

The logo for CIRCLE features the word "CIRCLE" in a bold, black, sans-serif font. A thin, curved line arches over the letters, starting from the top of the 'C' and ending at the top of the 'E'. A small yellow dot is positioned above the letter 'I'.

**LUND**  
UNIVERSITY

## **Resilience in the periphery: What an agency perspective can bring to the table**

Heli Kurikka (heli.kurikka@tuni.fi)

Faculty of Management and Business, Tampere University, Finland

Markus Grillitsch (markus.grillitsch@keg.lu.se)

Department of Human Geography & CIRCLE, Lund University, Sweden

### **Papers in Innovation Studies**

### **Paper no. 2020/07**

This is a pre-print version of a paper, which has been submitted to a journal.

Centre for Innovation, Research and Competence in the Learning Economy  
(CIRCLE)

Lund University

P.O. Box 117, Sölvegatan 16, S-221 00 Lund, SWEDEN

<http://www.circle.lu.se/publications>

## **Resilience in the periphery: What an agency perspective can bring to the table**

Heli Kurrika, Markus Grillitsch

**Abstract:** In this chapter, we study the relationship between regional economic resilience and agency. Especially since the 2008 recession, regional resilience has raised a lot of interest in economic geography. However, the resilience research has focused mostly on the structural perspective and the role of agency has gained less attention. Intentional and purposeful human actions can have an effect on regional development trajectories especially in a crisis situation. Economic crises typically are critical junctures where a variety of paths are possible and where the choices, strategies, and actions may have a decisive effect on the future. We are interested in the influence of change agency on different kinds of resilience outputs, especially regional adaptability. Different types of change agency play their own roles in constructing regional resilience. Innovative entrepreneurs are transforming or creating new economic activities through the novel combination of knowledge and resources. Institutional entrepreneurs are actors that challenge and transform existing rules and practices or aim at creating new ones. Finally, place-based leaders are co-ordinating and mobilising different actors and resources for the collective pursuit. Constructing regional resilience calls for this ‘trinity of change agency’. We provide empirical illustrations of our arguments from two peripheral Finish regions that went through similar crises but emerged differently from it. Our findings indicate that the interplay of different types of change agency has a significant role in regional processes of adaptation and adaptability of the region.

**Keywords:** resilience; adaptability; change agency; periphery; non-core regions; regional development; crisis; regional policy

**JEL:** O30; P48; R10; R58

Disclaimer: CIRCLE does not take any responsibility for opinions and views expressed by the authors in this paper.

# Resilience in the periphery: What an agency perspective can bring to the table

Heli Kurikka\* & Markus Grillitsch\*\*

\* Tampere University, Faculty of Management and Business, [heli.kurikka@tuni.fi](mailto:heli.kurikka@tuni.fi)

\*\* Lund University, Department of Human Geography, CIRCLE - Center for Innovation Research and Competence in a Learning Economy, [markus.grillitsch@keg.lu.se](mailto:markus.grillitsch@keg.lu.se)

## Abstract

In this chapter, we study the relationship between regional economic resilience and agency. Especially since the 2008 recession, regional resilience has raised a lot of interest in economic geography. However, the resilience research has focused mostly on the structural perspective and the role of agency has gained less attention. Intentional and purposeful human actions can have an effect on regional development trajectories especially in a crisis situation. Economic crises typically are critical junctures where a variety of paths are possible and where the choices, strategies, and actions may have a decisive effect on the future. We are interested in the influence of change agency on different kinds of resilience outputs, especially regional adaptability. Different types of change agency play their own roles in constructing regional resilience. Innovative entrepreneurs are transforming or creating new economic activities through the novel combination of knowledge and resources. Institutional entrepreneurs are actors that challenge and transform existing rules and practices or aim at creating new ones. Finally, place-based leaders are co-ordinating and mobilising different actors and resources for the collective pursuit. Constructing regional resilience calls for this 'trinity of change agency'. We provide empirical illustrations of our arguments from two peripheral Finish regions that went through similar crises but emerged differently from it. Our findings indicate that the interplay of different types of change agency has a significant role in regional processes of adaptation and adaptability of the region.

JEL Codes: O30, P48, R10, R58,

Keywords: resilience, adaptability, change agency, periphery, non-core regions, regional development, crisis, regional policy

Acknowledgments: This research was supported by a grant from Länsförsäkringar Alliance Research Foundation, Sweden (Grant Number: 2017/01/011)

## Introduction

The concept of resilience has become popular over the last 15 years in economic geography. Large uncertainties in the economy have affected regions all over in the wake of major global crises. Simultaneously, the globalization of the economy has created interdependencies that stimulate macroeconomic growth but as a downside can generate region-specific shocks (Iammarino, Rodríguez-Pose, and Storper 2017). There is the question why some regions survive and flourish after facing difficulties while others are trapped in negative development paths. The notion of resilience has been used to describe and partly explain the variegated effects of shocks to regional economies.

Crises are critical junctures where a variety of future development paths are possible and where the choices, strategies, and actions may have a decisive effect on the future. Capocca and Kelemen (2007) state that critical junctures are an important concept in understanding institutional change. Institutions are path-dependent in nature and exhibit long times of relative stability. In certain periods, this stability may waver. These brief phases of institutional flux are windows for change, critical junctures. The choices made at that time may have long-term and significant consequences, changing institutional arrangements and development paths.

Shocks may be due to national and global recessions, financial, environmental, or health crises, the effects of which are unevenly distributed in space. A shock can also be region-specific, e.g. the closure of a locally dominant company may cause sudden difficulties for communities (Martin & Sunley 2015, 14). Such shocks can cause long-lasting changes in regional development trajectories. These effects are often negative, in particular, if a high share of jobs and companies are lost leading to a significant shrinking of the productive base and to a permanently lower level of growth. Yet, positive effects may also occur. David (2001, 26-27) suggests that if endogenous development has ceased, an external shock is needed to release the region out of the lock-in. Even though such a shock is not always necessary (Martin and Sunley 2006, 406), a shock may remove unproductive structures e.g. by releasing resources and workers to the market, and in that way creating room for renewal (Martin & Sunley 2015, 21).

There are multiple quantitative studies about regional economic resilience where regional reactions to shocks are measured and described (e.g. Martin 2012, Sensier et al. 2016). In addition, explanations to regional differences in responses have been sought from numerous structural factors where single industry and peripheral regions face the biggest difficulties to recover from shocks (e.g. Lee 2014; Crescenzi et al. 2016; Martin et al. 2016; Kitsos & Bishop 2018). Notwithstanding some exceptions (Bristow & Healy 2014a, 2014b, David 2018) the agency perspective has gained less attention. As Bristow and Healy (2014b) state, it is crucial to understand the role of human agency as the heart of regional economic resilience. Yet, there is a dearth of systematic studies on the role of agency in shaping regions' resilience and what the mechanisms are that link together agency and structure in situations of crisis.

As response to crises, processes of adaptation and adaptability play a vital role. Grabher and Stark (1997) introduced these concepts where adaptation links to exploiting known territory i.e. adapting to the circumstances in the short-term. Adaptability is about exploring new solutions with a longer time perspective. Both of these processes call for agency. Especially adaptability

requires a special type of agency that can be called ‘change agency’, i.e. actions that are directed at stimulating or achieving change in the regional economy (Grillitsch & Sotarauta 2019). Grillitsch and Sotarauta (2019) link change agency to structure with the concept of opportunity spaces. Opportunity spaces capture a set of factors that shape the possibilities for future regional economic development. Rejecting deterministic views of path-dependency, processes of adaptability constitute a widening of opportunity spaces. Developing the notions of change agency and opportunity spaces in relation to regions’ resilience, this paper asks the following research questions:

- How do local actors engage in shaping regional development during and after a crisis?
- How do the actions and interventions of local actors affect opportunity spaces?

We investigate these two research questions in the context of two peripheral regions in Finland. Peripheral regions are theoretically interesting because their structural preconditions are unfavourable in a crisis. A shock to the local industry hits peripheral regions particularly hard due to a lack of other industries that could absorb the shock. Furthermore, regional support systems for innovation and entrepreneurship are weakly developed, which makes it more difficult to identify and seize new market opportunities (Grillitsch and Asheim, 2018). Hence, the need for change agency and widening opportunity spaces is particularly high. The empirical study builds on an innovative methodology combining quantitative and qualitative methods. The findings rest on rich empirical material including reports, newspaper articles, statistics and 15 interviews about Eastern Lapland and 19 interviews about Varkaus region.

In the next section, we outline current approaches on regional economic resilience and discuss respective limitations and possibilities. In section 3, we elaborate on the role of agency in constructing regional resilience and introduce the concepts of ‘trinity of change agency’ and ‘opportunity spaces’, which have a potential to explain regional processes of change. In section 4, we bring resilience and agency together and create a synthesis by proposing the essential analytical layers and interactions, and point out how resilience types, adaptation and adaptability, development paths and different forms of agency relate to each other. In section 5, we illustrate our theoretical sights with two case study regions from Finland. Finally, we conclude with a discussion about the relationship between resilience and agency, and reflect on implications for research and policy.

## Multiple perspectives on resilience

Resilience can be defined in several ways. First, ‘engineering resilience’, a concept introduced by Holling (1973), describes the ability of a system to ‘bounce-back’ to an equilibrium state after a shock. This definition is most often utilized in physical sciences and ecology (Martin & Sunley 2015). Hill et al. (2011) have also applied this definition to study the recovery of metropolitan areas to external shocks.

Second, ‘ecological resilience’ describes the ability of a system to absorb shocks without losing its identity and core functions. This definition is prominent especially in ecology (Holling 1986; Walker et al. 2006). Yet, ecological resilience can also be understood as capacity to absorb shocks in an economic context. Regional economies can maintain their growth path in some crises but if the

strike is too heavy, it may change regional economic structures into a new kind of state or equilibrium more permanently called 'hysteresis' (Martin & Sunley 2015).

Third, 'adaptive resilience' or 'evolutionary resilience' emphasizes structural and operational adaptations to shocks (Martin & Sunley 2015). This adaptive notion draws from theory of complex adaptive systems. Complex adaptive systems follow a non-linear logic and they can rearrange their structures spontaneously by self-organizing in response to internal or external shocks. In a regional economy, it captures the capacity 'to reconfigure, that is adapt, its structure (firms, industries, technologies and institutions) so as to maintain an acceptable growth path in output, employment and wealth over time.' (Martin 2012: 10) This definition is in line with the view of evolutionary economic geography that regions have an evolutionary, non-equilibrium and path-dependent nature (Martin & Sunley 2007).

The usefulness of the concept of resilience within economic geography has also been challenged. Hassink 2010, 55) argues that the '*resilience concept has, in comparison to existing concepts derived from evolutionary thinking, too little value added to be fully adopted in economic geography*'. He refers to regional adaptability as an already existing concept. However, Martin and Sunley (2015) and Folke (2006) have pointed out, that the presence of a crisis is the factor that makes resilience a distinct concept. Martin and Sunley (2015) emphasize that resilience should be restricted to the analysis of sudden shocks, not incremental 'slow-burn' adaptation processes that naturally also call for adaptability. Yet, the slow processes do matter behind the scenes as they may escalate into full and sudden crisis over time.

Studies on resilience need precision as regards who's resilience to what is investigated (Carpenter et al. 2001, Martin & Sunley 2015). Resilience is not a general quality but to a large extent context-dependent. For example, the resilience of companies, individuals or the whole regional economy can be studied. Within a regional economy, one can analyse changes of employment, GDP or some other variable. 'To what' is about the kind of disturbance a region faces. Furthermore, studies on resilience typically specify, which means are used to tackle the shock and what the eventual outcomes are. Sensier et al. (2016) point out that it is important to separate resilience outcomes (effects) and capacities (causes). Outcome is the actual regional performance, coping and recovering from a crisis whereas capacities are the regional assets that create this potential to survive and adapt.

Resonating with the above-mentioned definitions of resilience, Martin (2012) differentiates between four types of resilience: Resistance captures the extent to which a region is affected by recessionary shocks. Recovery is about how quickly a region recovers from a shock. Renewal refers to the whether regions return to previous growth paths or exhibit a hysteretic shift to a new level of growth. Re-orientation describes a structural adaptation to a new situation. These are different types of resilience outcomes (Sensier et al. 2016; Bristow & Healy 2014b). According to Martin (2012) resistance, recovery and renewal can be measured by changes in GDP or employment levels. Re-orientation can be studied by monitoring changes in the regional industrial mix<sup>1</sup>.

---

<sup>1</sup> The current literature on new industrial path development uses the term 'renewal' differently. 'Renewal' refers in this literature to a major qualitative change of industrial paths (Grillitsch, Asheim and Trippel 2018) and therefore better matches Martin's concept of re-orientation.

A slightly different kind of categorization is presented by Martin & Sunley (2015, fig. 1) where vulnerability is about a region's sensitivity to a shock, resistance about the initial impact to a shock, robustness is the adjustment of regional actors to the shock and recoverability describes the extent and nature of recovery. This categorization implies a processual way to approach resilience i.e. it identifies different stages in the shock recovery. This raises questions of 'how' do these adaptation processes actually happen and what are their mechanisms.

Pike et al. (2010: 62) have explored mechanisms of resilience and presented the concepts of adaptation and adaptability to describe the nature of change. *"Here, adaptation is defined as a movement towards a pre-conceived path in the short run, characterized by strong and tight couplings between social agents in place. Whereas adaptability is defined as the dynamic capacity to effect and unfold multiple evolutionary trajectories, through loose and weak couplings between social agents in place, that enhance the overall responsiveness."* Their definition draws from the work of Grabher and Stark (1997) who also use the concept of 'adaptive capacities' to describe different kinds of abilities of regions to adapt in new situations. Adaptability is about being able to break free from old paths and about finding new ones, adaptation is about path continuation. The mechanisms behind adaptability are based on loose ties between agents and these networks cherish diversity and new ideas that can contribute to regional path renewal. Mechanisms behind adaptation are rooted in close and tight bonds (Pike et al. 2010; Granovetter 1973). Adaptation is also crucial but it can offer support in the short run like in creating solutions that relieve effects of a shock. Yet, long-term renewal requires adaptability.

Most studies on regional resilience have had an emphasis on the systems level, not agency. While a macro-level systems perspective is insightful when studying changes in regional development paths, an agency perspective contributes to understand in more detail why and how these macro-level changes unfold. Bristow and Healy (2014a) have analysed the role of policies and policy-makers like the structures of governance, types of policy interventions and timing in constructing regional resilience. They argue that a networked and polycentric nature of governance institutions and place-based policies are critical for resilience. In addition, they underline the temporal aspect of resilience actions, like monitoring and anticipation, quick crisis responses and strategic transformation in the long term. However, as the focus is on policy related agents, other forms of agency are not regarded.

In another article, Bristow and Healy (2014b) study more general dimensions of agency that relate to regional resilience. They claim that to understand regional economic resilience, one should examine human behaviour, collective agency and agendas. The human behaviour in crisis situations create the grounds for agency. Generally, there are three types of behaviour related to shocks: people may anticipate and act proactively when they observe a risk. This human ability to think about possible futures and even change behaviour based on these estimations is the distinctive difference to ecological systems. Second, people react to shocks and change their behaviour during a crisis. Third, humans are also able to strategically transform their behavioural patterns over longer periods even to affect the contexts in which they live. In human behaviour protective factors (like positive emotion, teamwork etc.) matter in shock recovery. Bristow and Healy (2014b) emphasise the relevance of human communication and networks that are multi-scalar, open and diverse in search for new ways to learn and adapt. Collective agency is organised

in complex logics but governance plays an important role in coordinating and connecting multiple agents. They argue that this requires the formation of common value-based agendas. However, it remains unclear, exactly how actors engage in regional development processes during and after a crisis and what kind of interventions and actions make a region resilient, also keeping the context-dependent and region-specific nature of resilience in mind.

## The role of human agency in shaping regional resilience

While regional resilience captures a regional development process or outcome after a shock such as adaptation or adaptability, human agency is about the ways in which individuals, groups of individuals and organisations shape the process leading to the outcome. Human agency is generally defined as “the ability of people to act, usually regarded as emerging from consciously held intentions, and as resulting in observable effects in the human world” (Gregory et al. 2009). “Human agency refers to intentional, purposive and meaningful actions, and the intended and unintended consequences of such actions” (Grillitsch and Sotarauta 2019, p. 4). Agency comes in many forms and the basic distinction between reproductive agency and transformative agency (Coe and Jordhus-Lier 2011) is important in relation to resilience because these two types of agency can be directly mapped to adaptation and adaptability.

Reproductive agency or maintenance agency (used as synonyms here) is about reinforcing or extending existing regional development trajectories (Jolly, Grillitsch, and Hansen 2019). In case of a shock to the regional economy, e.g. closing of a major firm or drop in demand for dominant industries, maintenance agency refers to action that promote a continuation of the existing economic activities after the crisis. This may be actions to find new owners for a closing firm, actions to receive support for struggling industries, or actions to ensure that competences can be kept in the region during a crisis period. This may also include institutional work (Lawrence and Suddaby 2006) such as short-term arrangements between employers and employees to reduce the production capacity and keep the workforce. Maintenance agency, is thus at the heart of adaptation, actions aimed at absorbing a shock and quickly returning to a pre-conceived development path, which has qualitatively not changed – or only in minor ways – from before the crisis.

Transformative agency refers to actions intended to change existing structures. Transformative agency is about a qualitative change to regional development trajectories. Transformative agency captures actions that are targeted at breaking or at least substantially changing existing development trajectories. Thus, transformative agency is essential in shaping adaptability or re-orientation after a shock. In relation to regional development, three theoretically distinct, basic types of transformative agency are innovative entrepreneurship, institutional entrepreneurship, and place-based leadership, providing an integrated and holistic theoretical framework for studying agency, the Trinity of Change Agency (TCA) (Grillitsch and Sotarauta 2019; Jolly, Grillitsch, and Hansen 2019; MacKinnon et al. 2019).

Innovative entrepreneurship is recognised as a key driver for change in the economy (Schumpeter 1911; Shane and Venkataraman 2000) and regions (Feldman 2014; Foray, David, and Hall 2009; Grillitsch 2018). By combining knowledge and resources in novel ways, innovative entrepreneurs



venture into new markets or market niches and thereby provide the spark for new industrial specializations and growth paths. Innovative entrepreneurship does not unfold in a vacuum but is shaped by institutional configurations (Cooke and Morgan 1994; Gertler 2010; Rodríguez-Pose 2013) and regional support systems for innovation and entrepreneurship (Grillitsch and Asheim 2018; Stam 2015; Tödtling and Trippl 2005).

Consequently, institutional entrepreneurship, which is about challenging existing institutions by taking deliberate actions to change institutions or introduce new ones (Battilana, Leca, and Boxenbaum 2009; DiMaggio 1988), is another important type of change agency identified in the TCA. Besides providing an environment that is conducive for innovative entrepreneurship, the growth of new industrial paths may necessitate institutional change in the first place (Sotarauta and Suvinen 2018). Place-based leadership is the third type of agency identified in the TCA. It aims at coordinating regional development efforts with a wide range of actors (Collinge, Gibney, and Mabey 2015; Sotarauta, Beer, and Gibney 2017). The focus lies not on changing individual preferences (which institutional entrepreneurs do by altering e.g. norms or regulations) but about identifying common interests and steering joint efforts towards supporting these interests. In regional development, this captures the mobilization and pooling of collective efforts in developing an ecosystem that supports the emergence and growth of a new industry.

The conceptual framework for this study thus links processes of adaptation with maintenance agency and processes of adaptability with change agency, and, in particular, the three types of change agency identified in the TCA. The next important question in a study on agency is the link to structure, which has been debated in the social sciences for decades (Archer 2003; Archer et al. 1998; Giddens 2007:1984). There is general agreement about the close interconnectedness between structure and agency, and that causality goes both ways: structure shapes agency and agency reproduces or changes structures.

In order to operationalize this abstract and general relationship in the context of regional development, Grillitsch and Sotarauta (2019) introduce the notion of opportunity spaces. The authors (p. 10) define opportunity spaces as “the time or set of circumstances that make a change possible”. Opportunity spaces have a time-, region- and actor-specific dimension. Time-specific relates to changes in technologies, markets, or institutions. Global crises such as the financial and economic crisis in 2008 is an example of a time-specific event rippling opportunity spaces. Region-specific refers to variations in regional preconditions to – in the context of resilience – support adaptation or adaptability. Regions differ in the degree they are locked-in one industrial specialization (Grabher 1993; Hassink 2010), offer innovation potential of related or unrelated variety (Grillitsch, Asheim, and Trippl 2018; Hidalgo et al. 2018), or are embedded in a support systems for innovation and entrepreneurship (Cooke and Morgan 1994; Grillitsch and Asheim 2018; Stam 2015; Tödtling and Trippl 2005). Actor-specific relates to perceived opportunities and the capability of individual actors to make a change. Actors differ greatly in their background, knowledge, networks, and resources, which shapes how actors perceive and can seize opportunities.

Thinking about changing opportunity spaces as result of agency may be a fruitful conceptualisation at least for qualitative work but also in terms of policy development in the context of resilience. An important reason for this is that adaptation may show short-term results in terms of regional

growth but may close for alternative development paths in the medium- and long-term whereas adaptability may not lead to short-term results but open a larger range of opportunities in the medium- and long-term. This links to the debate about how to measure resilience (Martin 2012). Typical quantitative measures such as GDP or employment growth, decline, or time until recovery do not provide an indication for qualitative changes to regional economies (i.e. adaptability). In contrast, agency could be evaluated against the extent to which they lock-in development on narrow paths or whether they open-up for a larger variety of development opportunities. It may also be useful for regional innovation policy to think about interventions in terms of affecting opportunity spaces as direct job creation (except through state-owned companies and direct subsidies) is typically outside the sphere of regional innovation policy.

Table 1 summarises the cornerstones of the theoretical framework applied in this study. As regards resilience, we focus on the distinction between adaptation and adaptability. Comparing this to the framework proposed by Martin (2012), adaptability resonates with the notion of a re-orientation of the regional economy. Adaptation refers to resistance, recovery, and renewal. We aim to explain processes of adaptation and adaptability by underlying agency patterns where adaptation results from maintenance agency and adaptability from change agency.

**Table 1: Analytical framework: Relation between resilience outcome and types of agency**

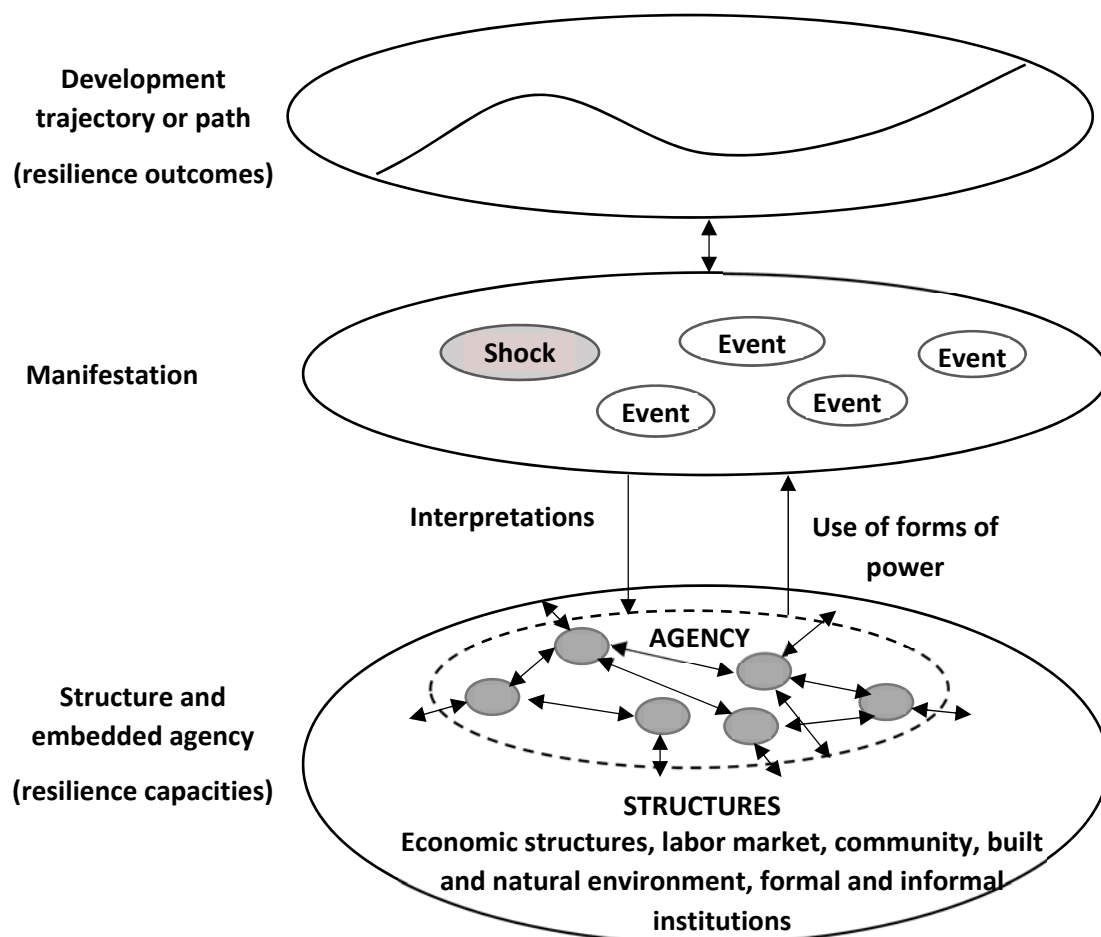
Conceptualization of Resilience		Conceptualization of Agency	
Adaptation	Resistance Recovery Renewal	← Maintenance Agency	
Adaptability	Re-orientation	← Change Agency	
Key Sources: Grabher & Stark 1997; Hassink 2010; Pike et al. 2010; Martin 2012; Boschma 2014		Key Sources: Grillitsch & Sotarauta 2019; MacKinnon et al. 2019; Jolly et al. 2020	

## Research Design

Figure 1 explains the interconnections between the concepts discussed above (inspired by Grillitsch and Sotarauta 2019; Bristow and Healy 2014b; Martin and Sunley 2015; Sensier 2018; Giddens 1984). The most abstract analytical layer is the regional (economic) development trajectory or path, here referring to ‘resilience outcomes’. These are observable changes in economic performance like GDP or employment and industrial structures. At the ‘manifestation’ level, we can observe particular events, including the shock event, which have formed these paths. These events can be endogenous, exogenous or mixed, like local plant closures, the global financial crisis, a new technology or a new study program in the region. Therefore, this layer also shapes the context for time-specific opportunity space; what is generally possible at certain point

in time. The third analytical layer concerns the micro-level process conceptualized as the constant interplay of structure and agency from where these events rise. Individual agents make decisions, use their networks and resources, get ideas etc. – or in other words – use their power to generate events. Agents perceive and interpret events and – based on the information gained – continue making future decisions. Each agent has their own actor-specific opportunity space based on their capabilities and they may also perceive opportunities differently. Agents are embedded in the structures that form their agency. These structures provide possibilities and set limits for region-specific opportunity spaces. Simultaneously agents slowly form the structures around them. A region’s ‘resilience capacities’ rest on structure and embedded agency.

**Figure 1. Analytical layers of regional economic resilience** (see e.g. Grillitsch and Sotarauta 2019; Bristow and Healy 2014b; Martin and Sunley 2015; Sensier 2018; Giddens 1984).



The research design included the following steps (Grillitsch, Rekers, and Sotarauta 2019). The first step was a quantitative study where regional growth of labour market regions was modelled as function of state-of-the art structural variables. Based on this model, outlier regions were identified with strong positive or negative residuals (Grillitsch et al. 2019). The second step was to prepare profiles of all outlier regions, which led to a taxonomy of outlier regions in the Nordic

countries including peripheral regions, northern-resource based regions, regions with industrial tradition, and cross-border regions. A number of cases were selected for in-depth case studies representing the various regional types. This manuscript is focussed on two peripheral regions in Finland, Varkaus and Eastern Lapland, which are introduced in more detail below. The two regions were chosen because they experienced the same type of shock but exhibited different development outcomes, which we relate in the analysis to the observed agency patterns.

After selecting the cases, a comprehensive desktop research, including for instance policy reports, newspaper articles, and regional strategies, was conducted in order to develop a timeline of key events. The desktop research was also used to identify key informants linked to the key events. The key informants were approached for in-depth interviews. Further interviewees were identified during the interviews using snowball techniques. The interviews were conducted in a semi-structured manner with the aim to identify who did what, why, with whom, when, at what geographical scale, and to what consequences. Interviewees were also asked about what enabled or hindered them in making a change. The interviews were used to elaborate a detailed timeline of actions. This comprehensive and deep material was consequently analysed against the theoretical framework combining agency and resilience as elaborated above.

15 interviews were conducted for Eastern Lapland (13 local/regional, 2 national level actors) from March 2019 to January 2020 and 17 interviews for Varkaus region (17 regional/local, 2 national level actors) between June 2019 and February 2020. Informants were key people representing local, regional, or national authorities, development agencies and business associations, companies, local media and research/educational organisations.

## Two case study regions in context

Varkaus and Eastern Lapland are peripheral regions that faced similar shocks. Both regions are dominated by the forest industry and faced a crisis in 2008-2009 when Stora Enso was cutting its capacity in several locations due to a global reduction of paper use. Also, the global financial crisis hit simultaneously. In Kemijärvi, Eastern Lapland, the closure of the pulp mill was a major blow to the local industry leading to roaring unemployment. In Varkaus, one paper machine had already been closed in 2006, but the threat of total closure in 2009 did not realise. Some production lines were closed and new ones emerged within few years. Moreover, some new industries emerged in Varkaus. These two cases are interesting because they both have been exposed to the downscaling decision of the same company and at the same time but with a different outcomes. Relatively minor differences in structural preconditions allow comparisons of agency patterns and changing opportunity spaces.

Finland's geography with long distances and a sparse population (18,2 per km<sup>2</sup>) is a key factor for regional development. Uneven development along the south-north and west-east dimensions has existed for centuries. Southern and western parts of Finland have been developing more positively whereas the eastern and northern parts have been mostly lagging behind (Nenonen 2018). Especially during the 'Great migration' in the 1960s and 1970s many people moved from rural areas to cities and to the south (Tervo 2005). Consequently, the increasing polarisation between regions has been a growing concern. In 2000, 16 of 70 sub-regions were growing while in 2018

only 12 were growing. Until 2030 predictions suggest that only 10 sub-regions, the largest university cities and Åland, will be growing. Growth is strongly focused on the 'growth triangle' of Helsinki, Turku and Tampere whereas middle-sized towns have begun to shrink (StatFin 2020). Varkaus and Eastern Lapland belong to the struggling regions.

Varkaus and Eastern Lapland are embedded in Finland's two-tier government system where central government is rather strong but self-governing municipalities also have lot of responsibilities and resources related to services. At the regional level, regional councils and state regional development agencies are in charge of regional development like managing regional development funds (Haveri 2015). In the early stages of the Finnish regional policy from the 1960s to late 1980s, regions were considered objects of a top-down regional policy and the main aim was to industrialise the whole country. From the late 1970s, a more comprehensive regional planning approach was adopted with the aim to distribute welfare and ensure comprehensive coverage public services became important. Especially after joining the European Union in 1995, the role of regions in shaping their own development has been increasingly foregrounded (Sotarauta 1997; Mäkinen 1999). This governance context and the powers, constraints, and possibilities it creates is the background for the agency patterns observed (Beer 2014).

### Varkaus subregion

The Varkaus subregion in Eastern-Central Finland, had a population of 30 030 in 2019 (reducing by 17 % from 2000). The region has a long tradition in pulp and paper, and mechanical engineering, especially in energy technologies and automation. These related industries originate from one local company that diversified into several different companies, which were bought by global corporations mostly in the 1990s. The forest, energy and automation industries are closely networked. A branch unit of the Savonia university of applied sciences provides engineering education. International companies innovate with technical solutions to global markets and act as the engine of the regional economy. The core specialisation lies in chemical and power boilers with global market leaders located in Varkaus. The leading companies have been the basis for regional adaptability by keeping up with technological development for example in environmental technologies, utilising production side streams and circular economy, i.e. acting as innovative entrepreneurs and gradually widening actor- and region-specific opportunity spaces. Even though these companies also had layoffs during the recession, they secured the renewal of energy and automation paths even when the forest sector path was in danger.

When Stora Enso made the announcement to close the Varkaus site in 2009, local agency was activated. The development company of the city was immediately re-established (after it had been decided to close it down). City representatives contacted the Ministry of Economy and began to negotiate about a state special 'abrupt structural change' funding to relieve unemployment. City representatives met all the major employers in the region and negotiated about new activities that could be supported with these funds. Many companies were met all around Finland to attract new establishments. These activities yielded some results such as the building of the Riikinneva waste burning energy plant owned by municipalities. The plant utilises energy technology solutions from a local supplier. Substantial investments were made in a salmon fish farming company in the Stora Enso factory site and in the establishment of a battery manufacturing

company. In addition, public funds were used to strengthen research and education in the energy sector.

Representatives of the city development company together with a local place leader who has a high standing in national politics and among factory site managers proactively proposed ideas to Stora Enso's highest-level management about new and innovative activities that could be performed in Varkaus building on the required human potential and well-functioning industrial networks. The local actors won some time to convince Stora Enso because its ongoing biodiesel production experiment slowed down the efforts of closing the site, even though these experiments did not lead to commercial production after all. Eventually, Stora Enso closed some production lines like fine paper but established new ones in packaging materials and laminated veneer lumber in response to changes in global demand.

These activities as response to the crisis predominantly focussed on diversification into new products or markets, or introducing new knowledge and technologies. Hence, an emphasis was on adaptability and change agency and less so on adaptation and maintenance agency. Agency in the Varkaus region has been rather versatile combining public and private actors who engage in all three types of change agency identified in the TCA concept. Even though SMEs are few, there are several strong larger companies. On the one hand, the domination of these international corporations has been a risk as big decisions are made elsewhere. On the other hand, they have provided access to technologies and markets, and have contributed to widening the opportunity space through innovative activities. Local public actors and representatives of the city development company have contributed to adaptability by supporting the regional skill base through education and stimulating innovative entrepreneurship of companies by offering new ideas.

Active agency had existed for a long time even before the shock. However, the shock increased the activity-level and made it possible to mobilise state resources in addition to local investments. Moreover, long-term adaptability would not have been possible without short-term adaptation and maintenance agency, which focussed on keeping employees in the region during redundancies, and helping them to find new jobs. In the long-term, openness to new economic activities such as fish and caviar production has promoted regional adaptability and widened the opportunity space to new industries.

In addition, agency patterns changed as a response to the crisis. Place leadership was activated to support companies and for example, a local development company rose from the ashes. SMEs also felt that they gained more respect and support than before. International companies located in the region had not engaged much before the crisis in developing the regional preconditions. Their local managers began to see their role also as place leaders: regional spokesmen and lobbyists promoting for instance adequate provision of education and training, the regional image, and regional development more generally. This enhancement in place leadership and potential of innovative entrepreneurship of local SMEs has the potential to affect positively regional resilience in the future.

## Eastern Lapland subregion

Eastern Lapland in northern Finland by the Russian border is a subregion with a population of 15 800 inhabitants in 2019, which has decreased by 31 % from 2000 (StatFin 2020). The sub-region is peripheral even in the Finnish context. The local centre Kemijärvi used to rely on the pulp and electronics industries along with some medicine manufacturing. Companies were globally operating but mostly Finnish-owned. The focus was on manufacturing with a relatively low knowledge-intensity. The region was hit by the closure of the medicine factory in 2002, the electronics factory in 2004, and the pulp mill in 2008. As a consequence, unemployment in the region peaked and outmigration that had been a problem for decades, intensified. In addition, there were no strong industrial clusters or networks but the key companies had been rather isolated. The region did not provide higher than secondary level education and has traditionally been a recipient of central government's regional policy subsidies and investments. Some small-scale livelihoods like reindeer herding exist, but generally the number of SMEs is low and the public sector has been an important employer. Yet, tourism provides a significant and potentially growing number of jobs to the region even if the ski resorts of Eastern Lapland are not the biggest ones in Northern Finland.

In 2007, Stora Enso announced that it would close down their pulp factory in Kemijärvi. This raised a citizens' movement that protested against the closure in Kemijärvi led by the city board chairman and few other lead figures. They actively contacted Stora Enso and also Finnish ministers because the state had a large share of the company ownership and locals wished the state to intervene and call of the decision. In addition, the city of Kemijärvi offered to buy the facilities and machinery so that they could acquire a new operator of the facilities to continue pulp manufacturing.

Yet, Stora Enso did not withdraw from their decision and the state did not want to get involved. The state designated Eastern Lapland as a region of 'abrupt structural change' that received targeted funding. Over five million euros of state money and the same amount from Stora Enso, were invested in an extra-regional company that promised to start manufacturing of laminated beam in the old pulp mill facilities and provide a lot of new of jobs. The establishment faced difficulties from the beginning, did not gain the support of the locals and became bankrupt in 2013. The state also supported employment in the region by establishing a service and call-centre of the social insurance institution of Finland (2009) in Kemijärvi. New establishments in Kemijärvi were a Finnish sawmill company (2014) and a refrigeration equipment manufacturer that decided to move to Kemijärvi because of low costs and available facilities (2015). These job importations were positive signals and even bringing in some new industries but they were not based on 'innovative entrepreneurship' that would combine knowledge and resources in novel ways but more on public intervention and cost-efficiency. Simultaneously, dreams of a pulp path continuation still existed.

In 2016, a new company was established by couple of locals including the abovementioned previous city board chairman, now a city council chairman. The company aimed at establishing a new kind of biorefinery (pulp) by pursuing Chinese investments. Personal contacts to pulp research played an important role in the emergence of this idea. Simultaneously, the idea of an entire industrial wood-based ecosystem circulated that would include several companies and their

co-operation. This development has been supported by the city with different projects. This process is still ongoing and results depend on the success in attracting a core company willing to make large investments. Actions around biorefinery and business ecosystem can be seen as an emerging change agency potentially renewing existing activities or even diversifying into new ones.

Even though there have been incipient signs of change agency promoting adaptability, such efforts have been scarce, belated and rested on the shoulders of very few key individuals who mainly engaged in place-leadership and institutional entrepreneurship and to some extent in innovative entrepreneurship. While change agency was weak, we observed a clear adaptation logic when the crisis hit. State interventions were expected to counter the crisis and respective employment shock. Public actors were expected to take the lead while the number of entrepreneurial activities was rather low. Consequently, the emergence of new locally owned innovative companies has been rare, apart from the biorefinery project. The basic logic has been to attract extra-regional investments and companies to move activities to the region foregrounding cost advantage over innovation performance.

Considering the circumstances like low education, remoteness and low financial resources locally, the regional opportunity space is narrow. Yet, contrasting Varkaus, no long-term efforts could be identified to develop regional adaptability proactively before the crisis period that was a critical juncture for regional development. Agency was focused on maintaining the current path and change agency was almost absent. The region relied too much on few manufacturing companies. Their operative environment in Eastern Lapland did not produce enough added value in the hard global competition. Recovery has been a slow process. However, the crisis resulted in some changes of local agency patterns. Local actors did take the lead in getting new investments to the region and reached out to China, hoping to attract a company that would be a good partner in developing newest technological and organisational innovations.

### Resilience comparison of cases

The two case study regions had differences and similarities in their preconditions. Both regions have a tradition in the forest industry and the same dominant company. However, their structural profiles are slightly different. The industrial mix of Varkaus region is more diverse and international, and the region has more human capital. In addition, Varkaus is less remote and peripheral than Eastern Lapland. Varkaus also had a benefit as regards timing. The decision to close Kemijärvi site was done two years earlier than in Eastern Lapland and global demand started to change. The global increase in the consumption of packaging materials provided opportunities for Varkaus, which came too late for Eastern Lapland. Later on, the former CEO even admitted that the closure of Kemijärvi pulp mill was a mistake and that the unit was profitable.

The patterns of agency in these two regions are not that similar either. The regions have a different emphasis on who is shaping regional resilience. In general, agency in Varkaus region is more active and it consists of strong and innovative company players and individuals who engage in institutional entrepreneurship. In Eastern Lapland, innovative entrepreneurship, institutional entrepreneurship and place-based leadership are overlapping because there are only few key



individuals who can adopt these roles. This may be effective but also leaves the region vulnerable as agency lays on the shoulders of few.

There is also the question of how these agents shape resilience. Neither of the regions was well prepared or anticipated the threat of losing their biggest employer. However, in Varkaus the behaviour was more proactive in the sense that they had placed more effort on developing regional human capital. Still, for example regional support structures for innovation and entrepreneurship could have been stronger in both regions. Also, the type of agency was different in these two cases: In Varkaus the reaction to the threat of closure was to offer new ideas and even experiment with risky ideas. In Eastern Lapland, the immediate response was defensive and focused on resisting the closure. The nature of collective agency is also dissimilar in these two regions. Relatively close regional business networks were a strength in Varkaus. The international companies contributed with their embedding in global flows of knowledge, people and resources, which promoted to regional adaptability. However, the connections between innovative entrepreneurs and place-based leaders were rather distant before the crisis. A distinctive feature of Eastern Lapland was the absence of regional industrial networks and couplings. Wood supply subcontracting existed but beyond the exchange against market prices, little added value was created. The most important network partner was the national state and the pursued support from the state focused on adaptive actions. Therefore, the nature of networks in Eastern Lapland was narrower both within and beyond the region, which did not support long-term adaptability.

As a result of differences in structural conditions and agency, the regional opportunity spaces differed between these two case study regions. The preconditions in Eastern Lapland were more challenging in the beginning but also agency played an important role. Both regions found their opportunity space in the forest industry, which is typical in Finland. In Varkaus region, the opportunity space has widened to energy technology and lately reached completely new fields. In Eastern Lapland, the focus has been to restore and upgrade the previous path. The crisis has also resulted in changed agency patterns. In both cases, regional agency intensified during and after the crisis. The patterns of agency were different however. In Varkaus the existing enterprises and place-based leaders took a more active role. In Eastern Lapland the citizens' movement generated a couple of key individuals that along with public actors begun to pursue replacing jobs. Many of the actions conducted in Varkaus region were rather proactive, innovative, and focused on new solutions – i.e. saving jobs and income by change agency. While in Eastern Lapland, it was mostly reactive and defensive – saving employment by maintenance agency.

## Conclusion

Agency and structure operate in a close interaction in shaping regional economic resilience. Structural preconditions define much of what is possible and create certain restrictions and enabling conditions, e.g. location, demographical factors or skill base. Many of these features, like human capital, can be shaped with the contribution of regional agency. However, these processes take time and cannot be fixed in an instant if a crisis occurs and, therefore, agency should be continuous, proactive and aim for adaptability in the long-term. Immediate reactions like the drop of employment in a shock situation are very much dependent on structural factors and preconditions, which could be called 'structural resilience'. Short-term recovery includes more

agency, but at this stage, it is 'maintenance agency' aiming at short-term adaptation. *To be able to be resilient in the long-term, re-orientation i.e. adaptability is required and this calls for active change agency.* The three forms of change agency, innovative entrepreneurship, institutional entrepreneurship and place-based leadership, together form a powerful coalition of agency that can contribute to regional adaptability. If one piece is missing or weak, it can prevent or slow down regional renewal processes.

*In peripheral regions, agency is thinner* than in core regions simply because of the lower number of actors. Sometimes these regions are highly dependent on one or few key companies or even individuals. Often these core actors are multinational corporations that play with their own global logic with limited interest to secure the resilience of the regions they are operating in. They provide wealth and opportunities to peripheries but simultaneously their decisions are made in distant headquarters, which creates a delicate vulnerability for many peripheral regions. The capacity of regional or local actors to affect these decisions is limited. *Still, there are ways regions can minimise the risks* and build resilience. These ways are described in our policy recommendations. While adaptation often calls for external resources, like state interventions, adaptability in peripheral regions rests much on the shoulders of local or regional actors who identify, develop and grasp opportunities.

*Opportunity spaces provide an interesting way to understand the interplay between structure and agency. Opportunities differ in time and space.* Over time, new opportunities arise and some opportunities are closed. Region-specific opportunity spaces rise from structural preconditions and therefore some regions have better abilities to counter a crisis than others. Yet, it is actors who identify and utilise their specific opportunity spaces resting on respective capabilities, networks, resources, and powers. Time- and region-specific opportunity spaces set a context but if actors are seeking change and new opportunities, they will over the long-term even change regional structures. Crisis can provide a window for change, a critical juncture, when multiple choices for regional development are truly open.

*Our policy recommendations to develop regional resilience in peripheral regions are 1) focusing on empowering change agents, 2) widening opportunity spaces and 3) finding a balance between adaptation and adaptability strategies.* First, it is crucial that regional agents take the role of active subjects contributing to the development trajectory of their region instead of being passive objects of events and development policies. The ability of regional actors to make a difference, and thereby change agency, is strengthened by encouraging networking in the region, by shaping an institutional environment that is conducive for change processes, and by strengthening the support system for innovation and entrepreneurship. In addition, reaching actors outside the region to bring in new ideas and to affect decisions made elsewhere is important. Yet, empowering change agents takes time and should therefore be a continuous priority.

Second, if the opportunity space is narrow, as it often is in peripheral regions, its widening and diversification should be a high priority. Sometimes this includes taking risks by experimenting with new unknown fields and accepting the possibility of failure. On the one hand, initiatives of institutional entrepreneurs and support from place-based leaders matter for the exploration of new fields. Innovative entrepreneurs on the other hand are crucial in generating new ideas and

turning them into viable businesses, growth and jobs. Regional opportunity spaces can also be widened by building regional capacities e.g. providing education.

Third, adaptability is the most important capability in ensuring regional resilience in the long-run. It should be continuously nourished because it may be too late when a shock occurs. However, adaptation should not be dismissed either. Actions aimed at quick adaptation, support of existing structures, and stabilisation in the short-run are often a precondition to develop in the long-run. Quick and responsive actions may secure the necessary conditions and resources for realizing new opportunities in the future, e.g. by keeping the labour in the region while looking for new possibilities.

Our study shows that a *crisis may also transform regional agency*. A shock stimulates agency in most cases, but regions differ to the extent to which they engage in defensive 'maintenance agency' or proactive 'change agency'. Crisis can activate regional cooperation and awareness of common goals. Again, these changes affect regional resilience in the future.

## Literature

- Archer, M.S. (2003). *Structure, agency and the internal conversation*. Cambridge University Press.
- Archer, M.S., R., Bhaskar, Collier, A., Lawson, T., & Norrie, A. (1998). *Critical realism: essential readings*. London: Routledge.
- Battilana, J., Leca, B., & Boxenbaum, E.. (2009). How Actors Change Institutions: Towards a Theory of Institutional Entrepreneurship. *The Academy of Management Annals* 3(1):65-107.
- Boschma, R. (2015). Towards an evolutionary perspective on regional resilience. *Regional Studies*, 49(5), 733-751.
- Bristow, G., & Healy, A. (2014a). Building resilient regions: Complex adaptive systems and the role of policy intervention. *Raumforschung und Raumordnung*, 72(2), 93-102.
- Bristow, G., & Healy, A. (2014b). Regional resilience: an agency perspective. *Regional studies*, 48(5), 923-935.
- Capocchia, G., & Kelemen, R. D. (2007). *The study of critical junctures: Theory, narrative, and counterfactuals in historical institutionalism*. *World politics*, 59(3), 341-369.
- Carpenter, S., Walker, B., Anderies, J. M., & Abel, N. (2001). From metaphor to measurement: resilience of what to what?. *Ecosystems*, 4(8), 765-781.
- Coe, N.M. and D.C. Jordhus-Lier. (2011). Constrained agency? Re-evaluating the geographies of labour. *Progress in Human Geography* 35, 211-233.
- Collinge, C.; J. Gibney, & C. Mabey. 2015. *Leadership and Place*. Abingdon: Routledge.
- Cooke, P. and K. Morgan. 1994. The regional innovation system in Baden-Wurttemberg. *International Journal of Technology Management* 9:394-429.
- Crescenzi, R., Luca, D., & Milio, S. (2016). The geography of the economic crisis in Europe: national
- Battilana, J., Leca, B., & Boxenbaum, E. (2009). How actors change institutions: towards a theory of institutional entrepreneurship. *Academy of Management annals*, 3(1), 65-107.
- David, P. A. (2001) "Path dependence, its critics and the quest for 'historical economics'". In P. Garrouste and S. Ioannides (eds). *Evolution and Path Dependence in Economic Ideas*. Cheltenham: Edward Elgar, 15-40.
- David, L. (2018). Agency and resilience in the time of regional economic crisis. *European Planning Studies*, 26(5), 1041-1059.

- Davoudi, S. (2012). Resilience: a bridging concept or a dead end? *Planning theory & practice*, 13(2), 299-307.
- Folke, C. (2006). Resilience: The emergence of a perspective for social-ecological systems analyses. *Global environmental change*, 16(3), 253-267.
- DiMaggio, P.J. (1988). Interest and agency in institutional theory. In *Institutional patterns and organizations: Culture and environment*, ed. L.G. Zucker, 3-22. Cambridge, MA: Ballinger.
- Feldman, M.P. (2014). The character of innovative places: entrepreneurial strategy, economic development, and prosperity. *Small Business Economics*, 43, 9-20.
- Foray, D.; P.A. Davi; & B. Hall. 2009. Smart specialisation—the concept. *Knowledge economists policy brief* 9:100.
- Gertler, M.S. (2010). Rules of the Game: The Place of Institutions in Regional Economic Change. *Regional Studies*, 44, 1-15.
- Giddens, A. (2007, 1984). *The constitution of society: outline of the theory of structuration*. Cambridge: Polity Press.
- Grabher, G. (1993). The weakness of strong ties; the lock-in of regional development in the Ruhr area. In *The Embedded Firm: On the Socioeconomics of Industrial Networks*, ed. G. Grabher, 255-277. London & New York: Routledge.
- Grabher, G., & Stark, D. (1997). Organizing diversity: evolutionary theory, network analysis and postsocialism. *Regional studies*, 31(5), 533-544.
- Granovetter, M. (1983). The strength of weak ties: A network theory revisited. *Sociological theory*, 201-233.
- Gregory, D., Johnston, R., Pratt, G., Watts, M., & Wathmore, S. (2009). *The Dictionary of Human Geography*. Oxford: Wiley-Blackwell.
- Grillitsch, M. (2018). Following or breaking regional development paths: on the role and capability of the innovative entrepreneur. *Regional Studies*, 1-11.
- Grillitsch, M. & Asheim, B. (2018) Place-based innovation policy for industrial diversification in regions. *European Planning Studies*, 26(8), 1638-1662.
- Grillitsch, M., Asheim, B. T., & Trippel, M. (2018). Unrelated knowledge combinations: the unexplored potential for regional industrial path development. *Cambridge Journal of Regions, Economy and Society*, 11, 257-274.
- Grillitsch, M., Martynovich, M., Fitjar, R. D., & Haus-Reve, S. (2019). Why bother about region-specific growth patterns and how to identify them? *Papers in Innovation Studies*.
- Grillitsch, M., Rekers, J. V., & Sotarauta, M. (2019). *Papers in Innovation Studies 2019/12*, CIRCLE, Lund University.
- Grillitsch, M., & Sotarauta, M. (2019). Trinity of change agency, regional development paths and opportunity spaces. *Progress in Human Geography*, 0309132519853870.
- Hassink, R. (2010). Locked in decline? On the role of regional lock-ins in old industrial areas. In *The Handbook of Evolutionary Economic Geography*, ed. R. Boschma and R. Martin, 450-468. Cheltenham: Edward Elgar.
- Hassink, R. (2010). Regional resilience: a promising concept to explain differences in regional economic adaptability?. *Cambridge journal of regions, economy and society*, 3(1), 45-58.
- Haveri, A. (2015), 'Nordic local government: A success story, but will it last?', *International Journal of Public Sector Management*, 28 (2), 136–149.
- Hidalgo, C.A., Balland, P.-A., Boschma, R., Delgado, M., Feldman, M., Frenken, K., Glaeser, E., He, C., Kogler, D.F., Morrison, A., Neffke F., Rigby, D., Stern, S., Zheng, S. & Zhu, S. (2018). *The Principle of Relatedness*, 451-457. Cham: Springer International Publishing.

- Hill, E., St. Clair T., Wial H., Wolman H., Atkins P., Blumenthal P., Ficenec S. & Friedhoff A. (2011) *Economic Shocks and Regional Economic Resilience*. Working Paper Number 2011-13. Building Resilient Regions: Institute of Governmental Studies, University of California, Berkeley, CA.
- Holling, C. S. (1973). Resilience and stability of ecological systems. *Annual review of ecology and systematics*, 4(1), 1-23.
- Holling, C. S. (1986). The resilience of terrestrial ecosystems: local surprise and global change. *Sustainable development of the biosphere*, 14, 292-317.
- Iammarino, S., Rodríguez-Pose, A., & Storper, M. (2017). Why Regional Development matters for Europe's Economic Future. *Working Papers of the Directorate-General for Regional and Urban Policy*.
- Jolly, S., Grillitsch, M., & Hansen, T. (2019). Agency in regional path development: Towards a bio-economy in Värmland, Sweden. *Papers in Innovation Studies* 2019/7. Lund University, CIRCLE.
- Kitsos, A., & Bishop, P. (2018). Economic resilience in Great Britain: the crisis impact and its determining factors for local authority districts. *The Annals of Regional Science*, 60(2), 329-347.
- Kurikka, H., Kolehmainen, J., & Sotarauta, M. (2018). Constructing regional resilience in a knowledge economy crisis: The case of the Nokia-led ICT industry in Tampere. In *Universities and Regional Economic Development* (pp. 163-179). Routledge.
- Lawrence, T.B. and Suddaby, R. (2006). Institutions and institutional work. In *The Sage handbook of organization studies*, ed. S.R. Clegg; C. Hardy; T.B. Lawrence; and W.R. Nord, 215-254. London: SAGE Publications Ltd
- Lee, N. (2014). Grim down South? The determinants of unemployment increases in British cities in the 2008–2009 recession. *Regional Studies*, 48(11), 1761-1778.
- MacKinnon, D., Dawley, S., Pike, A & Cumbers, A. (2019). Rethinking Path Creation: A Geographical Political Economy Approach. *Economic Geography*, 95, 113-135.
- Martin, R. (2012). Regional economic resilience, hysteresis and recessionary shocks. *Journal of economic geography*, 12(1), 1-32.
- Martin, R. and Sunley, P. (2006) "Path dependence and regional economic evolution", *Journal of Economic Geography*, 6:4, 395–437.
- Martin, R., & Sunley, P. (2007). Complexity thinking and evolutionary economic geography. *Journal of economic geography*, 7(5), 573-601.
- Martin, R., & Sunley, P. (2015). On the notion of regional economic resilience: conceptualization and explanation. *Journal of Economic Geography*, 15(1), 1-42.
- Martin, R., Sunley, P., Gardiner, B., & Tyler, P. (2016). How regions react to recessions: Resilience and the role of economic structure. *Regional Studies*, 50(4), 561-585.
- Mäkinen, M. (1999) *Yhteisöaluepolitiikan periaatteiden teoreettinen erittely ja soveltaminen Suomessa*. Tampere University Press: Tampere.
- Nenonen, M. (2018), 'Alueiden Suomi 1500-2000', in P. Haapala (ed), *Suomen rakennehistoria: Näkökulmia muutokseen ja jatkuvuuteen (1400-2000)*, Tampere: Vastapaino.
- Pike, A., Dawley, S., & Tomaney, J. (2010). Resilience, adaptation and adaptability. *Cambridge journal of regions, economy and society*, 3(1), 59-70.
- Rodríguez-Pose, A. (2013). Do Institutions Matter for Regional Development? *Regional Studies* 47:1034-1047.
- Schumpeter, J.A. (1911). *Theorie der wirtschaftlichen Entwicklung*. Leipzig: Duncker & Humbolt.

- Sensier, M., Bristow, G., & Healy, A. (2016). Measuring regional economic resilience across Europe: operationalizing a complex concept. *Spatial Economic Analysis*, 11(2), 128-151.
- Shane, S. and S. Venkataraman. (2000). The Promise of Entrepreneurship as a Field of Research. *The Academy of Management Review*, 25, 217-226.
- Sotarauta, M. (1997), 'Finnish regional policy in transition: Towards rigid planning machine or dynamic governance?', *European Spatial and Research Policy*, 4 (1), 85–100.
- Sotarauta, M. (2015). *Leadership and the city: Power, strategy and networks in the making of knowledge cities*. Routledge.
- Sotarauta, M.; A. Beer; and J. Gibney. (2017). Making sense of leadership in urban and regional development. *Regional Studies*, 51, 187-193.
- Sotarauta, M. and N. Suvinen. (2018). Institutional Agency and Path Creation: Institutional Path from Industrial to Knowledge City. In *New Avenues for Regional Innovation Systems - Theoretical Advances, Empirical Cases and Policy Lessons*, ed. A. Isaksen; R. Martin; and M. Tripl. New York: Springer.
- StatFin (2020), *Statistics Finland open database*. <http://pxnet2.stat.fi/PXWeb/pxweb/fi/StatFin/>
- Stam, E. (2015). Entrepreneurial Ecosystems and Regional Policy: A Sympathetic Critique. *European Planning Studies*, 23, 1759-1769.
- Tervo, H. (2005). Regional policy lessons from Finland. In *Regional disparities in small countries* (pp. 267-282). Springer, Berlin, Heidelberg.
- Tödtling, F. and M. Tripl. (2005). One size fits all? Towards a differentiated regional innovation policy approach. *Research Policy*, 34(1), 203-1219.
- Walker, B., Gunderson, L., Kinzig, A., Folke, C., Carpenter, S., & Schultz, L. (2006). A handful of heuristics and some propositions for understanding resilience in social-ecological systems. *Ecology and society*, 11(1).