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Abstract

Amid growing geopolitical tensions and supply chain fragilities, many countries adopt new industrial policies aimed at reshoring strategic industries. Simultaneously, rising awareness of the link between feelings of disenfranchisement and regional development levels underscores the strategic importance of intra-national industrial location. Within this context, we propose the concept of Strategic Regional Path Development, understood as a mechanism for (supra-) national industrial capacity-building based on top-down government interventions. Testing the framework using a semiconductor innovation zone in Québec as a case study, we conclude that success depends on aligning expectations and reconciling perspectives on its purpose across policymaking levels and involved actors.

Keywords: new path development, new industrial policies, geo-politics, reshoring, regional inequality, left-behind places

JEL: L52, O33, R11, R58

"Semiconductors are the oil of the 21st century"
(Olaf Scholz, Chancellor of Germany)

1. Introduction

As a consequence of decades of (hyper-)globalization, many nations today exhibit high levels of dependence on other countries in industrial domains considered critical for nation-states' prosperity, autonomy and well-being, such as medicine, semiconductors or solar panels. However, the Corona pandemic's revelation of the fragility of global supply chains, Russia's attack on Ukraine and rising geopolitical tensions have prompted policymakers to reconsider these structural dependencies, seeking greater sovereignty in strategic sectors (Edler et al., 2023). This shift, at times framed as a shift from "just-in-time" to "just-in-case" globalization (Brakman et al., 2020), is reflected – inter alia – in initiatives like the EU's 'Open Strategic Autonomy' and aspects of the US policy mix that has become to be known as 'Bidenomics' (Trippl et al., 2024).

A key feature of these programs is the revival of industrial policies (at least in Western nations and public debates), marked by state interventions and sector-specific support (Krahé, 2023; Rodrik, 2024). Accordingly, the skepticism of the 90s and 00s towards such measures has faded, giving way to new approaches aimed not only at strengthening industries but also at a mix of broader objectives (Aiginger & Rodrik, 2020). This distinguishes 'old' from 'new' industrial policies. While advancing innovation and manufacturing remain central, as does countering foreign competition (albeit with a new geopolitical dimension), new goals include supply chain resilience, and climate action (Krugman, 1983; Aiginger & Rodrik, 2020; Rodrik, 2024). The numerous current examples citing these goals include the U.S. 'Chips Act' (Luo & Van Assche, 2023), the EU's 'Raw Material Act,' (Hool et al., 2023) and Canada's 'Supercluster' program (Doloreux & Frigon, 2022).

In tandem with new industrial policies (NIPs), there is growing concern about regional development. Rising spatial inequalities, reflected in voting patterns (Rodriguez-Pose, 2018), reveal the limitations of previous approaches. After decades of assuming that entrepreneurial bottom-up policies would lead to regional convergence (Rey & Janikas, 2005) or that urban-focused policies would 'trickle down' to peripheral areas (MacKinnon et al., 2022), some governments are now considering increased regional intervention. In this context, the spatial dimension of NIPs has received attention from both scholars (Johnston & Huggins, 2023; Trippl et al., 2024) and policymakers (The Economist, 2023). For instance, the Biden administration was quite outspoken about *"adding place-based policies to the toolkit"* as a means to address interregional inequality and political polarization by investing in historically overlooked areas (The White House, 2023). The "Justice40" initiative should ensure that 40% of US federal investments are directed towards environmentally burdened and socio-economically disadvantaged localities and communities (Krahé, 2023).

As such, NIPs are – at least in some cases – spatially-aware and place-based, deliberately favoring some places over others for specific, sometimes political and not-market-related, reasons (Aiginger & Rodrik, 2020). We argue that this 'territorialization' of NIPs, often drawing on concepts like clusters, regional innovation systems, and learning regions (Shearmur et al., 2023; Doloreux and Frigon, 2022), makes them interesting from an economic geography perspective.

The regional industrial path development (PD) literature is often consulted on questions of geographical patterns of industry development, exploring structural preconditions for, mechanisms and agencies involved in and outcomes of the development of industrial activity in regions. Given the emergence and growing importance of NIPs – phenomena so far largely neglected by this literature (see, as a notable exception, Trippl et al., 2024) – we argue that there is merit in combining the debates and investigate NIPs from a PD perspective. To this end, we introduce the concept of **"strategic regional path development" (SRPD)**, defined as follows:

> *"SRPD refers to regional path development processes that emerge to a large degree due to the deliberate and targeted political support of specific industries, particularly in disadvantaged regions, that is driven by the goal of enhancing sovereignty and autonomy in industrial sectors critical to (supra-)national strategic ambitions."*

This paper's contribution is twofold. First, it develops the SRPD concept, highlighting its relevance in the context of the spatialization and territorialization of NIP. In particular, we emphasize that the objectives of NIP and regional development are not always compatible, and that the various actors involved – from local territorial governments to nation-states and multi-nationals – do not always share a unified vision. Second, we apply the framework to the case of microelectronics in Bromont's Technum Québec Innovation Zone (TQIZ), an NIP centered on a specific territory. Our framework dissects the policy, uncovering contradictions and paradoxes that surface as a strategic industrial policy is merged with a territorial approach.

2. Conventional and strategic regional industrial path development: Defining properties and key differences

Binz et al. (2016) define a regional industrial path as "*a set of functionally related firms and supportive actors and institutions that are established and legitimized beyond emergence (…)*". Yet, while this definition applies to strategic paths, not all paths are strategic.

So, what is a *strategic* regional path[1] then? Drawing on Edler et al.'s (2023) work on technology sovereignty, we broadly define **strategic paths as those that help fulfil at least one of the following goals**:

(i) paths that contribute to fulfilling central state functions (like defense, security or health),
(ii) paths that are considered necessary to support a nation's long-term economic competitiveness (like batteries or semiconductors), and
(iii) paths that are essential in bringing about socio-technical transformations (like solar modules or wind turbines).

Strategic regional paths can develop through different mechanisms, just as 'conventional' ones do. In their work on the regional implications of the EU's open strategic autonomy program, Trippl et al. (2024) make a broad distinction between path formation and path alteration. Path formation leads to the emergence of paths new to the region. Often, importation of assets is

[1] However, what is considered 'strategic' is constantly (re-)evaluated by key stakeholders, notably states, making it highly context-specific. Accordingly, at different times, different (unions of) states deem different sectors strategically worth supporting, while different regions may benefit.

essential. In such cases, strategic state intervention, for instance in the form of subsidies (Evenett et al., 2024), might lead to investments into specific places, e.g., by lead firms in strategic sectors. Path formation can also be based on diversification processes (Boschma, 2017). In many cases, state interventions target regions already hosting strategic industries, where SRPD takes the form of the alteration of an existing path.

The path development literature views these mechanisms as resulting from the complex interplay between regional structural conditions and actors, who – through their agency – identify, harness and valorize opportunities found in these conditions (MacKinnon et al., 2019; Trippl et al., 2020; Grillitsch & Sotarauta, 2020). This structure-agency relationship requires reconsideration in SRPD, for a variety of reasons.

First, regional path development scholarship highlights that regional innovation system configurations (Trippl et al., 2020), regional industrial compositions (Boschma, 2017) and a region's embeddedness in extra-regional networks (Binz et al., 2016) and institutional settings (MacKinnon et al., 2019) provide enabling or constraining conditions for paths to develop. In many cases, the structural conditions for strategic paths are **not 'enabling enough'** for market forces alone to translate the opportunities into desired forms of SRPD; instead, these structural conditions in SRPD are often 'enhanced' by strategic state intervention.

Second, the regional path development literature has recently embraced agency perspectives, emphasizing that different agentic processes are key for path development to occur and consolidate (Hassink et al., 2019; Gong et al., 2022). Regional path development is understood to rely on three distinct forms of change agency, namely Schumpeterian entrepreneurship, institutional entrepreneurship and place leadership (Grillitsch & Sotarauta, 2020). These agentic processes remain relevant in SRPD, but are propelled by state interventions. Thus, a key property of SRPD lies in the **central role of state agency** in advancing strategic goals and paths through interventions in the market (Thurbon et al., 2024), in which private and public actors form coalitions based on iterative exchange (Rodrik, 2024).

A related aspect is that often, at its core, SRPD centers on a few strategically chosen firms and key organizations to reshore elements of global production and innovation systems, leading – at least initially – to hub-and-spoke relations with other local economic actors (Gray et al., 1996). A distinction can therefore be drawn between the bottom-up interactions of entrepreneurs, institutions, and local culture in conventional path development, and the top-down strategies that characterize SRPD.

A final key feature of SRPD is its **distinct approach to regional development outcomes** (Breul et al., 2021). While conventional path development is rooted in a growth paradigm – with regional paths expected to be 'competitive' or to not succeed (Shearmur, 2008) – SRPD often shifts away from these goals. In some cases, the focal, strategic path might not be economically viable without subsidies. Instead, their 'raison d'être' lies in their contribution to societal needs (e.g., batteries for energy storage, military equipment for security, …) and/or in what can be called 'strategic inter-path relations' (Frangenheim et al., 2019; Trippl et al., 2024). The best example here are perhaps semiconductors, considered the backbone of many modern industries such as aerospace, renewables or automotive (Trippl et al., 2024).

Yet, strategic regional development outcomes can also be viewed from another perspective: states face not only external pressures from shifting geopolitical dynamics but also internal challenges from regional disparities and socio-cultural divergence (Rodriguez-Pose, 2018). As a result, regional development itself is becoming a strategic priority, with state-level strategies

increasingly focused on ensuring economic and social stability within national borders. Although the context has changed, similar regional strategies propelled the top-down regional development policies of the 1970s and 1980s (Rowland, 1994), as the industrial bases of many regions collapsed under the dual pressures of technological change and new global competition. These past experiences raise doubts as to whether top-down SRPD interventions effectively trigger broader regional development dynamics. While they *may* do so, supporting few strategic corporations and key organizations does not ensure wider or deeper regional development (Christopherson & Clark, 2007).

In sum, this examination of the nature and mechanisms suggests differences between conventional and strategic forms of path development (Table 1).

Table 1: Conventional and strategic territorial path development: Key differences

	Conventional PD	**Strategic regional PD**
Paths under consideration	No ex-ante limitation to specific industries	Explicit focus on industries that help to achieve strategic state ambitions
Role of structural influences	Structural conditions enable or constrain PD in a market-based logic	Structural conditions enable or constrain SRPD, but are often 'enhanced' by enabling state intervention
Role of actors and agencies	PD influenced by a complex interplay of different agentic processes driven decisively by market forces; Usually characterized by multi-actor, bottom-up interactions	SRPD influenced by a complex interplay of different agentic processes, initially enabled by top-down state agency; Usually characterized by the empowerment of few strategically chosen actors
Perspective on development outcomes	Paths primarily expected to be competitive and to yield economic returns	Strategic paths primarily expected to fulfill key function, e.g., strategic inter-path relations or regional dev.

Source: Own elaboration

3. Conceptual framework: Making sense of the unfolding and geography of strategic regional industrial path development

The unfolding of SRPD is shaped by spatial context conditions while simultaneously holding the potential to substantially alter places. In this section, we explore the unfolding and geography of SRPD. We propose a straightforward conceptual model to structure the discussion, focusing on (i) preconditions for, (ii) the process and (iii) outcomes of SRPD. Additionally, we distinguish spatially between regional and extra-regional influences and consequences (Figure 1).

3.1 Understanding the preconditions for SRPD

Trippl et al. (2024) discuss how regional preconditions significantly influence strategic industry development, drawing on research at the intersection of PD and regional innovation systems (RIS). Their insights can be summarized as follows: regions with strong RISs, a rich asset base,

and strong external connections are particularly well-positioned for SRPD interventions. This is also true for specialized regions that host relevant industries and RIS structures related to strategic fields. For some strategic sectors, such as critical raw materials and renewable energy, natural assets play a crucial role. Regions offering enabling structures are more likely to succeed in consolidating strategic paths and developing long-term cascading effects. In contrast, regions with weaker RIS structures, limited asset endowments, and poor external links face more constraining conditions.

Yet, to the extent that the ambition is (also) to balance geographical inequalities, being disadvantaged can be a prerequisite for SRPD investments (e.g., the 'Justice40' rule). However, as Gansauer (2024b) warns, disadvantaged regions inherently lack structural advantages such as anchor institutions, infrastructure, and human capital. Indeed, previous rounds of regional policy aimed at attracting corporations to underdeveloped regions have typically not succeeded in generating regional dynamics (Young et al., 1994). Thus, siting strategic sectors – especially innovative ones – in such regions carries substantial risks of failure, depends more heavily on external resources and represents a particularly fragile form of SRPD (Gropp, 2023). Such risk, which is inherent to policies that direct investment towards regions where it would not otherwise have been made (for equity, political or other reasons), may conflict with other SRPD objectives.

We consider this potential conflict between policies at different spatial scales as one of two interrelated areas of tensions (AoT; Figure 1) that emerge when considering SRPD not only as a means to achieve a nation-state's strategic ambition but quintessentially as a 'territorialized' process in a specific locality. Accordingly, these tensions manifest within the state apparatus: the objectives of regional policy may be in tension with other strategic goals from the outset (Trippl et al., 2024).

3.2 Exploring the process of SRPD

Regional as well as extra-regional structural preconditions will have a profound impact on how SRPD evolves. Furthermore, the industrial context (e.g., critical raw materials vs. semiconductors) and the multi-level governance system in place (level of centralization, integration into supranational political entities, etc.) set important framework conditions (Trippl et al., 2024).

Within this framework, the process itself is driven by the (supra-)nation-state as key enabling actor (Edler et al., 2023) that engages in various strategic actions from beyond regional boundaries. In this regard, the OECD (2023) distinguishes between three types of measures[2] to boost autonomy, which we conceptualize as being targeted towards specific forms of SRPD. Accordingly, two of which, protection and promotion, are particularly relevant to 'internal' SRPD, understood as SRPD processes in a specific target region within a nation's boundaries:

(i) **Protection** (focus on strengthening or redirecting *existing* strategic paths, e.g., through export controls, research security measures or trade restrictions)
(ii) **Promotion** (focus on bolstering *new* and *existing* strategic industrial activity and capacity, e.g., through subsidies, attraction of FDIs and talent, domestic skill development and innovation capacity building or facilitating international collaboration)

[2] For a more detailed discussion on the various forms of NIP interventions, see Evenett et al., 2024.

(iii) **Projection** (focus on strategic path development *elsewhere*, e.g., through STI alliances, recoupling strategies, forging links to like-minded nations or technical standards).

The balance between different interventions deployed by governments will depend on the specific ambitions pursued (e.g., increasing production for other domestic industries or bolstering innovation capacities to improve quality of domestic production) and the preconditions found in the target region (e.g., strategic industry located there already? Existing innovation system capacities sufficient? …).

SRPD is often based on specific brokering processes, e.g., through subsidies, localization incentives, or public procurement agreements (Evenett et al., 2024), between governments with strategic ambitions and lead actors in relevant fields, including key firms, research institutes, and incubators. In cases where lead actors are already present, state intervention might aim at altering existing paths in desired ways through promotion or protection measures. An alternative route to establishing strategic paths internally is based on diversification (Boschma, 2017). In this scenario, key actors in related fields present in the target region might be incentivized to branch into strategic domains (Mewes & Broekel, 2020). Alternatively, if lead actors are not yet in the region, promoting new strategic paths through attraction (‘induced coupling’) and importation are key mechanisms (MacKinnon et al., 2019).

Thus, the nature of SRPDs lies in their implementation within specific regions. This implies that state influence can (also) involve adapting the wider structures within the target region by building internal capacities (Gong et al., 2022) or sourcing external resources (e.g., knowledge) and anchoring them locally (Binz et al., 2016; MacKinnon et al., 2019). In addition, target regions have their own local governments, institutions and populations. At the very least the state must thus coordinate with local actors to ensure adequate land and infrastructure are available. More often, the state will seek local governments and organizations to take a more active role in promoting the SRPD process, e.g., by strengthening local structures (such as schools and colleges) or adapting urban planning practices in favor of the (new) industry.

Yet, state influence extends beyond these interventions: states have various non-territorialized channels to drive SRPD. These include altering broader contextual conditions, such as implementing export barriers, foreign direct investment regulations, and procurement policies (Evenett et al., 2024).

The necessity and effectiveness of all these strategies depend on the preconditions within the target region prior to state intervention.

3.3 Unravelling the outcomes of SRPD

The implementation of territorialized NIPs will result in intended and unintended effects, both at the regional and the extra-regional level.

From a (supra-) national policy standpoint, strategic paths should primarily contribute to fulfilling strategic state ambitions. This is usually the main rationale of higher-level state intervention. Yet, from a regional, local or industrial perspective, other outcomes might be central. Thus, different actors may have varying expectations as SRPD holds diverse implications for nation-states, host regions, firms, research institutes, and others. These

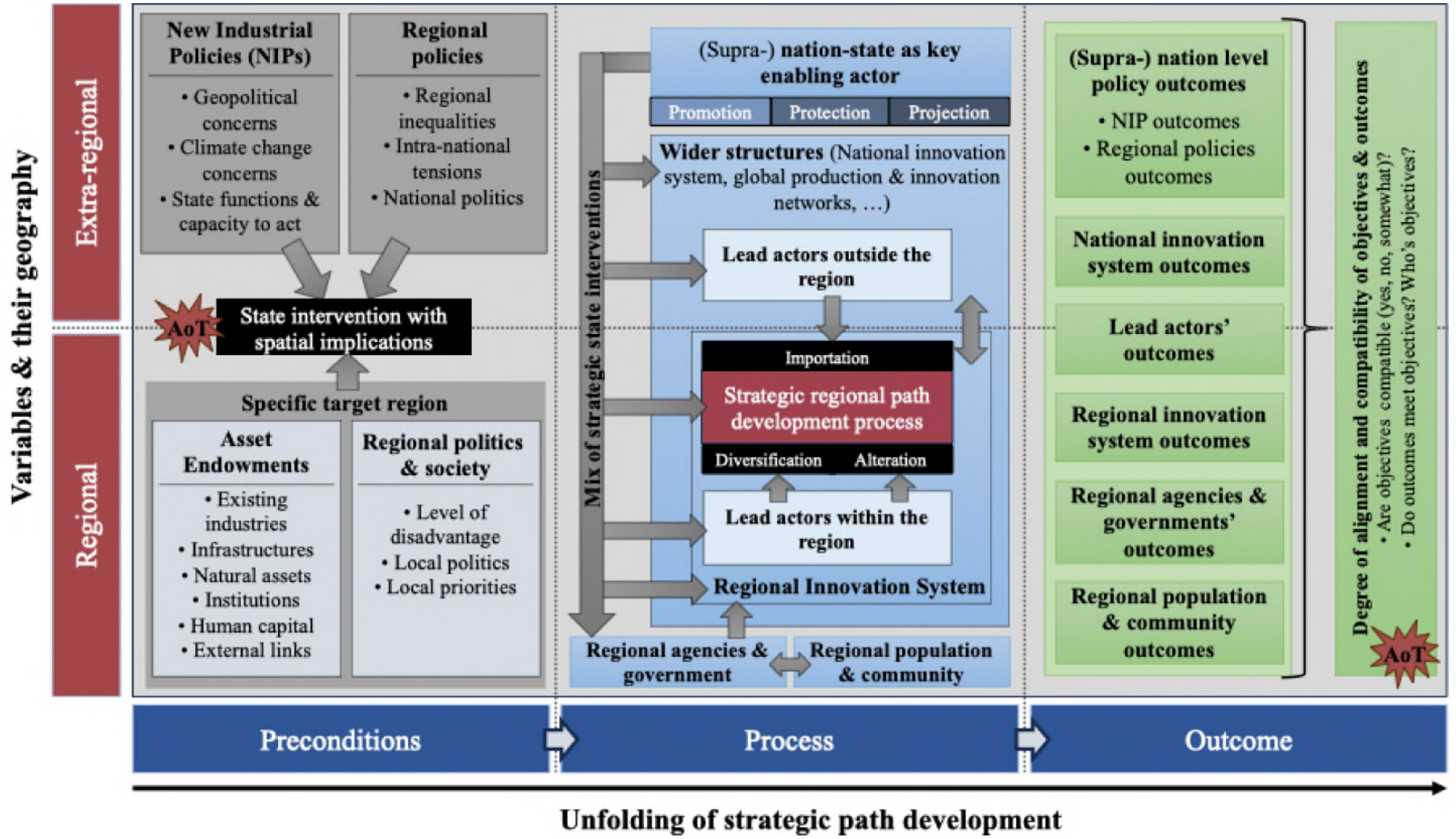
differing objectives and expectations may not align, creating a second area of tension (AoT) that complicates the assessment of success (Figure 1).

Focusing specifically on SRPD's implications for host regions, one can distinguish between positive and negative impacts (Trippl et al., 2024). On the one hand, target regions can benefit from state support, with new, often well-paying jobs and follow-up investments leading to economic prosperity. Not only might the focal path benefit, but other sectors may also gain through input-output relations, knowledge flows, and additional knock-on effects (Mewes & Broekel, 2020; Frangenheim et al., 2021). Host regions may also establish new or strengthened connections to global value chains and innovation networks, and their RISs could be substantially enhanced. These changes can contribute to broader policy objectives, such as regional development and cohesion (Aiginger & Rodrik, 2020), especially when interventions target disadvantaged areas.

On the other hand, SRPD can also lead to complex and undesirable regional effects (Trippl et al., 2024). A primary concern is that regions may not be fully equipped to host new strategic industries, resulting in significant challenges due to insufficient asset endowments. Consequently, new strategic paths might compete with existing regional industries for labor, policy support, and other resources, hindering their development (Frangenheim et al., 2021). From this perspective, government intervention in SRPD will most likely involve empowerment of some selected actors and a disempowerment of others. Furthermore, infrastructure, such as housing and roads, could become overburdened. In addition, the RIS may increasingly align with the enhanced strategic industry, potentially providing inferior services to other paths (Trippl et al., 2024). In regions with weakly developed structures, over-dependence on the new strategic industry and few selected actors can be particularly problematic. Strategic paths may also be weakly embedded, allowing external actors to capture value (Morales & Atienza, 2022). Some industries may have socially and environmentally harmful effects (such as sub-par working conditions, pollution). Finally, strategic state interventions may create inter-regional tensions: ‘picking-winners’ in a geographical sense might benefit some regions at the expense of others that miss out on private and public investments associated with state interventions for SRPD.

These issues can ultimately lead to poor regional development outcomes (Breul et al., 2021) and undermine the legitimacy of the new or altered strategic path. Accordingly, much will depend on structural conditions, actor constellations and the alignment of policy domains prior to state interventions. In addition, development outcomes will differ depending on the specific policy mix employed, particularly whether or not strategic interventions are coupled with investments in physical and social infrastructure (Gansauer, 2024b).

Figure 1: A conceptual framework to make sense of SRPD



Source: own elaboration

4. Methodological approach

4.1 Method and case selection

To explore our conceptual framework (Figure 1) and its value in exploring on the interactions between geography and new industrial policymaking (Aiginger & Rodrik, 2020; Johnston & Huggins, 2023; Trippl et al., 2024), we examine a case of potential industrial path alteration in the microelectronics industry within the Bromont region of Quebec, Canada. This case study, focused on Technum Québec Innovation Zone (TQIZ), uses a single-case approach suitable for analytical generalization and theoretical development and was selected based on the following theoretical criteria.

First, the municipality of Bromont hosts a small but well-established microelectronics cluster, including key industry and research leaders like IBM, Teledyne Dalsa, and the C2MI research center, which are critical to Quebec's and Canada's economic and technological competitiveness.

Second, in 2022, the provincial government launched TQIZ as a regional innovation policy catalyst, focused on the municipality of Bromont, to support the microelectronics industry, to stimulate the diffusion and commercialization of new technologies, and – explicitly – to strengthen an industry with strategic importance (Gouvernement du Québec, 2020; Les Affaires, 2024).

Third, Bromont offers an interesting setting for tracing industry-policy interdependencies in multi-level governance settings, as the federal government has begun to actively complement provincial policy interventions to contribute to building the necessary capacities and conditions for SRPD (Prime Minister of Canada, 2024).

4.2 Research procedure and sources of data

Our research adopts a theoretically informed case study approach (Eisenhardt, 1989). It evaluates our conceptual framework (Figure 1), informed by insights on regional industrial path development (Trippl et al., 2020), NIPs (Aiginger & Rodrik, 2020), and innovation studies (Edler et al., 2023). At the same time, we explore the rise of industrial sovereignty and autonomy as key policy objectives and their geographical implications through a real-time investigation of an unfolding process. This approach allows to capture nuances and inconsistencies not easily observed ex-post (Baumgartinger-Seiringer et al., 2021). These empirical observations will feed back to our theoretical perspectives.

Our primary research strategy involves semi-structured interviews with stakeholders from various actor groups directly related to TQIZ (Table A1 in the appendix). These actors include the provincial government, key lead firms and start-ups, R&D institutions, regional authorities and non-governmental organizations. In total, we conducted 31 interviews. A semi-structured interview guideline was used to assess the structural preconditions in Bromont, the role of key actors (including municipal, provincial and federal government), the changing relationship between stakeholders in the industry and region, and the expected consequences of government intervention on the industry and regional development. Interviews were conducted in French and lasted between 15 and 60 minutes. These insights were complemented and triangulated with data

from secondary sources (census data, reports, government documents, industry and policy reports, newspaper articles etc.), enabling a robust qualitative in-depth case study.

5. Strategic regional path development: altering the microelectronics path in Bromont, Quebec

5.1 Preconditions for strategic path development

5.1.1 Governments' strategic ambitions

Against the background of the COVID-19 pandemic, exposing significant vulnerabilities in global supply chains, the semiconductor sector has emerged as strategically vital for Canada and Quebec. Prime Minister Trudeau recently justified government interventions towards the microelectronics industry as he emphasized the need to *"strengthen semiconductor supply chains in the country... in an increasingly uncertain world"*. Quebec's minister of Economy, Innovation, and Energy, Pierre Fitzgibbon, echoes this sentiment, stating: *"We felt the major impacts that a disruption in the supply chain of this sector could have on the economy as a whole"*[3] (LaPresse, 2024).

Both draw attention to strategic path relations in legitimizing state intervention, noting that semiconductors are crucial for sectors Canada and Quebec seek to advance, like battery production for electric vehicles or AI. In this respect, Trudeau warns that Russia used gas to put pressure on Europe after the invasion of Ukraine, underscoring that the same could happen with batteries based on one-sided dependencies on China (LaPresse, 2024).

Moreover 'Bidenomics' have heightened competition over investments in North America and beyond, prompting Canada to offer its own incentives to prevent capital and talent from shifting south (Financial Post, 2023). The new US president, who is announcing protectionist policies, will likely further this competition. This situation underscores growing concerns about intensifying subsidy races between nations (Edler et al., 2023).

In this context, both federal and provincial governments have implemented strategies to promote SRPD to establish more resilience in critical sectors (Les Affaires, 2024). An important part of these efforts is Quebec's TQIZ, targeting, inter alia, the semiconductor industry in Bromont.

In parallel, Québec's prime minister is attentive to issues of regional development. Indeed, there is ongoing concern about the development of rural and peripheral regions, articulated in a *Law to ensure the occupation and vitality of territories*[4]. Innovation zones (like TQIZ) are put forward by Québec's prime minister as levers of regional development (Legault, 2023).

5.1.2 Regional preconditions and local assets in Bromont

Bromont (population in 2024: 11,834) is an up-market peri-metropolitan town in the Brome-Missisquoi Regional County Municipality. Since its incorporation in 1964, housing has been a

[3] All quotes were translated by the authors.
[4] Loi pour assurer l'occupation et la vitalité des territoires, CH0-1.3

development priority, alongside recreational tourism, a sector whose growth has been supported by the presence of ski hills and golf courses.

The area first saw the establishment of Bromont Regional Airport in 1968, four years before IBM Canada set-up in the newly established industrial park. Today, IBM's Bromont facility produces some of the world's most advanced semiconductors. Each week, the facility manufactures over 100,000 advanced chip modules. Teledyne Dalsa is another world-class company located in Bromont since 1980. A number of other semiconductor firms followed these two pioneers, including Cogiscan, Aeponyx Boréas Technologies, and Digitho (Table A2 in the appendix). Today, the business park spans over 2,600 hectares, housing approximately 30 companies in fields related to electronics and aerospace (Technum Québec, 2024), yet still has over 12 million square feet of available land.

Table 2: Semiconductor and related services employment, 2006-2021

	Brome-Missisquoi			Montreal Island			Québec		
Employment	2006	2021	*Growth*	2006	2021	*Growth*	2006	2021	*Growth*
Semiconductors	715	270	-62%	1 870	1 245	-33%	7 970	4 940	-38%
T-KIBS	265	455	72%	28 500	49 005	72%	70 480	113 590	61%
All sectors	26 200	30 445	16%	890 500	971 240	9%	3 725 905	4 100 445	10%
Location quotient			*Change*			*Change*			
Semiconductors	12.76	7.36	-5.40	0.98	1.06	0.08	1.00	1.00	
T-KIBS	0.53	0.54	0.01	1.69	1.82	0.13	1.00	1.00	

Notes: semiconductors correspond to NAICS 3344; T-KIBS comprise computer systems design (5415) and scientific and research services (5417). Bromont is located within Brome-Missisquoi County, and represents about half its population. Source: Statistics Canada Census, special tabulations.

The park also comprises the most important microelectronics research and innovation center in Canada. The MiQro Innovation Collaboration Center (C2MI), was inaugurated in 2012, relying on CAD $218 million[5] in funding from provincial sources, Industry Canada, private partners (IBM and Teledyne Dalsa), and the Université de Sherbrooke. C2MI plays a leading role as an intermediary.

Despite this activity, Bromont's semiconductor sector is relatively small and was, until before strategic state interventions started in 2022, in decline (Table 2). This decline is both absolute and relative to Montreal and the wider province. Nevertheless, relative to its size, Bromont housed seven times more semiconductor jobs than Montreal and the rest of Québec in 2021. Now, the growing attention and resources flowing into the region hold the promise of a new dynamism capable of shifting the regional industry onto a new development trajectory. One interviewee explained:

> *"We have been here 50 years. [...] Despite the presence of two major firms and of C2MI, we can't say that we have developed a flourishing zone. So, if it happens, if, say, in the next five*

[5] All monetary amounts are indicated in Canadian dollar.

years we can really, really, attain a new level of development, then it will prove that the zone really did it. Because nature didn't manage it alone over 50 years." (B7)

Additionally, other preconditions warrant attention, including the region's strategic location. Situated near the US border, Bromont lies approximately 80 km east of Montreal and equidistant from Sherbrooke, home to Université Sherbrooke. About 400 km south, Albany, in New York State, lies a major hub for semiconductor research, with some of the world's most advanced chip-making technology.

Interestingly, a natural feature of Bromont serves as another key precondition for semiconductor manufacturing: its air quality. This advantage supports C2MI's role as a provider of cleanrooms, which are essential for firms testing production processes and easier to maintain in Bromont:

"White rooms, which are clean rooms with filters that take out all dust. [...] if we compare, I think there are 300 000 particles of 0.5 micron or more in a cubic foot of air. In Montreal, it is in the order of 2 or 3 million. [...] It means filters will be blocked ten times faster. So, the majority of semiconductor manufacturers across the world are always half an hour or three quarters of an hour away from big centers." (B9)

In summary, Bromont's selection as a strategic site for microelectronics development is supported by existing preconditions and local assets, including an established semiconductor hub. However, these favorable preconditions have not led to a highly dynamic, bottom-up development of the semiconductor sector. Despite the presence of some key players since the 1970s, the path has remained relatively small and concentrated along few actors.

5.2. The processes of strategic regional path alteration

Although a governing and promotional organization (Technum) was set up in 2022, and although the policy interventions described below have been initiated, so far little has materialized. This section therefore explores explores recent policies, their aspirations, and early processes of change. It presents a picture of mixed objectives and strategies, where the hope for localised innovation dynamics in Bromont sits uneasily with provincial and federal strategic industrial goals, whose geographic focus is provincial or national.

5.2.1 Federal and provincial government interventions to initiate and accelerate strategic regional path alteration in Bromont

Through various programs, particularly the Strategic Innovation Fund (SIF), the federal government has supported projects to advance domestic semiconductor production and R&D (Innovation Canada, 2024). In February 2022, a $150 million investment was announced under SIF to fund microchip research, commercialization, and manufacturing (GlobalTradeAlert, 2024). In March 2023, this investment sum was increased to $250 million in a joint statement by US President Biden and Canada's Prime Minister Trudeau (Prime Minister of Canada, 2023). These federal subsidies promote the expansion of established players like IBM and C2MI in Bromont to boost industrial sovereignty (Prime Minister of Canada, 2024).

The province's TQIZ was created at about the same time. It emphasizes the importance of localized clustering to foster interactions and collaborations, promotes training of the local workforce, whilst also accenting the central role of leading actors (Gouvernement du Québec, 2020). This policy bears many of the hallmarks of innovation systems and clusters and brings to the fore the importance of key global industry and research leaders, such as IBM Canada, Teledyne Dalsa, and C2MI. Substantial private and provincial investments were planned for the initiation of the TQIZ and to achieve these goals (Gouvernement du Québec, 2020).

Promotion measures also focus on enhancing macroregional supply chains. The federal government's Declaration of North America on January 10, 2023, committed Canada, Mexico, and the US to increase investments in key future industries like semiconductors (Government of Canada, 2024). This agreement aims to support collaboration, boost competitiveness, and reinforce technology sovereignty in North America. One result in the form of new collaborations between C2MI and NY CREATES in Albany has already materialized.

Additionally, government promotion actions include legislative adjustments to support the microelectronics sector. A new provincial program provides tax benefits to microelectronic businesses. At the federal level, new export regulations now mandate permits to export advanced semiconductors to countries other than the United States. These protection measures reflect a global trend toward unilateral trade restrictions amid rising geopolitical tensions (Boscariol & Migitko, 2024).

5.2.2 Bromont's strategic semiconductor domains: Lead actors in state-induced motion

These top-down interventions through both promotion and protection instruments have reinforced and empowered certain agents in Bromont. Indeed, established regional lead actors have started to exploit and respond to this enabling state agency. In essence, three key strategies are pursued.

The first strategy focuses on **enhancing the industrial path's production capacity** by way of private investment, cooperation between public researchers and private manufacturers, and subsidies. For example, Teledyne Dalsa plans to complement state support and invest approximately $100 million, IBM and C2MI will receive over $60 million in subsidies to increase semiconductor manufacturing, and IBM itself intends to invest nearly one billion Canadian dollars over the next five years to expand its advanced semiconductor production and packaging[6] in Bromont. The expected outcome is a substantial increase in Canada's semiconductor production volume that should shield against possible disturbances in global production networks.

In addition, such investment serves to anchor firms – to some extent at least – in the region. A leading local semiconductor company explains:

> *"It's certain that once it's built, and [...] you have installed very expensive semiconductor equipment [...] it's very difficult to move. [...] An interesting thing about semiconductors is that once you are installed somewhere you stay for a long time, you don't move."* (B7)

[6] Packaging is a technical process that transforms chips into microelectronic components, requiring skilled labor and playing a critical role in the supply chain. With limited packaging capacity present in North America, key actors view these investments as essential for onshoring the entire supply chain to the continent (National Post, 2024).

The second strategy is **strengthening the microelectronics innovation system** in Bromont. A key approach is to leverage the local presence of global leaders. In this regard, it is hoped that IBM, Teledyne and C2MI serve as magnets. New companies are expected to benefit from proximity to enabling technologies, opportunities for scalable production, and the potential for ambitious technological projects and technology transfer.

> *"There is C2MI which can do the preproduction, [and] can determine how to put that into production. And then there are the big factories, there is Teledyne and IBM [...] The fact of having this ecosystem will attract other firms [...] It's really a continuum from fundamental research right to production."* (B10)

Notwithstanding possible milieu effects, attracting firms often remains dependent upon strategic government investment and subsidies. One respondent expresses some doubt as to whether TQIZ can compete with support provided in the US:

> *"So, firms ask us 'why would I come to you when I can go to, you know, the US, where I would get a [higher] subsidy?' [...] We don't necessarily have the financial levers, currently, to convince these firms."* (B13)

Another way of reinforcing the innovation system is to support entrepreneurial initiatives. In 2024, an incubator for semiconductor start-ups is being developed, and the Desjardins Technological Institute project has been initiated to enhance local labor force skills. The key player, however, is clearly C2MI. The center gathers an 'ecosystem' of approximately 400 organizations and 250 scientists from across Québec and Canada, providing essential support to firms at different stages of technology development, from prototyping to commercialization. As explained by an entrepreneur, *"any firm intending to develop a product that involves microelectronics…90% of the time C2MI can help"* (B28).

However, as illustrated by C2MI, the term 'ecosystem' is not always used to denote a *local* innovation system: C2MI's 'ecosystem' is provincial, if not national – and, as interview partners pointed out, an ecosystem can also be seen as something virtual. Thus, a distinction that is important from a regional development perspective, but not from the perspective of NIP, is between *doing business with* TQIZ and actually *locating* there. This hints at a certain misalignment between different goals associated with SRPD in Bromont: both across various governance levels and among different actors.

The third strategy is to **establish stronger extra-regional links**, mostly propelled by state-level actors. Both, Technum and C2MI actively promote and facilitate collaboration with actors beyond the region, extending to the national level and internationally, particularly with the U.S. and along the Bromont-Albany corridor. Additionally, the Fonds de recherche du Québec – Nature et technologies (FRQNT) has committed 3.5 million dollars in research grants to establish research chairs at the University of Sherbrooke that support scientists engaged in research tied to the innovation zone.

These extra-regional links as well as the outward orientation of the innovation system are important but may undermine the territorial focus of the TQIZ and raises questions about regional development ambitions. Indeed, many actors already located in Bromont are not particularly

embedded. They consider themselves, geographically, along a corridor between Sherbrooke and Montreal, with good access to Albany as well as to international collaborators and clients. For them, Bromont has useful features – especially the expertise of C2MI, and possibly the TQIZ, should it take off – but for these actors the ‘'region’' is southern Québec, or even the North-East of the continent. Their activities and collaborations extend over a variety of scales, as the following interview quote demonstrates:

> *“We are starting a partnership with a Silicon Valley firm [...] we have six other firms ready to do pilot projects with our technology. [...] In the US, mainly: two are in Canada [one is in Bromont]. We are really focused on the global scale. We don't have big transport costs; they are small products. [...]”* (B6)

5.3 Outcomes

It is too early in the SRPD process for tangible results to have emerged, but anticipated outcomes are outlined in policy documents and highlighted by our respondents.

The federal government has clearly articulated the semiconductor industry’s strategic importance, as outlined in section 5.1.1. From a national or even North American perspective, the main goal of significant government interventions is therefore to enhance sovereignty and resilience in this key industrial domain. While it is too early to draw conclusions, recent private investments (e.g., by IBM, Teledyne Dalsa, and Aeponyx), new collaborations (e.g., with NY CREATES), and evolving innovation system developments (section 5.2.2) suggest that some of these interventions may succeed.

In contrast to the federal level, the provincial government’s objectives focus more (but not exclusively) on economic development:

> *“The creation of international caliber innovation zones is at the heart of [the government’s] economic vision, which aims to increase the commercialization of innovations, exports, local and foreign investment as well as firm productivity.”* (p1, Government of Québec, 2020)

Thus, ‘traditional’ development goals remain prevalent at the sub-national level. Yet, even at locally, most actors within governments and agencies (also) acknowledge the broader strategic objectives of the TQIZ:

> *“We collectively realized, during the pandemic, our level of dependence: all microelectronics [...] come from Taiwan. We saw the vulnerability of supply chains.”* (B11)

Although some interviewees hence recognize the potential of positive development outcomes on various spatial scales – from an increase in employment and tax revenue at the local level to fulfilling strategic state ambitions at the national level – many express misgivings about development pressures should TQIZ and a state-induced growth of the microelectronics industry take off. Bromont and the towns that surround it are well-off and do not need development. Furthermore, there are labor and housing shortages, which local actors construe as challenges. In addition, interviewees express concerns about the supply of electricity and water:

> "*"If a company comes, it will need a certain amount of electricity. Is the zone able to supply that quantity? It will need water. Can we supply that water? It will need people. Can we provide these people. And so on."* (B8)

> *"We are limited by the population or by what [qualified labor] universities are able to produce each year. So, it is not enough, clearly. We know there is a labor shortage. Especially, the more we move towards new technologies, the more it is obvious."* (B10)

> *"Do we have the real-estate to welcome all these newcomers? No, we know that we don't. We have a housing shortage in our territory, like in many Québec region [...] So the challenge, I'd say, is, rather than endure, is how to receive and organize the reception of this opportunity so that, in terms of social acceptability, it can make sense."* (B11)

This competition over scarce regional assets could have detrimental effects on other actors and paths in Bromont, potentially disempowering them and constraining their development if the microelectronics sector, bolstered by government intervention, continues to demand increasing resources (Breul et al., 2021).

A further issue concerns the precise delimitation of the innovation zone. TQIZ and is specific to the *municipality*, meaning that only Bromont will benefit, whereas surrounding municipalities might face negative impacts:

> *"For sure, when companies arrive, [there will be] high [tax] values, in the millions. The tax income is useful to receive, but it's on the territory of Bromont. It won't come to [neighboring municipalities]. What [they] will have as fallout, is to house citizens and have the infrastructure to receive them. So [they] will be in spending mode, whereas the innovation zone will be in income mode."* (B16)

Overall, our empirical investigation reveals ambiguity or even misalignment of expected outcomes of SRPD between and within governance levels. On the local level, some actors are enthusiastic about the potential and resources coming with SRPD, but many remain guarded and somewhat apprehensive as they perceive the challenges that rapid and locally uneven development might bring. Provincial as well as federal policymakers openly express optimism that government interventions, and the enhanced localized interactions and clustering resulting from it, will generate synergies that will make Québec (and Canada) a key contributor to its (allies') semiconductor needs.

6. Discussion and conclusions

The fragility of global supply chains has become evident over the last decade as geopolitical tensions have arisen and logistical issues – especially during COVID – revealed the benefits of more localized supply lines. This is especially true in strategic sectors like semiconductors, which have become essential to many modern industries. In response to these altered macro-contextual conditions, many nations have developed New Industrial Policies whose objectives are, inter alia, to overcome this fragility by re-shoring key industries (Aiginger & Rodrik, 2020; Evenett et al., 2024).

It is within this context that the concept of Strategic Regional Path Development (SRPD), introduced in this paper, is relevant. We understand SRPD as both, a response to the increasing demand for autonomy and sovereignty in key strategic domains (Edler et al., 2023) and a mechanism for (supra-) national industrial capacity building (Trippl et al., 2024). We grounded our conceptualization in key insights from the regional path development literature, which is often consulted when examining *where*, *how* and *why* industries emerge or radically transform (Boschma, 2017; Hassink et al., 2019; Baumgartinger-Seiringer et al., 2021). We identified the particularities of SRPD (Table 1), emphasizing that the key difference lies in the role of state-level strategies and deliberate, targeted political interventions. We then introduced a conceptual model to explore the unfolding and geography of SRPD (Figure 1).

While we believe the concept of SRPD offers valuable insights into state-driven industrial capacity building, the significant concerns and challenges tied to such strategies should not be neglected. These include, but are not confined to, the following points. First, scholars warn that a shift toward inward-focused protectionism and autarky could create a vicious cycle, ultimately undermining international openness in science and technology (Edler et al., 2023). Second, pursuing sovereignty in key industrial domains might raise the costs of 'green' products, such as solar panels or electric vehicles, which could be sourced more cheaply elsewhere, potentially delaying sustainability transitions (Jansen et al., 2023). Third, supporting already dominant players might solidify their position and raise questions about the appropriate use of taxpayers' money. Finally, scholars argue that NIPs often pursue goals in a ‘spatially blind’ manner, jeopardizing the success of these interventions (Johnston & Huggins, 2023; Trippl et al., 2024).

While not disregarding the former, it is particularly the last point that deserves attention from an Economic Geography perspective. While many state strategies are indeed not inherently territorial, we contend that they are, at least in some cases, *territorialized* for two main reasons. First, state-level actors believe that cutting-edge industries are more likely to thrive in dense clusters that generate milieu effects; second, these same actors often have territorial strategies linked with voting patterns or spatial equity considerations (Gansauer, 2024a).

This leads to the second main perspective on SRPD adopted in this article: these new state interventions are not only introduced in a period marked by concerns about supply chain fragility, but also in a context of heightened nationalist sentiment (Rodriguez-Pose, 2018). This has an important consequence: NIPs – which promote national suppliers and industries to the detriment of imports – may also serve other strategic state objectives, and some state governments feel that NIPs can be leveraged as an impetus for regional development, especially in left-behind regions (Gansauer, 2024b).

Indeed, regional development has itself become a more prominent strategic state ambition, as many places have faced economic and social decline since the late 1980s (Polèse & Shearmur, 2006), with a clear link to (populist) voting patterns (Rodriguez-Pose, 2018). Thus, beyond supply chain concerns, NIPs might signify a tentative return to top-down approaches to regional development that intersect with industrial policy. This, however, comes with the danger of strategic paths being developed at cross-purposes by the state: NIP expresses national *industrial* priorities, whereas regional development policies are devised with *elections*, *spatial equity*, or *territorial occupation* in mind. NIP and regional development are only occasionally compatible (Trippl et al., 2024; Gansauer 2024a).

Our empirical case study of Bromont, a provincially instituted Innovation Zone founded in 2022, is an example of SRPD. The province, in collaboration with the federal government, developed a NIP targeting the semiconductor industry for strategic purposes related to supply chains and geopolitics. Our investigation of this early and ongoing SRPD process revealed promising activities, suggesting that some of these government interventions may succeed and, ultimately, could contribute to fulfilling strategic state ambitions.

On a regional and local level, our findings are mixed. Rather than supporting this industry province-wide, the government concentrated its intervention on a specific municipality, following the regional approach laid out by the prime minister (Legault, 2013). Bromont was chosen for its favorable local assets, including the presence of key semiconductor producers and research facilities, as well as a large, underutilized business park.

Our interviews reveal that while local semiconductor actors welcome the creation of the Innovation Zone, they do not express a strong need for it: their networks remain predominantly national or global. Their presence in Bromont is rooted more in historical, environmental, and accessibility factors rather than any particular advantage offered by the TQIZ itself. Additionally, the empirical investigation points at fundamental challenges: the region's strong economy already faces labor and housing shortages that might only be exacerbated, benefits are concentrated in Bromont while costs spill over to neighboring municipalities, and concerns over scarce resources, infrastructure, and town’s potential transformation from a tourist hub to a busy industrial center raise issues of social acceptability. These factors suggest that the provincial government’s assumptions – such as that job creation and economic development are inherently desirable, that local actors prioritize local collaboration, and that the interests of surrounding municipalities align with Bromont's – do not fully reflect the realities or the diverse interests at play.

Thus, the empirical case highlights the difficulties in implementing SRPD while following multiple ambitions at different spatial scales – even if situated in a relatively well-off area. Beyond the challenge of selecting industrial sectors to support, as discussed by Krugman (1983), two additional challenges emerge. First, the presence of large industrial players does not automatically lead to the development of a local ecosystem, as Christopherson & Clark (2007) and Gray et al. (1996) suggest, and our interviews confirm. Second, tensions arise at both the precondition and outcome stages of SRPD implementation (Figure 1). At the precondition stage, a misalignment between regional policy and national industrial policy is evident, while at the outcome stage, the diverse objectives of different stakeholders complicate the assessment of success. A key lesson is thus that unless the *process stage* includes a meaningful effort to align objectives and to ensure all participants understand the motivations and interests of other actors, SRPDs will meet with mitigated success.

References

Aiginger, K., & Rodrik, D. (2020). Rebirth of industrial policy and an agenda for the twenty-first century. *Journal of Industry, Competition and Trade*, 20(2), 189–207. https://doi.org/10.1007/s10842-019-00322-3

Baumgartinger-Seiringer, S., Miörner, J., & Trippl, M. (2021). Towards a stage model of regional industrial path transformation. *Industry and Innovation*, 28(2), 160–181. https://doi.org/10.1080/13662716.2020.1789452

Binz, C., Truffer, B., & Coenen, L. (2016). Path creation as a process of resource alignment and anchoring: Industry formation for on-site water recycling in Beijing. *Economic Geography*, 92(2), 172–200. https://doi.org/10.1080/00130095.2015.1103177

Boscariol, J. W., & Migitko, O. (2024). Canada adopts new export controls on quantum computers and advanced semiconductors in face of rising geopolitical tensions and national security threats. McCarthy Tétrault. https://www.mccarthy.ca/en/insights/blogs/terms-trade/canada-adopts-new-export-controls-quantum-computers-and-advanced-semiconductors-face-rising-geopolitical-tensions-and-national-security-threats

Boschma, R. (2017). Relatedness as driver of regional diversification: A research agenda. *Regional Studies*, 51(3), 351–364. https://doi.org/10.1080/00343404.2016.1254767

Brakman, S., Garretsen, H., & van Witteloostuijn, A. (2020). The turn from just-in-time to just-in-case globalization in and after times of COVID-19: An essay on the risk re-appraisal of borders and buffers. *Social Sciences & Humanities Open*, 2(1), 100034. https://doi.org/10.1016/j.ssaho.2020.100034

Breul, M., Hulke, C., & Kalvelage, L. (2021). Path formation and reformation: Studying the variegated consequences of path creation for regional development. *Economic Geography*, 97(3), 213–234. https://doi.org/10.1080/00130095.2021.1922277

Christopherson, X., & Clark, J. (2007). *Remaking regional economies: Power, labor, and firm strategies in the knowledge economy*. Routledge.

Doloreux, D., & Frigon, A. (2022). The innovation superclusters initiative in Canada: A new policy strategy?. *Science and Public Policy*, *49*(1), 148-158.

Edler, J., Blind, K., Kroll, H., & Schubert, T. (2023). Technology sovereignty as an emerging frame for innovation policy: Defining rationales, ends, and means. *Research Policy*, 52(6), Article 104765. https://doi.org/10.1016/j.respol.2023.104765

Eisenhardt, K. M. (1989). Building Theories from Case Study Research. *The Academy of Management Review*, 14(4), 532–550. https://doi.org/10.2307/258557

Evenett, S., Jakubik, A., Martín, F., & Ruta, M. (2024). The return of industrial policy in data. *The World Economy*, 47(7), 2762–2788. https://doi.org/10.1111/twec.13608

Financial Post. (2023). How the Inflation Reduction Act changed Canada. Financial Post. https://financialpost.com/commodities/mining/how-inflation-reduction-act-changed-canada

Frangenheim, A., Trippl, M., & Chlebna, C. (2019). Beyond the single path view: Interpath dynamics in regional contexts. *Economic Geography*, 96(1), 31–51. https://doi.org/10.1080/00130095.2019.1685378

Gansauer, G. (2024a). For growth or equity: A taxonomy of ‘Bidenomics’ place-based policies and implications for US regional inequality. *Regional Studies*, 1–15. https://doi.org/10.1080/00343404.2024.2399802

Gansauer, G. (2024b). The Biden administration’s infrastructure investments may not be a silver bullet for historically disadvantaged regions. US Politics and Policy (USAPP) Blog, London School of Economics. https://blogs.lse.ac.uk/usappblog/2024/01/25/the-biden-administrations-infrastructure-investments-may-not-be-a-silver-bullet-for-historically-disadvantaged-regions/

Global Trade Alert. (2024). Canada federal government announces CAD 59.9 million in aid to IBM Canada and the MiQro Innovation Collaborative Centre. https://www.globaltradealert.org/intervention/136060/state-loan/canada-federal-government-announces-cad-59-9-million-in-aid-to-ibm-canada-and-the-miqro-innovation-collaborative-centre

Gong, H., Binz, C., Hassink, R., & Trippl, M. (2022). Emerging industries: Institutions, legitimacy and system-level agency. *Regional Studies*, 56(4), 523–535. https://doi.org/10.1080/00343404.2022.2033199

Gouvernement du Québec. (2020). Zones d’innovation Québec. Governement du Québec, Québec. https://www.economie.gouv.qc.ca/fileadmin/contenu/documents_soutien/zones_innovation/guide_projet_zones_innovation.pdf

Gray, M., Golob, E., & Markusen, A. (1996). Big firms, long arms, wide shoulders: The ‘hub-and-spoke’ industrial district in the Seattle region. *Regional Studies*, 30(7), 651–666. https://doi.org/10.1080/00343409612331349383

Grillitsch, M., & Sotarauta, M. (2020). Trinity of change agency, regional development paths and opportunity spaces. *Progress in Human Geography*, 44(4), 704–723. https://doi.org/10.1177/0309132519853870

Gropp, R. (2023). Subventionen für Halbleiter? *Wirtschaftsdienst*, 103(3), 152.

Hassink, R., Isaksen, A., & Trippl, M. (2019). Towards a comprehensive understanding of new regional industrial path development. *Regional Studies*, 53(11), 1636–1645. https://doi.org/10.1080/00343404.2019.1566704

Hool, A., Helbig, C., & Wierink, G. (2024). Challenges and opportunities of the European critical raw materials act. *Mineral Economics*, *37*(3), 661-668.

Innovation Canada, (2024). Strategic Innovation fund, Governement of Canada: Ottawa. https://ised-isde.canada.ca/site/strategic-innovation-fund/en

Jansen, J., Jäger, P., & Redeker, N. (2023). For climate, profits, or resilience? Why, where and how the EU should respond to the Inflation Reduction Act*. European Policy Centre. https://www.epc.eu

Johnston, A., & Huggins, R. (2023). Europe’s semiconductor industry at a crossroads: Industrial policy and regional clusters. *European Urban and Regional Studies*, 30(3), 207–213. https://doi.org/10.1177/09697764231165199

Krahé, M. (2023). Frischer Wind in Washington. Dezernat Zukunft. https://dezernatzukunft.org/frischer-wind-in-washington/#_ftn4

Krugman, P. (1983). *Targeted industrial policies: Theory and evidence. In Proceedings of Industrial Change and Public Policy*, Symposium organized by Federal Reserve Bank of Kansas, Jackson Hole, August 24-26, 123–156.

La Presse. (2024). Ottawa et Québec investissent 100 millions dans l'électronique de puissance. https://www.lapresse.ca/affaires/entreprises/2024-04-26/bromont/ottawa-et-quebec-investissent-100-millions-dans-l-electronique-de-puissance.php

Legault, F. (2023, November 15). Les zones d'innovation: Un outil de développement économique. Gouvernement du Québec. https://www.quebec.ca/nouvelles/actualites/details/les-zones-dinnovation-un-outil-de-developpement-economique-leffet-quantique-166-m-dinvestissement-pour-la-zone-dinnovation-distriq-52399

Les Affaires. (2024). Technum Québec et Liseq : Un partenariat stratégique pour l'avenir de l'électronique et des semi-conducteurs au Québec. https://www.lesaffaires.com/contenus-partenaires/le-quebec-grand-leader-en-electronique-et-semi-conducteurs/technum-quebec-et-liseq-un-partenariat-strategique-pour-lavenir-de-lelectronique-et-des-semi-conducteurs-au-quebec/

Luo, Y., & Van Assche, A. (2023). The rise of techno-geopolitical uncertainty: Implications of the United States CHIPS and Science Act. *Journal of international business studies*, *54*(8), 1423-1440.

MacKinnon, D., Dawley, S., Pike, A., & Cumbers, A. (2019). Rethinking path creation: A geographical political economy approach. *Economic Geography*, 95(2), 113–135. https://doi.org/10.1080/00130095.2018.1498294

MacKinnon, D., Kempton, L., O'Brien, P., Ormerod, E., Pike, A., & Tomaney, J. (2022). Reframing urban and regional 'development' for 'left behind' places. *Cambridge Journal of Regions, Economy and Society*, 15(1), 39–56. https://doi.org/10.1093/cjres/rsab022

Mewes, L., & Broekel, T. (2020). Subsidized to change? The impact of R&D policy on regional technological diversification. *The Annals of Regional Science*, 65, 221–252. https://doi.org/10.1007/s00168-020-00981-9

Morales, H., & Atienza, M. (2022). New path capture: Insights from the diversification process in mining regions. *The Extractive Industries and Society*, 11, 101091. https://doi.org/10.1016/j.exis.2022.101091

National Post. (2024). IBM investing $730M to grow Canadian semiconductor manufacturing plant. https://nationalpost.com/news/canada/ibm-investing-730m-to-grow-canadian-semiconductor-manufacturing-plant

OECD. (2023). *Science, Technology and Innovation Outlook 2023: Enabling transitions in times of disruption*. OECD.

Polèse, M., & Shearmur, R. (2006). Why some regions will decline: A Canadian case study with thoughts on local development strategies. *Papers in regional science*, *85*(1), 23-46.

Prime Minister of Canada. (2023). Prime Minister Trudeau and President Biden joint statement. https://www.pm.gc.ca/en/news/statements/2023/03/24/prime-minister-trudeau-and-president-biden-joint-statement

Prime Minister of Canada. (2024). Investing in semiconductors to create jobs, economic growth, and new opportunities. https://www.pm.gc.ca/en/news/news-releases/2024/04/26/investing-semiconductors-create-jobs-economic-growthandnew

Rey, S., & Janikas, M. (2005). Regional convergence, inequality, and space. *Journal of Economic Geography*, 5(2), 155–176. https://doi.org/10.1093/jeg/lbh048

Rodríguez-Pose, A. (2018). The revenge of the places that don’t matter (and what to do about it). *Cambridge Journal of Regions, Economy and Society*, 11(1), 189–209. https://doi.org/10.1093/cjres/rsx024

Rodrik, D. (2024). Industrial policy for economic development. VoxDevTalk. Podcast. https://voxdev.org/topic/macroeconomics-growth/industrial-policy-economic-development

Shearmur, R., Doloreux, D., & Fil-Kristensen, I. (2023). Canada's Ocean Supercluster initiative: A national policy in regional clothing?. *The Canadian Geographer/Le Géographe canadien*, *67*(4), 484-498.

Shearmur, R. (2008). Of urban competitiveness and business homelessness. *Urban Geography*, *29*(7), 613-615.

Technum Québec. (2024). Technum Québec. https://technumquebec.ca/parc-scientifique/

The Economist. (2023). The Biden administration embraces place-based industrial policy. https://www.economist.com/united-states/2023/07/27/the-biden-administration-embraces-place-based-industrial-policy

The White House. (2023). Remarks on how President Biden’s "Invest in America" agenda has laid the foundation for decades of strong, stable, and sustained equitable growth. https://www.whitehouse.gov/briefing-room/speeches-remarks/2023/05/31/remarks-by-heather-boushey-on-how-president-bidens-invest-in-america-agenda-has-laid-the-foundation-for-decades-of-strong-stable-and-sustained-equitable-growth/

Thurbon, E., Kim, S.-Y., Tan, H., & Mathews, J. A. (2024). *Developmental environmentalism: State ambition and creative destruction in East Asia’s green energy transition.* Oxford University Press.

Trippl, M., Baumgartinger-Seiringer, S., Frangenheim, A., Isaksen, A., & Rypestøl, J. O. (2020). Unravelling green regional industrial path development: Regional preconditions, asset modification and agency. *Geoforum*, 111, 189–197. https://doi.org/10.1016/j.geoforum.2020.02.016

Trippl, M., Soete, L., Kivimaa, P., Schwaag Serger, S., Koundouri, P., & Pontikakis, D. (2024). *Addressing the regional dimension of open strategic autonomy and European green industrial policy*. Publications Office of the European Union. https://doi.org/10.2760/141776

Young, S., Hood, N., & Peters, E. (1994). Multinational enterprises and regional economic development. *Regional Studies*, 28(7), 657–677. https://doi.org/10.1080/00343409412331350075

Appendix

Table A1: Details of interviews

#	Type of organization*	Date	Lenght (minutes)
B1	Support organization	2024-02-08	31 min.
B2	Firm	2024-02-09	20 min.
B3	Firm	2024-02-09	28 min.
B4	Support organization	2024-02-09	39 min.
B5	Firm	2024-02-12	51 min.
B6	Firm	2024-02-12	29 min.
B7	Firm	2024-02-13	35 min.
B8	Support organization	2024-02-13	24 min.
B9	Support organization	2024-02-13	67 min.
B10	Support organization	2024-02-14	28 min.
B11	Support organization	2024-02-15	34 min.
B12	Support organization	2024-02-15	30 min.
B13	Support organization	2024-02-16	31 min.
B14	Support organization	2024-02-20	44 min.
B15	Firm	2024-02-20	34 min.
B16	Municipal organization	2024-02-21	33 min.
B17	Support organization	2024-02-21	29 min.
B18	Support organization	2024-02-23	40 min.
B19	Support organization	2024-02-26	30 min.
B20	Support organization	2024-02-27	43 min.
B21	Ministry organization	2024-03-04	36 min.
B22	Municipal organization	2024-03-05	23 min.
B23	Municipal organization	2024-03-06	48 min.
B24	Ministry organization	2024-03-06	27 min.
B25	Ministry organization	2024-03-07	14 min.
B26	Municipal organization	2024-03-06	31 min.
B27	Municipal organization	2024-03-08	33 min.
B28	Ministry organization	2024-03-13	44 min.
B29	Municipal organization	2024-03-20	36 min.
B30	Firm	2024-03-22	30 min.
B31	Municipal organization	2024-04-02	31 min.

*Actors have been grouped into broad categories to ensure the anonymity of the interview partners.

Table A2: Main actors and infrastructure in the microelectronics industry

Actors	Founded year	Main function	Role and activities in the microelectronics industry
Industrial actors			
IBM	1972	Semiconductor assembly and test facility	Contributes to semiconductor research and development. The first microelectronic company to set up in Bromont. The facility in Bromont is the largest semiconductor assembly and test facility in North America.
Teledyne Dalsa	1980	Semiconductor manufacturer	Manufactures silicon-based CCDs (image sensors) and MEMS (micrometer-sized electromechanical systems). Specialized in digital imaging and semiconductor products which have many applications: photonics, telecoms, biomedical, automotive, and industrial.
Cogiscan	1999	Software development company for the electronics assembly industry	Supplier of software for the electronics assembly industry. Supply electronic assembly plants with tracking, tracing and control (TTC) software and solutions that improve production quality and plant productivity.
Aeponyx	2011	Telecommunications equipment manufacturer	Develop and bring innovative electronic products for the telecommunications industry. Develop different technologies like integrated photonic circuits using silicon nitride and MEMS switches.
Boréas Technologies	2016	Fabless semiconductor company specializing in integrated circuits	Designs and commercializes high-voltage integrated circuits for various devices (cellphone, computer, car). Focuses on haptic applications and on consumer, automotive and industrial market.
Digitho	2021	Start-up proposing technologies to improve the semiconductor manufacturing process	Develop technologies that that can be integrated into standard lithography equipment and allow semiconductors traceability and identification.
Institutional actors			
C2MI	2011	Research center integrating components essential to the use and deployment of digital technologies	Leading role within the semiconductor industry. Intermediaries between applied research and the accelerated commercialization of microelectronic components. Support firms to finalize the development of their concepts, from prototyping to commercialization.
Industrial infrastructure			
Parc scientifique de Bromont	*1964*	Science park organized around three high-tech industries: microelectronics, aeronautics and advanced manufacturing.	Regrouped around 29 companies employing more than 5000 people in 2020. Presence of leading companies such as IBM, Teledyne and GE Aviation. Total surface area of 14,000,000 ft². Brings together industry and research actors working closely to grow the microelectronics industry.