Towards studying the developmental consequences of regional industrial path development

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Abstract

A major reason for the great interest in regional industrial path development (RIPD) is the associated hopes for positive regional development outcomes. However, up to now we know surprisingly little about the often mixed economic, social, and ecological effects of RIPD for regions. Existing studies on RIPD tend not to link to these outcomes. This special issue aims to improve our understanding of the conditions under which RIPD contributes to determining what kind of regional development and for whom. The introductory paper provides impulses how future research can link RIPD-dynamics to its broader developmental outcomes and poses urgent open questions.

Keywords: regional industrial path development; path creation; sustainable development; regional development; Evolutionary Economic Geography

1 Introduction: Understanding regional industrial path development – but for what purpose?

Why does one region emerge as a global hub for ICT, while another excels in biotechnology, or develops an e-mobility cluster? How regions change their economic structure and develop new industrial paths is a core interest in the fields of economic geography and regional studies.

Since the 2000s, research within the framework of Evolutionary Economic Geography (EEG) has significantly enhanced our understanding of regional industrial dynamics and the emergence of new economic activities. This body of work explains how new industries evolve from related endogenous capabilities through path-dependent diversification processes (Boschma & Frenken 2011; Boschma 2017). In recent years, these conceptualizations have been enriched by incorporating insights from approaches such as regional innovation systems, transition studies, and global production networks (for an overview, see Hassink et al. 2019).

Thereby the EEG emphasis on structural factors has been increasingly complemented by integrating the critical role of agency in shaping regional structural change (e.g. MacKinnon et al. 2019, Binz et al. 2016, Grillitsch & Sotarauta 2020).

In short, great advancements have been made in the last two decades that increasingly enable us to investigate and explain how new industries emerge in regions. Without a doubt, this is powerful knowledge about the feasibility of regional industrial path development (henceforth RIPD) that can be applied to designing strategies for regional diversification – most prominently in the EU's smart specialization strategies (e.g., Balland et al. 2019; Breul 2023). Yet, we contend that knowledge about how new regional industrial paths develop is only half the answer. We have to take a step back and ask for the purpose and the associated hopes of regions to grow new industries – a genuinely normative debate. There is no point for local actors in becoming a region that succeeded in developing a popular industrial path, such as AI, the space industry, or whatever industry and technology is currently in fashion or in demand to address challenges at national or global scales, unless it contributes to the broader developmental goals of the region.

Job generation and value creation and capture, or economic prosperity at large, are often primary hopes and policy goals associated with the promotion of RIPD - regardless of the different regional contexts (e.g. offshore wind in old industrial regions in Northern Germany (Fornahl et al. 2012); tourism in a peripheral region in Namibia (Breul et al. 2021); AI in a diversified and highly innovative region like Montreal, Canada (Doloreux & Turkina 2021). While the rise of new industries in old industrial areas shall compensate for losses in declining mature paths, it shall broaden the industrial base or reap first-mover advantages in more innovative industrial regions.

Furthermore, in our current context marked by great environmental and social challenges, like climate change, aging, and growing inequalities, regional innovation and economic policies - that focus on RIPD, among other things - are increasingly perceived as a vehicle to address broader developmental goals and provide solutions to these challenges (e.g., Tödtling et al. 2021; Trippl et al. 2024). For instance, the development of the EU's smart specialization strategy approach (S3) towards "smart specialization strategies for sustainable and inclusive growth" (S4+) (McCann & Soete 2020) reflects this shift from a dominant focus on economic growth towards a regional transformation-oriented policy that aims to reconcile economic, ecological and social objectives. Also, the idea of just transitions highlights that RIPD is not only perceived as a measure to follow a one-dimensional mission of economic growth but also to contribute to broader human- and ecological well-being – in other words, non-economic developmental outcomes (Eadson & van Veelen 2023). This mission is particularly urgent in peripheral regions, which are often highly specialized and where diversification is one of their primary strategies to achieve development and sustainability (Breul & Atienza 2022).

Against this background, this special issue starts from two critical observations that characterize most existing work on RIPD despite the above-outlined hopes and policy goals.

<u>First, implicit within most of the existing RIPD literature is the assumption that RIPD can be equated with regional economic development. Up until now, RIPD studies have hardly focused on revealing the actual economic effects caused by the emergence of new industries.</u> Although a new regional industrial path has the potential to generate substantial economic gains - both directly (e.g., employment generation, firm entries, etc.) as well as indirectly (e.g., knowledge

spillover, production linkages, etc.) – recent research also points to possible ‘dark sides’ of new industrial path development (Breul et al. 2021; MacKinnon et al. 2019). Negative inter-path relations can arise and withdraw scarce assets, such as skilled workers or fertile land, to the detriment of existing economic structures in the region, thereby causing unintended and undesirable economic outcomes for others in the host region (Breul et al. 2021; Mateo-Peinado 2022). Moreover, the prospects for translating RIPD into beneficial regional economic outcomes strongly depend on the degree of territorially embedded conditions and actors. The dominance of extra-regional actors controlling local resources and industrial activities can result in path capture (Morales & Atienza 2022), where economic outcomes do not unfold in the host region but are predominantly transferred outside the area.

Second, despite the mission-oriented shift in regional innovation and economic policy to contribute to the Sustainable Development Goals, questions of broader societal and environmental impacts have been largely neglected by the existing body of work on RIPD (Gibbs & Jensen 2022; Eadson & van Veelen 2023). Although the development of ‘green’ industrial paths has received increasing scholarly attention in recent years (e.g., Trippl et al. 2020; Sotarauta et al. 2021; Steinböck & Trippl 2023), little is known about how the emergence of ‘green’ industrial paths is linked to regional environmental outcomes. ‘Green’ paths like e-mobility or renewable energies are a key component for the green transition of our economies. Apart from more environmentally friendly products, “the manufacturing process in these sectors carries significant environmental burdens in their host regions, including greenhouse gas emissions, energy consumption, land degradation, habitat loss, and pollution” (Trippl et al. 2024: 21). Moreover, RIPD can cause mixed social outcomes. Well-known examples like the co-occurring rise of high-tech sectors in Silicon Valley and localized inequality (Lee 2024), the development of export footwear production in Eastern Europe, and rising gender-based labor exploitation (Selwyn et al. 2020) point to possible negative social consequences. It requires a focus on the impact of RIPD on working conditions, social in-/exclusion, gender (in)equality, health, etc., to evaluate the contribution of regional economic change on broader human well-being.

This brief overview shows that besides the largely assumed positive regional economic impacts, RIPD can also leave variegated economic, social, and ecological developmental imprints in the host region. In other words, RIPD typically creates winners and losers and might not entail a desirable direction for regional development. This points to the critical role of policy, beyond supporting the creation of regional industrial paths, to optimize its socio-economic and ecological outcomes throughout the region and for different social groups. To inform these kinds of complementary RIPD policies, there is an urgent need for future research to link the question of how new regional industrial paths emerge with a developmental perspective that can grasp the conditions under which RIPD contributes to what kind of regional development and for whom. Apart from a few recent exceptions (Breul et al. 2021; Eadson & van Veelen 2023; Morales & Atienza 2023), these insights are up to now quite limited.

Therefore, this Special Issue invited scholars to overcome this critical gap and link the study of RIPD with a developmental perspective. We contend that these insights are moving towards what is required to inform future RIPD policies that can address targeted developmental outcomes or solve specific challenges while simultaneously considering possible trade-offs.

In the remainder, we present the articles on this special issue, structured around three topics: uneven development, well-being, and developmental outcomes. The final section provides impulses how future research could link RIPD dynamics with broader developmental outcomes. Moreover, we propose how concepts from related research strands can help future research understand why the emergence of a new industrial path generates what kind of regional development and for whom. Finally, urgent open questions for a future research agenda are posed.

2 Overview of the special issue

2.1 Uneven development

Uneven development is a core topic for regional studies and economic geography with profound implications for broader regional development outcomes (Smith 2008). In recent years, uneven development has attracted renewed interest due to the political and social backlash that increasing disparities between metropolitan and non-metropolitan regions have created, which has been summarised by the notion of increasing discontent (McCann 2020; Rodríguez-Pose 2018). The double-crisis in this context, as Donald and Gray (2019) describe, is that regional development is struggling both with striking imbalances as well as a green transformation addressing the global threat of climate change and biodiversity loss. The problem is that those regions that are already lagging behind, have the least capacities to grasp opportunities of an emergent green and digital economy and are the most vulnerable to the risks of climate change, thus further aggravating the problem of uneven development (Rodríguez-Pose & Bartalucci 2024). A lot of work has thus been devoted to the question of regional development "against the odds", documented in two special issues covering non-metropolitan regions and old-industrial regions more specifically (Kinossian, Grillitsch, & Nagy 2024; Sotarauta & Grillitsch 2023). The papers in this special issue contribute to this stream of literature by emphasizing the importance of institutions and governance structures for RIPD, making it possible for non-metropolitan regions to develop "against the odds". Furthermore, the role of multi-scalar agency and the nation-state in creating the conditions and removing constraints for local agency was identified as important.

More specifically, Mfundo Mlilo, Michael Bollig and Javier Revilla Diez (2024, in this collection) study the emergence of tourism paths in post-colonial states of Southern Africa. In post-colonial contexts, the authors identify the nation-state as an essential actor to open opportunity spaces for regional-level actors by removing constraints to agency. This paper extends the trinity of change agency approach by Grillitsch and Sotarauta (2020) to explicitly incorporate a multi-scalar perspective of institutional entrepreneurship to explain how different forms of agency shape regional path development during critical junctures. The paper zooms in on the end of colonialism as a specific triggering event, leaving behind structurally weak regional contexts. In all three cases, this entails a shortage of empowered local actors and exposes a delicate situation where external and often foreign players continue to dominate path development. Hence, local agency needs to evolve over time to make an impact. This is also where the nation-state becomes vital as a powerful actor who can drive tourism path development through institutional entrepreneurship, targeted at building conditions and capacities for local actors to engage in tourism path development. In addition, the paper shows that path development is a long-term process where outcomes are shaped in a number of critical junctures. In terms of broader and just regional development outcomes, the identified processes of breaking dependencies and building agency of local actors to participate in path development are essential.

Heike Meyer et al. (2025, in this collection) study the transformation of small- and medium-sized industrial towns in Slovenia and Switzerland. The study explores how the characteristic of smallness provides opportunities or entails limitations in path development, with a particular focus on the role of agency. As Mlilo et al., they discuss the importance of agency across multiple scales. The difference was, however, that in the context of small- and medium-sized industrial towns in Slovenia and Switzerland, this referred to the capability of local actors to operate at different scales (local, regional, national). The study provides evidence that the cases that went through a more profound structural transformation, successfully mobilised different scales. Furthermore, in the case of smallness, the authors found that individual actors often wore different hats so that different forms of agency overlapped. Yet, the study foregrounded the importance of institutional entrepreneurship for multi-scalar work. Smallness, they find, can both enable and hinder such work and industrial transformations. In the positive cases, smallness facilitated coordination between actors, making them effective in "borrowing size" (knowledge, resources, infrastructure) from near cities through multi-scalar local agency. In the negative cases, local actors engaged less in multi-scalar relations, felt disempowered and in the shadow of nearby cities. Power relations played an important role in small- and medium-sized cities in terms of inclusion of different stakeholders and the possibility to develop new narratives and future perspective for regional development.

Jiří Blažek and Viktor Květoň (2025, in this collection) conduct an in-depth case study of the South Moravian Region in Czechia, which is one of the most dynamic regions in Central and Eastern Europe. They make a conceptual contribution arguing that the mode of governance will influence the extent to which actors engage in more path-breaking activities and system-level agency. The authors differentiate between two dimensions, the strength of local public administration and the inclusiveness and responsiveness of the institutional set-up. Combining high levels in both dimensions characterizes an institutional environment that widens the opportunity space for regional path development, and the likelihood that local actors engage in system-agency. Such integrated regional institutional structures provide for a strong support-system, including education, competences, finance, trust and a collaborative culture, and a better visibility internationally. Within such an environment, however, firms differ in the extent to which they engage in the more radical forms of new path development. Those that do also tend to engage more often in system-level agency, that is to say, actions to transform the regional support system. Probably, deviating more substantially from existing structures creates an incentive and necessity for respective firms to engage in changing the support structures. This study, in contrast to the previous two, zooms in on a case where the institutional structures and modes of governance are supportive for structural transformation. The other side of the coin is that local agency is more constrained in other contexts, like the studies of Mlilo et al. and Meyer et al. have shown, which opens the questions of how institutional reform can be achieved. Better governance will open more opportunities for regional path development, catering to the different interests and valorising the different capabilities and knowledge local communities possess.

2.2 Towards well-being

As already established by research within regional economic geography, regions are facing a "double crisis" in terms of climate and environment but also socio-economic inequalities (Donald & Grey 2019). This inequality actualises, we have known for quite some time, into profound issues when it comes to health and well-being, with evidence showing that larger inequalities negatively impact health outcomes for all within society (rich as well as poor) (Wilkinson & Pickett 2010). We have also known for quite some time that in the current specificities of late-stage capitalism within which we find ourselves, inequalities between rich and poor are stubbornly growing at a broader societal level (Piketty 2014), and in particularly at the regional level leading to sentiments and symptoms of left-behindness and discontent (McCann 2020; Rodríguez-Pose 2018). As we explained already in the introduction to this piece, the hope is that we can re-orient regional development theory and practice to account for the solving of grand societal challenges and emerging trends such as the greening of smart specialisation (McCann & Soete 2020) and incorporating justice into discussions of regional path development (Eadson & van Veelen 2023) represent promising, if nascent attempts on both research and practice sides to achieve this. Incorporating wellbeing into our conceptualisation of economic development is an important but as of yet largely unsolved issue; recent efforts have been made to use wellbeing as a means of promoting a transition to a more sustainable and equitable version of the fashion and textiles industry (Pugh et al. 2024). Such efforts attempt to take broader theoretical conceptualisations of the "well-being economy" and apply it to specific examples of organising aspects of the economy on a sectoral basis. The well-being economy is posited as a more sustainable and just arrangement, which focuses on planetary and people's health and well-being (Coscieme et al. 2019; Fioramonti et al. 2019, 2022). Precisely how to translate this concept to the regional level is as yet unclear, but an agenda to which we can contribute with this special issue collection by specifying the links between RIPD and well-being.

The paper by Stefan Philipp and Anestis Amanatidis (2024, in this collection) in this edition raises the question of innovation in public healthcare provision and how this is linked to path-dependent change processes. Specifically, they consider the grand challenges when it comes to healthcare facing many regions in Europe around aging societies, increases in non-communicable diseases, and workforce shortages. They contrast the need to address these challenges via innovation in the public health sector with the situation whereby it seems to be hard to generate widespread uptake from healthcare innovations that have proven to deliver positive outcomes. Against this challenging backdrop, they apply the economic geographic concepts of change agency and path dependence to understand what structures enable and constrain human actions to deliver change. To do so, they draw insights from different fields of study – economic geography, institutional theory, and structuration theory – to develop a structure-practice-agency framework to situate practice relationally. They apply their framework to study healthcare innovation in two European regions- Örebro and Murcia-drawing primarily on interviews with key stakeholders and illustrating how the two regions took different strategies to address challenges in the public healthcare system. Different articulations of change agency were identified, with Schumpeterian entrepreneurship emerging as the key mode in Murcia, whereas Örebro leaned towards a community and state-oriented approach within a multi-level governance system. In terms of pathways for change at the regional level, they observe two processes. First, they point to the institutional alignment between practices, organisations, and institutions that result in what they call evolutionary adjustments. Second, they notice an emergence of future trajectories that represent as institutional accretion of micro-change processes that may lead to transformational change. In both cases, they highlight the fact that healthcare system innovation is a non-linear process and lift the role of intermediaries as key change agents who change the system in favour of experimental change.

The paper by Mateusz Ziembla, Elvira Uyarra and Jonatan Pinkse (2025, in this collection). also focuses on a specific industry, in this case, the decarbonisation of housing stock, and unpacks the role of system-level agency in the emergence and growth of this industry in Manchester. In particular, they focus on how key change agents in the system are able to address barriers to new path development. Through this specific industry case, they contribute to debates about linking up climate change and regional development goals, exploring the possibility of the emergence of new green industries. They unpack the role of system-level agency in creating change beyond the boundaries of a single system, shaping geographical and technological innovation systems, showing that interactions between systems are important when we think about spatially embedded industries. By taking a longitudinal approach to study the emergence and growth of a sector in one particular place, they analyse various initiatives undertaken in Manchester to decarbonize the housing stock. They highlight barriers to the growth of the industry, in specific skills shortages and lack of specialized knowledge within the region and more widely, and show how the policymakers in the region, as they became more aware of system-level constraints, started to mobilise resources and other system actors to address these. Through analysing system-level agency, they can unpack new path formation and mobilisation, unpacking some elements of the black box in our knowledge regarding how these new paths emerge and the challenges they often face in their formative years. In doing so, the authors increase our knowledge about how regional policy actors can assist in the move towards decarbonisation, and better link up regional development and climate goals, and lift the importance of housing as a sector for regional economic geographers to explore as a key piece of the foundational economy puzzle.

2.3 Connecting Regional Industrial Path Development to Developmental Outcomes

How RIPD translates into development outcomes remains an open question in the EEG approach both theoretically and empirically. From a biological standpoint, evolution does not inherently signify progress. Similarly, in the social sciences, the creation of new regional industrial paths does not necessarily lead to economic, social, or environmental development. As Martin and Sunley (2022) highlight, integrating evolutionary (phylogenetic) and developmental (ontogenetic) processes offers a promising avenue for future research. This would imply connecting EEG with the geographical political economy and focusing on the dynamics of uneven regional development, as the previous sections have shown. The state's role, governance modes, various types of agency, and, consequently, politics and policy are essential for RIPD to foster regional development. However, for these efforts to succeed, it is crucial to identify the mechanisms that translate the emergence of new paths to tangible development outcomes and to consider how the evolution of place-specific conditions explains whether new regional industrial paths lead to social, economic, or environmental development outcomes.

In this special issue, Miguel Atienza, Marcelo Lufin and Moritz Breul (2024, in this collection) analyse how RIPD translates into regional development outcomes, focusing on the development of the mining services industry in the northern Chilean Antofagasta Region, one of the leading copper and lithium producers in the world. To create this analytical link, the study proposes to concentrate on how the nature of asset mobilisation for path development (here: human capital) can affect its developmental outcomes. The analysis reveals that the mining services supplier path in Antofagasta evolved significantly from 1974 to 2021, from a multi-scalar perspective considering global, national, and regional historical changes. Initially, human capital in mining was territorially embedded, with company towns anchoring workers. Over time, the embeddedness of labour progressively declined due to shifts toward subcontracting and long-distance commuting (LDC). By 2021, over half of the workforce in this path commuted from outside the region, undermining local economic benefits. Key mechanisms translating RIPD into development—such as wage circulation, local multiplier effects, and labour agency—have been weakened by the disembeddedness of the workforce. Fly-over effects from commuter wages, reduced fiscal contributions, and limited labour market thickening constrain future regional economic diversification and agglomeration economies. The spatial fragmentation of labour challenges the contribution of the new path to regional development as well as the consolidation of a sustainable mining cluster. In short, the findings highlight that RIPD does not necessarily translate into the expected regional economic outcomes but depends on the particular configuration of how regional industrial paths develop. More importantly, the article demonstrates a promising approach to link RIPD to developmental outcomes by focusing on the changing modes of asset mobilization for RIPD. While methodically challenging, a multi-scalar historical analysis has proved to be helpful in grasping these altering modes and geographies of asset mobilization and its developmental implications. The study calls for re-evaluating human capital's territorial embeddedness, particularly in peripheral regions and industries characterized by fragmented labour practices, to understand the contribution of new industrial paths to regional economic development.

Nils Grashof and Stefano Basilico (2024, in this collection) focus on the environmental dimension of regional development and examine the winners and losers of the green transition in Europe between 1996 and 2017 by exploring new path development into green technologies through two key dimensions: regional economic strength and the characteristics of the regional knowledge base. The authors use patent data to identify green and brown technologies and evaluate regions' ability to diversify. They find that economically strong and weak regions can diversify into green technologies if they possess related technological capabilities. However, brown-specialized regions face significant challenges unless their knowledge base overlaps with green technologies. Regions with a mix of green and brown technologies ("colorful regions") show higher diversification potential due to their ability to recombine complementary knowledge domains. High-income regions generally have better conditions for innovation, such as diverse knowledge bases and human capital, but their established structures may hinder experimentation. On the other hand, structurally weak regions rely more heavily on related technological capabilities to achieve green diversification. The study challenges the assumption that weaker regions only diversify into simpler technologies, showing that both strong and weak regions can engage in complex green innovations if regional conditions permit. It underscores, however, the importance of tailoring policy interventions to specific regional capacities to avoid divergence among weak and strong regions, focusing on overcoming lock-in effects in regions specialized in brown technologies and supporting regions with related green capabilities. The findings contribute to the critical question of how green structural change occurs across different regions by highlighting the nuanced interplay between place-specific conditions such as technological relatedness, pre-existing economic strength, and green innovation. While green technologies offer opportunities for regional development, disparities persist, particularly for regions with entrenched "brown" specializations. The study calls for a Just Transition approach, aligned with the European Green Deal, to ensure an inclusive and sustainable green transition.

Markus Grillitsch, Lars Coenen and Kevin Morgan (2025, in this collection) discuss how directionality and subsidiarity can be combined when addressing sustainability challenges in regional development policy, with a focus on the wellbeing of people and planet. Overall, the authors suggest that regional development policy rationales need to be fundamentally rethought, to deliver desired development outcomes locally while contributing to sustainability imperatives articulated at higher scales (national, European, global). In the paper, the authors revisit the theoretical foundations of the entrepreneurial discovery process as the main mechanism for local engagement in the current EU regional policy framework. In its place, an alternative theory of change is proposed with purpose collective action at its centre. Purpose collective action goes beyond the entrepreneurial discovery process as it is concerned with shaping the opportunity spaces within which entrepreneurial discovery processes unfold. It entails a capacious perspective of agency, combining what Grillitsch and Sotarauta (2020) framed as Trinity of Change Agency, namely place-based leadership, institutional entrepreneurship, and innovative entrepreneurship with social innovation addressing the need of local people. Overall, this would rebalance directionality and subsidiarity where development outcomes relevant for local people are at the centre, calibrated with the necessary contribution to addressing sustainability imperatives. In this framing, RIPD is one but not the only mean to achieve desired futures.

3 A look ahead

The contributions of this special issue open a discussion that Evolutionary Economic Geography and complementary approaches must address more explicitly. Several years ago, Neffke, Henning, and Boschma (2011, 241) stated that understanding "*how new regional growth paths emerge […] is one of the most intriguing and challenging issues in the field of economic geography*." While significant progress has been made, this challenge must now be extended to examine how these new industries contribute to regional development. Notwithstanding the aforementioned contributions, we have to conclude that the challenge from which this special issue started – linking RIPD dynamics with developmental outcomes – still remains, to a large extent, unsolved. While the articles make crucial contributions to our understanding of how RIDP is connected (or not) to regional development and add empirical insights from diverse regional (e.g. from former industrial regions to peripheral regions in the Global South) and industrial contexts (e.g. from public healthcare provision to the decarbonisation of housing stock or mining services) that have not received much attention yet in the RIPD body of work, our understanding of the conditions under which these dynamics unfold into beneficial developmental outcomes is still lagging. This continued gap eventually points to methodological and conceptual challenges in explicitly creating this link. To encourage future research to tackle this challenging task, we would like to use the remainder of this article to make suggestions how to focus on this link in future studies.

Table 1 lists developmental outcome indicators along two dimensions (without claiming to be exhaustive). The first dimension (first column) ensures a broad focus on how RIPD affects regional development. It spans beyond the more prominent economic dimension and includes broader societal and environmental impacts of RIPD, as is increasingly called for (Eadson & van Veelen 2023). The second dimension distinguishes between intra-path and extra-path impacts. Intra-path impacts are developmental outcomes immediately created by the new industrial path, such as job creation and working conditions in the new industry. In contrast, extra-path impacts describe developmental impacts that a new industrial path generates outside its demarcation in the region. In other words, these are positive and negative externalities, such as knowledge spillover or environmental degradation. Studies that try to explain the emergence of new industrial paths tend to be characterized by a "single path view" (Frangenheim et al. 2019). This distinction into intra- and extra-path impacts highlights the need to overcome this inclusionary bias (Werner 2016) and link RIPD-dynamics with other parts of the region - meaning people, places, and economic activities at the sidelines of the new industrial path – to study how RIPD affects wider regional development (Breul et al. 2021).

Table 1: An overview of regional developmental impacts of regional industrial path development.

IMPACT DIMENSIONS	INTRA-PATH	EXTRA-PATH
ECONOMIC	e.g., firm formation, firm growth, profits (retained locally), job creation (volume and type), innovation, entrepreneurship, tax income	e.g., knowledge spillover, production linkages, competition for labour, land, energy and other resources, dual use of infrastructure and resources created for the industrial path
SOCIAL	e.g., working conditions, gender (in)equality, income and wealth (in)equalities, occupational health	e.g., labour market diversity, social in-/exclusion, health effects, local tax revenues and possibilities to provide foundational services and infrastructure, change in power dynamics
ENVIRONMENTAL	e.g., Energy transition (green growth), land-use	e.g., local biodiversity, soil fertility, soil and water contamination, water availability, emissions of GHGs, emission of toxic substances

In short, along this structure, possible variegated developmental outcomes of RIPD, both bright and dark sides, become apparent. We contend that this overview will provide orientation and encourage future research to address urgent questions that analyse the mechanisms of RIPD that lead to positive or negative outcomes, such as:

- How does smart growth also lead to inclusive growth?
- To what extent does the creation of "green" paths generate sustainable forms of regional development?
- Which conditions affect how new industries' positive and negative developmental outcomes are distributed within a region?
- What factors need to be considered to define the desirability of new industrial paths for a region apart from classical indicators like the degree of complexity and relatedness?

- In what way do power dynamics and agency affect the development outcomes resulting from industrial path development?
- How do regional preconditions and governance structure affect the link between regional industrial path development and development outcomes?
- What policy design and implementation processes tend to yield a desirable nexus of regional industrial path development and development outcomes?

To address these urgent questions and derive meaningful policy implications, we see great value in focusing on the development translation mechanisms of RIPD. This enables us to grasp the causes of the revealed variegated developmental outcomes of RIPD in regions. In this article's final part, we, therefore, propose some helpful concepts from related literature strands that could spur future studies:

The first point to consider is the relevance of context-specific conditions to make RIPD a driver of regional development. In this regard, understanding the connection between new paths and developmental outcomes addresses the recent call by Chu and Hassink (2023) and Kogler et al. (2023) for a new ontology in EEG. They emphasize moving away from abstract spatial approaches toward studies grounded in the lived experiences of real places. While this shift can enhance the understanding of mechanisms that connect new paths to its development outcomes, it also requires a long-term perspective on path development (Henning 2019). The interaction of specific places with their historical contexts across different scales —especially in an era of grand societal challenges and polycrisis— is crucial for uncovering and theorizing "…the connections between contexts and outcomes…" and "…tracing the generative process in time…" to validate existing theories (Martin & Sunley 2022:11). Path tracing would be an appropriate methodology to achieve this purpose (Sotarauta & Grillitsch 2023).

Second, as the case studies in this special issue clearly show, "regions need to be conceived of as both territorial and networked entities" (Coe & Hess 2011: 135). It requires both, an intra-regional as well as an extra-regional focus, to fully detect the different kinds of development translation mechanisms of RIPD that are at work. In order to investigate the effect of RIPD within the region, such as on other parts of the regional economy or livelihoods, a focus on inter-path relations can provide a powerful analytical lens (Breul et al., 2021; Mateo-Peinado, 2023). On the one hand, it allows to reveal how supportive inter-path relations, like knowledge spillover or the dual use of infrastructure developed for the new path create novel opportunities in the region. On the other hand, it unveils competitive inter-path relations, such as increasing competition for land, water, or other scarce resources in the region possibly harming the conditions of established economic activities and livelihoods in the region. By being able to consider regional actors into the analysis that are not part of the new path the approach can address intra-regional distributional issues of new regional industrial dynamics. On this basis, future studies can generate insights about how RIPD-policies need to be complemented by a wider set of policy framework for optimally distributing the benefits of new industries and avoiding possible devastating outcomes within the region.

In a similar vein, extra-regional linkages can have a dual role as a mechanism to translate the creation of new paths into regional development. Depending on context-specific conditions, extra-regional linkages can play a crucial role in regional development by facilitating knowledge flows, investment, and regional growth. But they can also lead to "path capture," where extra-regional actors absorb most of the value created by RIPD (Morales & Atienza

2022). In this regard, to understand the connection between new paths and regional development, it would be necessary to move beyond a purely local to a multiscalar approach to analyse to what extent the benefits of RIPD leak outside the region. This highlights the value of integrating EEG with conceptual considerations of the Global Production Network (GPN) framework (Atienza et al. 2024, in this collection; Boschma 2022; Rodríguez-Pose 2021; Yeung 2021). In particular, the concepts of territorial embeddedness and value capture (Coe & Yeung 2015) can be helpful to connect RIPD to its developmental outcomes while considering extra-regional influences in the form of the spatial division of labor or the geographical transfer of value. For instance, Atienza et al. (2024, in this collection) show how the territorial disembeddedness of an industrial path's resources can fail to establish a sense of place, remain disconnected from local actors' interests and emotional bonds, and foster a sense of placelessness, thereby risking missed opportunities for further development (Chu & Hassink 2023; Jones 2023).

Finally, another important point is that any work towards regional development outcomes desirable in specific local contexts requires a bottom-up approach, with an emphasis on the aspirations, interests, capabilities, and vulnerabilities of various sets of local actors. This calls for a focus on agentic processes of navigating different interests, on power dynamics between stakeholder groups, on articulating purposes for regional development that can be agreed upon between stakeholder groups, providing a balanced perspective of development, and on jointly shaping opportunity spaces and development processes that make it possible to release the desired futures (Grillitsch et al., 2025, in this collection; Breul 2023). The burgeoning literature on human agency in regional development would be a relevant starting point, combined with a more capacious perspective of local agency considering social innovation for the need of local people (e.g. Marques et al., 2018), and for the delivery of the foundational services and infrastructure needed for wellbeing (Foundational Economy Collective, 2022).

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