the strengthening of a smart metropolitan area.

The effects of the adoption of regulatory frameworks on FINTECH development. Comparative analysis.

Mario Miguel Pérez (Center for Research and Teaching in Economics (CIDE), Mexico)

Adriana Ramirez Ruiz (Centro de Investigación y Docencia Economicas)

Jaime Hernández Rocha (Center of Research and Teaching in Economics)

The effects of the adoption of regulatory frameworks on FINTECH development. Comparative analysis.

Abstract

Fintech companies are organizations known for having great innovation potential in the financial intermediation industry, allowing the increase of competition by decreasing the costs of intermediation, which in turn has changed the way companies offer financial products (Philippon, 2019). FINTECH is a term that refers to technologies (particularly information and communications technologies) applied to the financial sector that transform the services offered by this sector (Feyen et al., 2021).

Financial institutions solve the problem of information asymmetry between savers and credit applicants by

improving the efficiency of economic resources, which makes them an important piece for economic growth and development (Petralia et al., 2022). Several authors (See Bagehot (1873); Hicks (1969); Schumpeter (1912); Boyd & Prescott (1986); King & Levine (1993); Thakor (1996) and Levine (1997)) have shown a positive relationship between the development of the financial industry and economic growth and development.

The quick expansion of innovation in financial technologies has created significant regulatory challenges, not only because of the speed of innovation but also because of its complexity. The literature is inconclusive about the effect that regulation has on innovation. On the one hand, authors such as Suryono et al. (2020) advise that regulation can inhibit technological innovation. On the other hand, authors like Weiner (2004) point out that the regulation strengthens users' confidence in technology and stimulates competition. This study seeks to participate in this debate by analyzing the evidence on the relationship between the adoption of regulatory frameworks and variations in the development of FINTECH in 76 countries, differentiating the effects by country income. We argue that the adoption of explicit regulatory frameworks on Fintech favors the entry of new companies into the market, with faster effects in low-income countries. This contribution is important because it makes visible the effect that the regulatory environment has on innovation that comes from highly dynamic technologies such as FINTECH which, in turn, affects relevant financial variables such as the capacity of the financial system which is responsible for promoting economic growth.

We measure the adoption of the regulation through a documentary review of the Fintech legislation in each country. From this analysis, we constructed a binary explanatory variable with values of 0 and 1 in the 2011-2021 time period. The development of Fintech is measured in four dimensions: total number of established companies, registered capital, number of funding events, and amount of funding, which are grouped into an index as Zhao et al, (2022) do. We used a difference-in-difference model staggered with the Goodman-Bacon specification (2021) to analyze the effects at different points in the intervention. Our model allows us to capture differences between high-, middle- and low-income countries.

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Session 2

Tuesday, June 27th 15:50 to 17:50 (KHW375)

Reflections on the geographical distribution of projects financed by Conacyt's "Innovation Stimulus Program" in Mexico, between decentralization and the reproduction of metropolis

Mónica López Rivas (Centro de Investigación y de Estudios Avanzados del IPN)

The objective of this paper is to reflect on the geographical distribution of the projects financed by the Innovation Stimulus Program (PEI) between 2009 and 2018, the period in which the program operated. The main objectives of PEI were to financially support scientific, technological and of innovation projects proposed by the private industry, and to encourage the link between the academy, the government and the productive sector.

This topic is relevant for two reasons, firstly, because it highlights the fact that in Mexico, public policies on Science and Technology at the federal/national level have historically had a more systematized structure, compared to public policies at the state or local level, in terms of legislation and funding. On the other hand, this distribution also accounts for a regional composition that adheres to the organization in Regional Research Subsystems, proposed by Conacyt in the early years of the 21st century that sought to strengthen the decentralization process of Science and Technology, in addition to promoting the link between various sectors of society.

Based on the analysis of the information published by the Conacyt for this period, it stands out that only eight Federal entities, a quarter of the national total, concentrated more than 50% of the projects approved by PEI, a federal S&T program. These data show that even when public policies in Mexico have sought to decentralize the processes of Science, Technology and Innovation, since the second part of the 20th century, the national programs contribute, rather, to strengthening a circular process, that supports major metropolitan regions above the rest of the country.

I believe that reflecting on the centralization of Science, Technology and Innovation processes in countries like Mexico from a local perspective, allows us to put the goals of the S&T policies in terms of the importance of regional diversification on the table for discussion.

GUADALAJARA METROPOLI DE LA ELECTRÓNICA

José Leyva

Sometimes, success is the result of several coincidences and not of high-level political decisions. By coincidence, I mean people with decision-making power, with the same objectives that coincide in space and time and that come together to achieve a goal. When this happens and it coincides that intelligent people with decision-making power operate in the middle management of the government, then public policy works, and the objectives are achieved. These long-term projects require that these coincidences last for several years.

In the opinion of the author, this is what happened in the construction of an industry that did not exist in Mexico 30 years ago, an industry that today exports to the world more than 21 billion dollars in high-tech products, i.e. the so-called Mexican Silicon Valley.

This article reviews the work done by people in industry, government, and academia that resulted in the

development of the high-tech industry; semiconductor and electronic system design, firmware and software development, and the strengthening of the maquiladora industry in the metropolitan area of Guadalajara.

The perspective given here is from the point of view of the author's work at the “Semiconductor Technology Center” (CTS), the Cinvestav’s technological arm in electronics technology.

The importance of long-term policies to consolidate innovation spaces in Latin America. The case of Hidalgo State Government, in Mexico.

Nahely Ortiz Lira (Universidad Nacional Autónoma de México)

The government of Hidalgo State is in Central Mexico. In the last 10 years, Hidalgo's economy has grown faster than the national average. Moreover, productivity increased in the state, this was due to foreign direct investment, low production costs (compared to other Mexican states), important logistics network and an aggressive policy to recover the wide space available in brown field sites and industrial parks.
This paper is about the importance of the Hidalgo Science, Technology and Innovation Council which is considered a successful case of continuity in the Hidalgo government’s scientific and technological policy (that worked through more than a sixyear term) that consolidated a model of collaboration and experimentation, which resulted in the development of scientific and technological parks for innovation.
The main objective is to explore the decisions made by governments to configure this long-term policy and innovation spaces. The first question is how has science, technology and innovation policy been designed and implemented? Moreover, what has been the governance process to consolidate the CITNOVA? The second objective is to show evidence of the results of Hidalgo´s innovation spaces policies and projects, their contribution to the local economy and to sustained and inclusive economic development.

(Virtual) Evaluating Performance of Regional Innovation Systems: a Meta-Analysis of Empirical Studies based on National Innovation System (NIS) Framework

Mingxi Zhang (Hong Kong University of Science and Technology(Guangzhou), China)

While the concept of national innovation system (NIS) has been applied extensively in evaluating the performance of the regional innovation systems around the world, there is no agreement on what should or should not be taken as a component of NIS. In addition, the inter-disciplinary nature of innovation also presents considerable challenges for empirical studies due to differences in research methodologies. As a result, empirical studies focusing on the evaluation of the performance of NIS have produced mixed results, making it difficult for theory building and lesson drawing. This paper presents results of a meta-analysis of empirical studies on evaluating performance of regional innovation systems based on NIS framework. Our findings point to the clustering and ordering of determinants of performance of regional innovation systems and changing patterns over time. R&D serves as the evergreen component of empirical studies, while the demographical characters receive growing attention. Meanwhile, when considering the outputs of innovation systems, scholars turn from focusing on intellectual properties such as patents and academic articles to emphasizing more on the overall productivity of the society. We also show that research methodologies used in empirical studies, such as data sources, data collection, and data analysis, play a key role in identifying key factors determining the performance of regional innovation systems. Our paper sheds a light on key components of NIS and offers insights into theory building and practical impacts of research based on NIS.