

Studien zur Resilienzforschung

Rüdiger Wink *Editor*

Economic Resilience in Regions and Organisations

 Springer

Studien zur Resilienzforschung

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Economic Resilience in Regions and Organisations

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Preface from the Editor

The global Covid-19 pandemic is only the most recent of very severe and presumably disruptive challenges. While studies on regional economies and organizations focused on specific crises, the assessment and management of risks of crises activities to stabilize the economies and organizations, the increasing number of studies dealing with resilience on the level of regional economies and organizations since the beginning of this century added at least four important elements to research:

- the consideration of unforeseeable shocks, disruptive events and elements making it more difficult to prepare and anticipate specific challenges but necessary to look for more general capabilities to adapt to unforeseeable situations
- the embeddedness of capabilities to cope with and recover from crises in longer-term processes to use learning from own or others' experiences and creativity as preconditions for an increasing and adjustable adaptability
- the importance of cultural and social contexts influencing the social construction when to identify a crisis, which challenges to connect with the crisis, which objectives to prioritize and which measures to choose to change a situation
- the relevance of linkages between resilience strategies of individuals, families, private communities and organizations and inter-organizational collaborations to form strategies on the regional level

The papers in this book are based on a conference in November 2019 and an extended call for papers at the beginning of 2020 and were therefore prepared before the Covid-19 pandemic unfolded its full global potential. Nevertheless,

some aspects from the early experiences with this crisis could be included and all papers deal with issues, which provide important hints on preconditions for a successful process during and out of the pandemic. Simultaneously, the papers reflect the overall state of research on regional and organizational resilience from different angles, which ensures their relevance beyond a specific crisis like the current Covid-19 pandemic.

The structure of the book follows three basic questions and challenges in resilience research. Firstly, the role of *regional structures* is picked out as a central issue in the contributions from Simone Grabner, Ron Martin and Ben Gardiner and Juntao Tan. While Simone Grabner looks at the specific impact of agglomerations, Martin and Gardiner investigate the impact of economic structures on British cities during crises and Juntao Tan analyzes the specific challenges in Chinese resource-based regions. Secondly, the importance of and preconditions for *agency and governance mechanisms* are central topics of the papers from Marianne Sensier and Elvira Uyarra, Heli Kurikka and Markus Grillitsch and Patrizio Bianchi and Sandrine Labory. Although the three papers deal with experiences in different countries (North England, Finland and Italy), their analyses emphasize the common importance of suitable governance systems between local and central national level, the availability of different forms of change agents and regionally specific objectives and strategies. Thirdly, the five papers by Daniel Zacher and Elvira Gavriljuk, Thomas Urban, Ann-Kathrin Dieterle, Ianina Scheuch and Florian Koch and Marie-Anne Berron reflect on *resilience on the meso and microlevel* with perspectives on a specific sector (tourism in the paper from Zacher and Gavriljuk), the relationship between entrepreneur, family and organization (Urban), inter-organizational collaborations (Dieterle), intra-organizational teams (Scheuch) and socio-linguistic resilience of young academics (Koch and Berron).

The editor wishes to thank all contributors to this volume for their outstanding discipline in keeping deadlines and their openness to the inter-disciplinary research context. The observation of common topics and methods between research on regional economies and organizations and connected levels will hopefully contribute to the emergence of new inter-disciplinary research networks and communities-of-practice in this field.

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Introduction: Covid-19 Pandemic as New Challenge for Regional Resilience Research?

Rüdiger Wink

1 The Covid-19 Shock as Challenge for Economic Resilience

The contributions to this book had already been prepared before the Covid-19 pandemic dominated the agenda in almost all global societies. In some of the included papers, first thoughts and observations could already be integrated and connected with the research on economic regional and organizational resilience. In this introductory chapter, connections between this most recent challenge for our “vulnerable world” (Bostrom 2019, with even more dystopic perspectives), current strands in regional resilience literature and the line of thought for this book are presented.

The basic idea of regional and organizational resilience is rooted in the successful management of short-term or structural crises following the lines of salutogenesis—investigating factors supporting human health and well-being instead of focusing on factors causing diseases (Antonovsky 1979)—in medicine and psychology (Fookien 2016) or the concepts of robustness and socio-ecological resilience in biology and ecology (Folke et al. 2010). The Covid-19 pandemic reveals at least four specific challenges for this perspective on shock and response, which share characteristics of other challenges to economic resilience:

1. *The multitude of diverse kinds of shocks*

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Of course, a pandemic is first and foremost a severe health crisis. Therefore, on an individual level, challenges include not to be infected or to minimize risks of severe health damages. Simultaneously, a spatial pattern with a strong regional concentration of infection cases, diseases and fatalities reveal the close linkages between individual and regional perspectives on the health crisis (see e.g. Bailey et al. 2020). The severeness of health consequences is closely related to the integration of individuals in families and communities as well as the organization of the health systems confirming the need to look at close linkages between individual, community, organizational and regional level when trying to identify patterns and causes for resilience in this crisis.

The health crisis, however, also causes direct and indirect effects on the economy and society (OECD 2020). Direct effects include e.g. stoppages of production due to sick absent employees, while indirect effects cover all activities to avoid the spread of the infection from political instructions on “social distancing” and lockdowns to individual decisions to abstain from travelling, visiting shops or using public transports. In many industrialized countries, GDP will show the strongest annual declines after World War II in 2020 even surpassing the negative economic impact from the global recession in 2008/2009.¹ According to OECD estimations in September 2020, GDP will decline in 2020 in the US by 3.8% (2009: -2.5%), in the UK by 10.1% (2009: -4.2%), France by 9.5% (2009: -2.9%) or Italy by 10.5% (2009: -5.3%) (OECD 2020a). Besides these overall symptoms of economic crises, severe existential threats are observed in particularly affected, primarily service-based sectors, and huge structural changes are expected in the organization of global industrial production chains in manufacturing. All these developments affect business models and investments of organizations, the financial constellations of states and public jurisdictions as well as employment and qualification perspectives on the individual level. Direct health and economic effects, however, only described a fraction of the overall shock on affected societies with additional negative effects being caused by social distancing and lockdowns on psychological well-being, additional cases of domestic violence or trust in sovereign authorities.

These observations illustrate the many facets of a single shock event and—consequently—the heterogeneity of potential cause-effect relationships challenging the vulnerability of societies as well as characterizing the resilience of societies to these diverse facets of a shock.

¹ Already the Sars-Cov-1 epidemic in Asia 2002/2003 caused severe short-term economic damages (up to -2.6% annual GDP change in Hong Kong or -1% in China), although the outbreak could be mostly concentrated and contained in Asia (see Lee and McKibbin 2004; Hanna and Huang 2004).

2. *Cumulative effects with mid-term structural shocks*

The Covid-19 pandemic also reveals that there are always linkages between new (short-term) shocks with already existing disruptions and slow-burn shocks, as the new shocks can intensify or soften the effects of the mid-term shocks (see on first evidence Mattana et al. 2020). The challenge caused by these linkages usually depend on the amplitude of the cumulative effects. Previous experiences with epidemics in emerging and industrialized countries already offered indications of positive correlations with digitalization (see e.g. the study by Jung and Sung 2017, on the influence of the MERS outbreak in Korea in 2015 on online and offline retail sales). The Covid-19 pandemic with its need for physical distancing and wearing face coverings caused new incentives to extend online sales, use streaming services for creative products and to organize work and school remotely from home. Accordingly, urban mobility patterns changed to avoid physical proximity in public transport. At the beginning of the Covid-19 pandemic, negative effects along international supply chains—due to increased infection risks or interruptions of production processes—also led to debates on structural transformations towards more regionalized supply chains (see Meier and Pinto 2020, on short-term effects), as technological changes towards urban manufacturing (based on 3-D-printing and small-scale customized automation) already began to change the cost structures of international production systems and the pandemic then might only lead to an additional push towards structural adjustments (Bailey et al. 2020). All in all, those new experiences during the pandemic—particularly if it takes longer to introduce vaccines and therapeutics against the Coronavirus—can lead to new routines and facilitate the disruption of incumbent structures, which cause additional shocks to affected regions and organizations.

So far, the international recession in 2008/09 is the economic shock, which stimulated most studies on economic resilience (Speda 2018, on empirical evidence). These studies revealed huge differences in the resilience among countries and regions. One important factor to explain the resilience referred to the permanent and long-term structural impact of the recession, as countries (and organizations), which could cope with the recession without changing their structure and business model, only needed a short-term adaptation to achieve a strong recovery. Germany proved as a typical example, as the huge decline of GDP in 2009 could easily be compensated in 2010 and the following years by increasing exports particularly to emerging countries. The dominant sectors before the crisis were still the dominant sectors after the crisis with only incremental technological adjustments (Wink et al. 2017). Therefore, vulnerability and resilience to the Covid-19 crisis will also be determined by the links with slow-burn structural shocks.

3. Shock and reaction transmissions on individual, organizational and regional level

The Covid-19 pandemic as a shock event caused different challenges on the individual, organizational and regional level, although reactions on the different levels influence each other. On the regional (as well as on the national or supra-national) level, perspectives are more directed to aggregate effects and the coordination of measures based on political decisions and legislative interventions. For example, lockdowns were introduced to limit the health risks and to maintain or gain back the functionality of the health systems, while simultaneously subsidies, short-term work schemes or the suspension of insolvency rules should limit the indirect negative effects of the lockdown orders. Studies on regional resilience in former economic crises observed huge disparities in the effectiveness and acceptance of political measures trying to stabilize the regional economies (Bristow and Healy et al. 2014). Problems typically occurred when political strategies to cope with the crises did not match with the perspectives and capabilities on the individual and organizational level.

Individual and organizational expositions to the shock differ remarkably dependent on health status, integration into communities, qualification and employment status, sector or market position. Despite these differences, however, studies on individual and organizational resilience strategies in former economic crises observed common needs on an abstract level including the importance of (formal or informal institutional) stability and routines to lean on in times of turmoil (see e.g. Promberger 2017), potentials for reflection and learning (Duchek 2020) as well as common objectives based on common visions of meaning within the crises (Kuhlicke 2013). Accordingly, the Covid-19 pandemic caused specific challenges when trying to support stability and common objectives, as the relatively high level of insecurity on cause-effect relationships, the duration of the health crisis and the long-term consequences of the crisis imply a huge potential for different visions and increasing disparities in the society.

4. Uneven (regional) patterns of resilience capabilities

The Covid-19 pandemic affected regions all over the world unevenly (Bailey et al. 2020). At the beginning of the pandemic, outbreaks were usually spatially concentrated with urban areas being more vulnerable to outbreaks due to limitations to keep physical distance (Hamidi et al. 2020). Economically, service sectors dependent on physical distance were particularly negatively affected and mostly located in urban areas. Employees with lower qualifications and lower wages were forced

to work without physical distance, while better qualified employees got opportunities to work remotely. First studies in several European and US regions revealed that social divides between economically strong and lagging groups increased due to the effects from the pandemic (Williamson et al. 2020; Basu et al. 2020; BAG KJS 2020).

These observations confirm experiences from past economic and health crises. During the last decade, the growing disparities between attractive urban core regions and peripheral rural regions as well as between highly-skilled, mobile and economically successful social groups (“anywheres”) and immobile, low-skilled and marginalized social groups (“somewheres”) dominated many political discourses particularly in Europe and North America (Goodhart 2017; Rodriguez-Pose 2018). Although sudden and short-term external shocks like the Covid-19 pandemic are initially recognized as crises affecting everybody, resilience capacities—i.e. capacities to reduce or cope with negative effects and/or to successfully adjust and transform living conditions to improve well-being—vary dramatically among social groups, regions and countries and might even increase already existing disparity patterns (Bristow and Healy et al. 2014; Annoni et al., 2019; Giannakis and Bruggeman 2020). Consequentially, the scientific discourse on regional economic resilience has been criticized for neglecting the normative content of resilience concepts and the role of uneven power structures (MacKinnon and Derickson 2013; Wink, 2014).

Against the background of these challenges, we will look at current approaches to define and conceptualize regional economic resilience in the next section. This will lead us to some remaining needs for further research, which serve as a structure to an overview to the contributions for this book and their links to the remaining needs to investigate the economic resilience of regions and organizations.

2 Economic Resilience from a Complex Adaptive Social System Perspective

2.1 Definitions of Regional Resilience

A typical characteristic of regional economic resilience is the fuzziness of its concepts. While most researchers agree on general aspects of a definition, consequences for operationalization and research drawn from the definition still differ (see for definitions inter alia Martin and Sunley 2015; Boschma 2015, and on

debates about the usefulness of resilience concepts in regional research (Gong and Hassink 2017; Martin and Sunley 2020). Common aspects of definitions include:

- a *disturbance or stressor* ranging from a sudden shock (earthquakes, Covid-19 pandemic, global recession) to a slow-burn decline (demographic changes, declining sectors)
- affecting a *region* (defined by administrative borders or functional linkages)
- and capabilities to *maintain or rapidly return to desired functions*
- including a successful *resistance* to the external or internal stressors, fast *recovery* from negative effects, *adaptation to change* or reorientation and/or *transformation or renewal* of structural features of the region

The perspective on regional economic resilience adds at least three important elements to concepts in economic geography: first, the perspective on stressors with a potential for disruptions implies that regional economic development neither implies permanent turbulent changes of structures, actors, connections and institutional linkages nor continuous stable environments along pre-defined pathways but evolutions with different intensities and speed of changes and their sources (Martin (2010); Isaksen et al. (2016), on extensions of traditional perspectives on path dependence in economic geography). Phases of stability facilitate the strengthening of connections, reflections on past experiences and the exploitation of efficiency gains by optimized processes, while disruptions and shake-ups create new linkages, learning experiences and new potential demand. In the first section, Covid-19 was introduced as a potential accelerator of ongoing structural transformations. These connections between acceleration by (additional) shocks and stabilization by functioning institutional environments characterize processes of long-term transformations, e.g. towards sustainable cities or decarbonized societies (see also Wink 2021). Therefore, resilience is not a concept replacing or challenging concepts of sustainability but helping to better understand the complexity of pathways towards sustainability.

Second, foreseeability of characteristics, timing, directions, or intensity of stressors is limited so that any strategy to build and strengthen resilience capabilities is not directed to cope with specific and concrete stressors based on risk management concepts but to more general characteristics facilitating actions in unforeseen situations of surprise (see on the role of limited foreseeability in the context of resilience Wink 2014). For example, the Global Health Security Index 2019 revealed huge gaps in preparing for an epidemic or global pandemic with the United States and the United Kingdom at least being the two countries in the world with highest scores in preparedness (NTI and Johns Hopkins University

2019). As experiences with Covid-19 pandemic showed, those gaps in preparedness became obvious but governments and societies with better capabilities to cope with unforeseen constellations and uncertainties on suitable reactions seemed to compensate for their gaps in preparedness, while United States and United Kingdom were among those countries with relatively high rates of excess mortality (Johns Hopkins University 2020) and negative economic impact (OECD 2020).

Third, resilience is often connected with a change of perspectives on situations causing stress. Regional economic resilience is less focused on vulnerability, crisis and its negative impact but on opportunities for coping and overcoming negative situations. This perspective, however, causes risks of neglecting disparities in access to resilience capabilities if resilience is defined as a standard for regional economic developments (Wink 2014). Therefore, capabilities and preconditions forming regional economic resilience and their distribution within and between regions have to be analyzed to understand, how regional economic resilience can be increased and how disadvantaged regions, communities and individuals can be supported.

Despite these common aspects, however, regional resilience is still recognized as a “fuzzy concept” with different strands of interpreting basic preconditions and processes to strengthen resilience. These potentials for interpretation include normative decision which might differ among regions and social groups. For example, the term “desired functions” could imply a huge variety of indicators with different priority to different social groups. While most studies of regional economic resilience focus on regional GDP and employment as indicators of “desired functions”, several sociological studies refer to experiences of community actions and mutual support as more important for citizens to confirm the resilience and well-being of their region, even if employment or GDP decreased (see e.g. Hill et al. 2010; Kuhlicke 2013). Similarly, the recognition of a stressor might differ according to individual living conditions. For example, stressors from Covid-19 pandemic might range from threats on life and health to economic threats due to lockdowns or social and psychological threats due to distancing rules and loss of social interactions. Accordingly, priorities on what to be overcome as stressor and which desired functions to maintain might differ among regions and social groups and might lead to different reactions and adaptations. For example, Christmann et al. (2014) used a qualitative empirical research methodology based on a concept of “communicative constructivism” to identify specific narratives on vulnerabilities and resilience to threats of flooding in German coastal cities revealing huge differences on the main fears and suitable reactions. Therefore, economic regional resilience research will have to combine

quantitative research with indicators like GDP or employment with qualitative indicators considering different concepts of well-being.

2.2 The Complex Adaptive Systems Perspectives

During the last years, not only the idea of regional economic resilience gained popularity in regional studies. Simultaneously, evolutionary economic perspectives on regions were no longer restricted to biological metaphors of variety and selection but also increasingly driven by terms and concepts in complexity theory (Martin and Sunley 2007). In this context, regions are analyzed as complex adaptive systems with diverse linkages between agents (firms, individuals, private communities, public authorities). These different linkages create potentials for the agents to adapt to experiences, and with these adaptations new linkages and potentials to adapt (“adaptability”) emerge (see on relationships between adaptation and adaptability Boschma 2015; Gong and Hassink 2017; Martin and Sunley 2020). The perspectives on complex adaptive systems makes it possible to take a closer look on the role of structural properties of regional economies as well as the processes of adaptation and creation, which lead to the capabilities of regions to cope and overcome crises.

- Structures

Structural properties affecting regional economic resilience include the diversity, modularity and connectivity of economic sectors and qualification patterns in the regions and their labor markets. Several empirical studies confirmed positive effects of more diverse and modular structures to regional economic resilience (see for overviews Strambach and Klement 2016; Di Caro 2020), although characteristics of the shocks and other regional specificities led to different results. Similarly, a relational variety in products, skills or technologies also can support a short-term adaptation by shifting resources from a negatively affected sector towards a less or even positively affected sector, while the creation of new linkages between sectors, firms or skills with hitherto unrelated variety can lead to the creation of completely new structures which can increase the mid-term adaptability of the regional structures (Boschma 2015). Looking at the Covid-19 crises, those regions with a more diverse industrial structure—integrating IT and online commerce sectors with offline retail services—and with a workforce being able to switch between sectors seem to be better prepared to cope with the crisis, while particularly cities with a high share of services dependent on physical proximity

face the strongest short-term declines of economic output (see also Martin and Gardiner 2020).

- Processes and Institutions

Processes describe the phases before, during and after crises, which might overlap when considering the cumulation of crises. For the agents (firms, individuals or authorities) these include activities like anticipation, cognition, reaction and adaptation (and where appropriate transformation). In sociology and psychology, processes are recognized as core subjects to understand and identify resilience capacities (see e.g. Endreß and Rampp 2015; Egeland et al. 1993). In the context of Covid-19, regions with better preconditions to anticipate, recognize, react and adapt are expected to be less negatively affected or at least to recover faster than other regions. In contrast to the structural perspectives on complex adaptive systems, the focus on processes includes the social constructedness of resilience (Endreß 2015) as well as of any crisis. Furthermore, processes are based on implicit or explicit choices of actions to cope with the crisis as well as on the impact of communication and other forms of interactions between the agents on the social construction of situations and on the mobilization of capabilities to adapt. Accordingly, the framing of challenges caused by Covid-19 as well as experiences of collaborations and mutual support within regional communities led to specific regional processes.

Resilient processes are closely related to the institutional context of regions, as institutions in general serve to stabilize expectations on the behavior of other agents (firms, individuals, but also public authorities), if all agents comply to the institutional rules (North 1993). In general, this stabilizing influence on the behavior causes an ambiguous effect on regional economic resilience. On the positive side, functioning institutions facilitating adaptation and the emergence of new activities support the successful recovery of regions after negative developments due to shocks (see on the influence of quality of government on the resilience of European regions Rios and Gianmoena 2020). In Germany, the relatively fast recovery after the great recession particularly in regions with thick institutional structures is closely related to the flexibility emerging from fast coordination mechanisms between firms, trade unions and policy (Wink et al. 2017). On the negative side, institutions are parts of regional structural trajectories influencing cognitive patterns, the range of included actors as well as of the potential reactions to crises (see already Grabher 1993; Setterfield 1997). Therefore, studies recently looked closer at preconditions for institutional changes to avoid lock-ins (see for example Evenhuis 2016). In the context of the Covid-19 pandemic, these

challenges become obvious when looking at the positive experiences with short-term work schemes in Germany, which are very familiar to German firms and trade unions (SVR 2020), while the support for firms in the creative economy—often based on one self-employed person—remained relatively weak, as previous crises usually left the creative economy relatively unaffected and specific institutional approaches were not needed. Therefore, regional economic resilience to the Covid-19 crisis will also depend on the flexibility in developing new institutional solutions.

- Agency

Structure and processes are typical descriptors for complex adaptive systems. New structures can emerge within the systems by adaptations of agents. Agents can contribute to structural adjustments of the systems but their contributions—set of actions—are usually limited and pre-defined. In contrast, complex adaptive *social* systems are able to add further dimensions of emergence by integrating social interactions between agents, which lead to new creative ideas and further potentials to change the structure and transform the system (see on debates about relationships between structure and agency Giddens 1984; Sewell 1992). This additional dimension is closely related to the term *agency* (Bristow and Healy 2014; Wink et al. 2017; David 2018). *Agency* describes individual or collective human actions, which lead to the emergence of new cognitive frames, practices, routines of behavior or rules (see in more detail Sewell 1992). These emerging frames, practices, routines and rules make it possible to mobilize new resources for changes within the complex adaptive systems. For example, the Covid-19 pandemic with its specific challenges to daily practices, mobility patterns or social contacts led to new forms of mutual support in communities (e.g. voluntary support for immobile persons, private neighborhood schooling and care activities etc.), and first preliminary studies confirmed positive correlations between social capital in regions and health as well as reduced economic decline during the pandemic (Bian et al. 2020; Borgonovi and Andrieu 2020; Bartscher et al. 2020; see also Bastaminia et al. 2017, on similar observations after natural disasters). Social capital—such as high participation rates in communities and NGOs, social interactions and trust in common institutions—facilitates the spread of new information and patterns of behavior and creates more opportunities for interactions, where new common ideas can be developed. Similarly, entrepreneurs

in the creative economy developed new business models to provide creative services while still complying with needs to protect their customers.² The time after the pandemic will show whether these short-term adaptations based on individual and collective agency remain and become permanent changes of structures and processes or become restricted to short-term phenomena.

- Micro-meso-macro linkages

Investigations of complex adaptive social systems do not only look at the behavior and interdependencies of agents but also on linkages between different levels of scale within the systems. In the context of ecological resilience, Holling (2001) described complex adaptive systems on different levels of spatial scale and the linkages between the scales. This “panarchy” model became influential to understand the potential impact of inter-level dependencies on the resilience of the system levels. These different levels of scale are usually described as “micro”, “meso” and “macro” (see also Dopfer et al. 2004). In the context of regions as complex adaptive social systems, “macro” refers to structures and processes on the regional level also considering exchanges with other regions and—for public governance structures—integration into further multilevel governance systems with federal and supranational levels. Due to the high number of agents involved, processes on the macro level are usually expected as relatively slow. The “meso” level describes formal or informal collaborations and communities of firms, other kinds of organizations in the region and individuals, while “micro” refers to the level of single firms, households and families (Wink et al. 2017). As the coordination of action is less complex on the micro level (compared to other levels), processes on this level are expected to be fast. On the different levels, different interpretations of stressors and crises might occur as well different potentials to mobilize agency to cope and overcome the crises. Holling’s model of ecological resilience used two dimensions to describe the potential to adapt to crises on the different levels (Holling 1986): resources and connectivity. Accordingly, four different constellations (phases) with different combinations of resources and connectivity are possible:

- *Reorganization* with high potential of resources but low connectivity
- *Exploitation* with low potential of resources and low connectivity

² Examples in Germany include the short-term installation of drive-in cinemas, the conversion of clubs into exhibition halls or online productions of cultural events. See for an overview BMWi (2020).

- *Conservation* with high potential of resources and high connectivity
- *Release* with low potential of resources and high connectivity

Fath et al (2015) used this categorization to distinguish forms of “energy” and capabilities within social systems to maintain resilience according to different constellations:

- Learning and *experimentation for reorganization* to help emerging new structures and connectivity³
- *Activation energy for exploitation* to mobilize growth of resources⁴
- *Self-organization* to store capital and information for conservation to prevent loss and decline⁵
- *Improvisation* for the constellation of “release”⁶

For the context of different levels of scales in regions, the mobilization of the necessary capabilities does not only depend on the constellation for a specific level but also on mutual influences between the levels. In his reference on “panarchy”, Holling emphasized the different speed of changes on the different levels (the lower the level, the higher the potential acceleration of change) and described the example of a release on the micro level disrupting existing connections transmitting these disturbances to the meso and macro level, which might also move towards “release”. Holling used for this linkage the term “revolt”, while “remember” described a stabilizing effect from the macro level being in a phase of conservation on a micro level being in a phase of “release” or “reorganization”.

So far, most of the research on regional economic resilience focused on the macro level analyzing the structures of regional industries, labor markets or export structures, processes of political governance to strengthen the adaptability and

³ This constellation might correlate with Covid-19 containment measures in China, which were more based on government resources to control and command than on connectivity in private communities (see also Maier and Brockmann 2020).

⁴ This challenge could be observed in Brazilian favelas during the Covid-19 pandemic, in particular due to a lack of health infrastructures and basic preconditions for social distancing (see also The Lancet Editorial 2020).

⁵ Examples in the Covid-19 context include the German experiences with a relatively good infrastructure in the health system and reserves in sovereign budgets, which were also used to stabilize communities and process experiential knowledge (see SVR 2020; Schneider et al. 2020).

⁶ Examples in the Covid-19 context would include improvisations in the Italian region Lombardy, when the pandemic hit this region particularly strong and resources in the public health system became scarce (Torri et al. 2020; Bartscher et al. 2020; Pisano et al. 2020).

looking at quantitative economic effects (Speda 2018; Strambach and Klement 2016). The consideration of different levels of scale in regions, however, requires a broader integration of micro and meso levels. On the micro level, psychological attitudes to crises and transformation as well as sociological processes of developing and transferring social routines or forming new kinds of social relations during crises play a major role to understand basic challenges in building up basic resilience capabilities. For example, Obschonka et al. (2016) analyzed correlations between macro-psychological traits among individuals in regions and regional economic resilience and identified a crucial role for factors describing the emotional stability for the entrepreneurial vitality in US and UK regions during the great recession. Similarly, Obschonka et al. (2018) identified long-term specificities of macro-psychological factors in former and current coal regions. Promberger (2017) provided a categorization of reactions to the great recession by private households in different European regions emphasizing the importance of stability for the economic resilience of the households, while Lee et al. (2020) described short-term reactions by private households in India during the first weeks of Covid-19. Accordingly, reactions by single firms to shocks might cause specific follow-up effects in regional labor markets and industrial structures (see e.g. Nyström 2018, on the effects of displacements across the region and Holm and Ostergaard 2015, describing experiences in Denmark before and during the great recession). On the meso level, formal collaborative structures between firms in the regions like cluster organizations, chambers or industrial associations are also affected by shock events like the Covid-19 events and might use their institutional linkages and experiences to support the transmission of learning experiences or develop joint strategies to cope with social distancing and other protective regulations (see BMWi 2020, on some approaches by associations in the creative economy). Experiences in German cities like Stuttgart during and after the great recession confirmed the important role of regional industrial associations, trade unions and other organizations to implement strategies to increase the economic adaptability within the region and to exploit learning experiences from former crises to cope with shocks (Wink et al. 2017).

Summing up, the perspective of complex adaptive social systems on regional economic resilience provides important insights on the complex linkages between structure, processes, institutions and agency along the different levels of scale in regions and their impact on economic performance and well-being in regions. In particular, this perspective seems to be adequate when considering the complex context of a shock event like the current Covid-19 pandemic. Nevertheless, a lot of research questions on the specific cause-effect relationships along resilience

processes remain, and in the next section we look how the contributions in this book address some of these research questions.

3 Research Questions and Scope of the Book

The previous section on concepts and approaches to identify and explain regional economic resilience in the context of complex adaptive social systems revealed that still a relatively high number of research questions remain on single topics within the concepts but also on linkages and potentials to integrate insights from resilience research beyond the narrow core of regional economic resilience. In this book, three segments of research questions are particularly addressed:

1. *Specificities of regional structures and their linkages with economic performance and resilience*

Three papers particularly discuss relationships between structural issues and regional economic resilience. *Simone Maria Grabner* provides in her paper on “*Regional economic resilience: review and outlook*” an overview to current debates on theoretical concepts and empirical results on factors determining regional economic resilience. She shows that different empirical methods help to analyze different time contexts of regional resilience with quantitative methods more focused on short-term resistance and adaptation in the regions, while qualitative empirical studies facilitate the comprehension of mid-term processes and the emergence of adaptability and transformative capabilities. Furthermore, she emphasizes the differences in resilience challenges between urbanized areas and more rural and peripheral areas.

Ron Martin and Ben Gardiner focus in their paper on “*The resilience of Britain’s core cities to the great recession (with implications for the Covid recessionary shock)*” on the specificities of urbanized areas and use quantitative methods to analyze the resilience of core city regions in Britain after the great recession in 2008/2009. They particularly identify the impact of the industrial structure on the resilience experiences and look at recent data from first impacts of the Covid-19 recession on the city regions.

Juntao Tan investigates in his paper “*Regional economic resilience of resource-based regions and influential factors during economic crises in China*” specificities in resilience processes of specialized regions with a high degree of dependence on demand for natural resources. By looking at the experiences in China, he also adds the context of Asian emerging economies to the analysis. His paper shows

that there are differences among resource-based regions and factors beyond the industrial structure influence the resilience experiences.

2. *The role of governance mechanisms, agency and institutions on regional economic resilience*

Three papers focus on the influences of governance processes, agency and regional institutions on regional economic resilience under specific circumstances. *Marianne Sensier and Elvira Uyarra* compare in their paper on “*Investigating the governance mechanisms that sustain regional economic resilience and inclusive growth*” the local governance styles in two cities in North England. The comparison reveals the differences in defining objectives as well as the choice of instruments and coordination with the national government, which lead to remarkable differences in economic output.

Heli Kurikka and Markus Grillitsch analyze in their paper “*Resilience in the periphery: What an agency perspective can bring to the table*” the experiences of two peripheral regions in Finland based on a conceptualization of agency, which uses categories of agency to understand the different and specific functions agents of regional institutional and structural change offer. They show how context, timing and the types of agency lead to different resilience experiences.

Patrizio Bianchi and Sandrine Labory analyze in their paper “*Regional resilience: lessons from a region affected by multiple shocks*” the challenges for regions being affected by several shocks and show the important role of regional institutions in contrast to national and local authorities. Regional institutions can make a difference in regional economic resilience, if these institutions support the inclusion of all relevant parts in the regional system and strengthen the learning capacities in the region.

3. *Economic and other types of resilience on the meso and micro level*

Five papers deal with resilience on a lower scale level than the regions and provide important insights to understand challenges of achieving compatibility between resilience processes on the macro, meso and micro level. *Daniel Zacher and Elvira Gavriljuk* introduce in their paper “*Developing resilience understanding as a tool for regional and tourism development in Bavaria*” the perspective of the tourism sector on resilience into regional economic development strategies. By connecting the perspectives of a sector with the perspective of urbanized and peripheral regions in Bavaria, they emphasize the importance of resilience for practitioners in associations and public authorities.

Thomas Urban adds in his paper “*Crisis, coping and resilience as a multi-layered process—Haniel, Thyssen and Krupp between the 1950s and the 1970s*” two additional dimensions to the resilience research. Firstly, he shows the complex interplay of the individual or entrepreneurial resilience, the family resilience in shareholder or firm-owner families and organizational resilience in companies owned by families and conceptualizes the different strategies and actions to maintain resilience. Secondly, he shows the methodological strengths of a historical perspective on sources and context, which provide important preconditions to analyze the interplay between micro, meso and macro levels over decades.

Ann-Kathrin Dieterle introduces in her paper “*Resilience process framework for inter-organizational cooperation*” the different theoretical ingredients to a concept of analyzing resilience on the meso level. This concept integrates approaches of regional economic resilience as well as organizational resilience and the resilience of supply chain networks and offers the preconditions for empirical research on linkages between resilience processes on the macro, meso and micro level.

Ianina Scheuch focuses in her paper “*Team diversity and development of resilience capabilities in organizations*” on the specific impact the diversity of team provides to capabilities for organizational resilience. Similar to investigations on the regional level, this analysis shows the linkages between structural perspectives on the diversity with processes to build resilience capabilities.

Finally, *Florian Koch and Marie-Anne Berron* widen in their paper “*Sociolinguistic resilience among young academics: A quantitative analysis in Germany and France*” the resilience perspective beyond a narrow economic focus by looking at sociolinguistic resilience. As the social constructedness of crises and resilience play a huge role in understanding motivations and efforts during resilience processes, the sociolinguistic perspective offers important additional methodological and conceptual contributions to improve the underlying social processes.

The contributions to this book fill gaps in understanding economic resilience processes in regions and organizations. Hopefully, this inter-disciplinary perspective on resilience will also help to overcome existing conceptual and methodological boundaries in resilience research.

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Regional Economic Resilience: Review and Outlook

Simone Maria Grabner

1 Introduction

Regional resilience became a key concern across various disciplines and policy discourses. Within social sciences, the concept has drawn a lot of attention in the context of the 2008 global economic crisis and will likely play a fundamental role to understand the economic evolutions of regions after the Covid-19 epidemic in 2020. As such, the spatial economy, comprising regions, cities and localities, can be subject to all sorts of disruptions: periodic recessions, financial crisis, global competition as well as more incremental processes, such as technological and structural change. Generally, a system is deemed resilient, if it is able to resist, recover or adapt to such shocks and stresses (Martin and Sunley 2015). However, there is no universally accepted definition of resilience, which has attracted much criticism (Gong and Hassink 2016; Pendall et al. 2010; Davidson 2010; Hassink 2010). There are three main definitions, each highlighting different aspects of regional economic resilience (Evenhuis 2017): i.) engineering and ii.) ecological interpretations are both equilibrium concepts of resilience, in which resilience is regarded as a response to external disturbances and a move back to the pre-crisis equilibrium or to a new steady state (Reggiani et al. 2002); iii.) an evolutionary approach focuses on the capacity of regions to continuously reconfigure their socio-economic structure (Boschma 2015; Christopherson et al. 2010; Simmie and Martin 2010). Moreover, much effort is attributed to identifying local characteristics which foster regional resilience: industrial diversity, human capital,

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knowledge networks, governance and institutions are among the most prominent determinants (Martin and Sunley 2015; Boschma 2015).

The objective of this chapter is to systematically review conceptual and empirical studies on regional economic resilience, to pinpoint potential limitations of the literature and to present the socio-economic differences between urban and rural areas as key considerations for future research. To do so, the paper first defines the concept of resilience. Drawing from theoretical papers, I present engineering, ecological and evolutionary definitions resilience. Then, to counter the profound criticism directed towards this conceptual malleability, I demonstrate that the definitions of resilience are complementary, where each has its own merit, depending on the kind of shock and timescale under investigation.

Second, to shed light on the complex forces and features which underlie regional resilience, the paper categorizes empirically established resilience determinants under theoretically grounded factors. Doing so, some limitations of the empirical literature appear: the majority of studies narrowly focuses on engineering resilience, European regions and the context of the last economic crisis of 2008. This urges the need for more diverse empirical research on resilience determinants into various crisis and place contexts.

Moreover, I identify the tendency in the resilience literature to refer to regions in a generic way without taking specific urban and rural characteristics into consideration. The third and central point of this paper therefore presents the socio-economic differences between cities and rural areas as well as urbanisation externalities as key elements for future resilience research. Urban and rural economies differ in various ways, ranging from the economic structure, human capital and institutions. Externalities arising from urbanisation economies are believed to be a driving force behind urban and rural discrepancies: they enhance growth, productivity, innovation and the concentration of economic activities in cities, albeit at the expense of rural areas. The result is persistent spatial inequality between metropolitan-core and rural-peripheral areas, which seem to be doomed as places that don't matter (Rodríguez-Pose 2018). This prompts the question, whether the fate of resilient regions depend on the economic dynamism of cities, or if certain urbanisation externalities, such as spatial inequality, compromise resilience of all types of areas? To shed light on this question, future research on resilience needs to systematically address socio-economic differences between urban and rural areas, as well as the externalities arising from urbanisation.

The chapter is organized as follows. Section 2 gives a comprehensive overview of interpretations of regional economic resilience and aims to show their complementarity. Section 3 categorises resilience determinants. Section 4 highlights theoretical and policy approaches on the socio-economic differences between

urban and rural economies, as well as a survey of empirical studies on this issue. The fifth section draws concluding remarks and sets out a perspective for future research.

2 Defining Regional Economic Resilience

Resilience thinking originates from ecological and environmental studies, but the concept quickly found its way into social sciences, where it refers to the responsiveness of individuals, organisations and systems to shocks or changes (Christopherson et al. 2010). Within the regional sciences the question of regional resilience is however not a new one, instead a rather recurrent topic on why some regions and cities are able to recover and reinvent themselves in the face of a crisis and structural change while others fail (Hassink 2010). The following section reviews the theoretical development and conceptual issues of regional resilience. It outlines the three main definitions of economic resilience and aims to show their complementarity.

Definitions of Resilience

The first widely used interpretation is the so-called engineering resilience, which refers to a systems' ability to absorb shocks without experiencing changes and efficiently return to its pre-shock equilibrium. Physical sciences, engineering and disaster studies tend to embrace this interpretation of resilience (Pendall et al. 2010). This definition with a focus on a single equilibrium resonates well with the idea of self-correcting market forces in neo-classical economics. In this perspective it is assumed that an economy's self-correcting adjustment forces move it back to its unique equilibrium after a shock has occurred. Pendall et al. (2010) argue that many important regional subjects, such as growth, population and unemployment are at least partly equilibrium phenomena, thus engineering resilience offers a legitimate metaphor to understand regional economies. Yet, many researchers refute the single equilibrium approach, as it makes no reference to changes in the structures of regional economies (Martin 2012). A return to the pre-shock state without adjustments to the system may be a sub-optimal process, if the initial condition created the risk for shocks in the first place (Davidson 2010).

A second definition of resilience caters the need for such structural adjustments: originating from environmental sciences, the so-called ecological resilience focuses on whether a shock is pushing a system from one equilibrium to a new one (Pimm 1984; Holling 1973). Ecological resilience may be measured by the magnitude of disturbance, which can be absorbed before the systems' structure adapts or

how efficiently a system reaches the new equilibrium after a shock (Martin 2012). Ecological resilience resembles in many ways the concept of economic hysteresis. Hysteresis is a situation where a unique disturbance permanently affects the development path of the economy (Romer 2001). This often involves structural change, where a severe shock, positive or negative, alters the behaviour of economic agents and the sectoral composition of the economy (Martin 2012) (see Table 1).

However, also the ecological interpretation of resilience came under scrutiny, as its reliance on equilibria was deemed insufficient to understand economic systems, which are continually evolving, dynamic and restless (Christopherson et al. 2010). Derived from evolutionary economics and the theory of complex adaptive systems, an evolutionary definition of resilience rejects equilibrium notions and instead places significance on successful transformation (Pike et al. 2010). Similar to the concepts of emergence and self-organisation in complexity science,

Table 1 Definitions of Regional Economic Resilience

Type	Dynamic Properties	Origins	Similar Concept	Interpretation
Engineering Resilience	Single equilibrium	Physical Sciences, Engineering, Planning	Self-correcting market in neo-classical economics	Ability of a system to absorb shocks forces without experiencing changes and return to its pre-shock equilibrium
Ecological Resilience	Multiple equilibria	Socio-Ecological Systems Economic	Economic hysteresis	The scale of a shock a system can endure before moving to a new equilibrium
Evolutionary Resilience	Dynamic and restless process of transformation	Theory of Complex Adaptive Systems, Evolutionary Economics	Emergence and self-organisation	A system's adaptive capacities to continuously rearrange their structures in response to stress and shocks

the so-called evolutionary resilience emphasizes non-linear, path-dependent dynamics and adaptive capacities of systems to rearrange their structures in response to shocks as well as to slow-burn stresses (Martin and Sunley 2007). Additionally, human agency, formal and informal institutions, variety and relatedness are central to evolutionary resilience (Boschma 2015; Pike et al. 2010; Simmie and Martin 2010).

On the Complementarity of Definitions

The rise of resilience thinking within the social sciences has been met with much dissent. Profound criticism was directed towards the malleability of its meaning: the different interpretations and definitions make the concept fuzzy and difficult to measure and operationalise (Gong and Hassink 2016; Pendall et al. 2010; Davidson 2010; Hassink 2010). However, the manifold meanings of resilience can also be a strength of the concept, because it enables a dialogue between various scientific fields and policy makers (Christopherson et al. 2010; Pendall et al. 2010). Against this background, I emphasize, that engineering, ecological and evolutionary interpretations of regional resilience are not mutually exclusive, instead they are complementing each other.

To show this complementarity it is useful to distinguish between short-term and long-term resilience processes. Building on Grabher (1993), Pike et al. (2010) conceptualized resilience into short-term shock adaptation and long-term adaptability: the former refers to the ability to recover and return to the previous development path after a shock. Adaptability on the other hand, refers to the adaptive capacity to undergo successful transformations, thus the long-term ability to create new development paths (Pike et al. 2010). Engineering, ecological and evolutionary interpretations of regional resilience focus either on short- or long-term processes and since both, adaptation and adaptability, are equally important for a region to be truly resilient (Boschma 2015), the three definitions should be seen as complementary. Engineering resilience focuses on the short-term, as it evaluates the ability of an economy to recover to its pre-shock state. This interpretation is most applicable to cases of small emergencies or business cycle fluctuations, which cause no permanent changes to the regional economic system. Also, ecological resilience has a rather short- or medium-term focus, as it assesses whether an economy could withstand a shock or adapted to a new equilibrium. The ecological conception may be most suitable for understanding large emergencies or crisis which cause some permanent alternations taking place in a regional economy. Evolutionary resilience on the other hand has a clear focus on long-term adaptability processes, as it emphasizes continuous transformations and the development of new growth paths. Evolutionary

interpretations of resilience are most applicable to analyze incremental reconfiguration of economies, such as structural change and prolonged recessions, which cause fundamental alterations in a regional economy (Evenhuis 2017).

Furthermore, there is no generally accepted methodology for how resilience should be measured empirically (Martin and Sunley 2015), but conceptualizing it into short-term adaptation and long-term adaptability can provide some methodological guidance: various econometric methods are particularly useful to assess the short-term resistance and recovery elements of resilience, which are easily quantified by using resilience proxies such as unemployment and GDP (Faggian et al. 2018; Di Caro 2017; Sensier et al. 2016; Cellini and Torrìsi 2014). Adaptation could be well measured with input–output and shift-share analysis, as these methods can observe changes in the economic structure (Giannakis and Bruggeman 2015; Kitsos et al. 2019; Han and Goetz 2019). Lastly, the long-term adaptability of an economy requires detailed case studies and mixed methods, as the transformation of an economy after a crisis is subject to the previous development path and place-specific aspects, which are hard to quantify. Thus, analyzing adaptability requires additional qualitative methods and disaggregated data (Hu and Hassink 2017; Evenhuis 2016) (see Table 2).

Table 2 Short-term and Long-term Elements of Regional Economic Resilience

Element	Meaning	Interpretation	Disruption	Methods
<i>Short-term</i>				
Adaptation	Ability to return to the previous development path	Engineering Resilience and Ecological Resilience	Smaller emergencies and business cycle fluctuations, which cause no or only minor changes to the local economy	Various econometric methods, input–output analysis and shift-share analysis
<i>Long-term</i>				
Adaptability	Ability to undergo successful transformation and to create new development paths	Ecological Resilience and Evolutionary Resilience	Larger emergencies and prolonged crisis, which cause significant alterations of the local economy	Mixed methods and detailed case studies

The concept of resilience highlights a complex and dynamic perspective on regional economies, which reflects into the malleability of its meanings: engineering, ecological and evolutionary interpretations are highlighting different aspects of regional economic resilience. To fully realise the potential of resilience as a bridging concept between various academic disciplines and policy (Christopher et al. 2010), it is essential to not limit the notion to a single definition, but rather understand them as complementary, where each is particularly suitable for the analysis of different shock and crisis contexts.

3 Determinants of Regional Economic Resilience

A central question about resilience is, why it might vary from region to region, city to city, locality to locality (Martin and Sunley 2015). The last economic crisis, starting from 2007, triggered a large body of empirical studies, mainly on the regional scale: cross-country studies on European regions (Sensier et al. 2016; Doran and Fingleton 2013; Dijkstra et al. 2015; Groot et al. 2011; Davies 2011) as well as many country-specific studies (Faggian et al. 2018; Di Caro 2017; Cuadrado-Roura and Maroto 2016; Petrakos and Psycharis 2015; Cellini and Torrìsi 2014; Lagravinese 2014; Fingleton et al. 2012) showed that areas reacted significantly different to the last economic crisis. Beyond this empirical observation, it is still up to debate, what exactly are the features which make some places more resilient than others. Indeed, it is probably futile to aspire a full and complete account of all the features and characteristics which make a place resilient (Boschma 2015). Understanding what is underlying regional resilience is complicated by the fact that it is a highly complex issue, where many different factors play a role (Fingleton et al. 2012). According to Martin and Sunley (2015), regional economic resilience is produced by a complex interplay of compositional, collective and contextual factors. Compositional factors refer to the economic structure of the region, such as the sectoral composition. Collective factors make up the relationships and connections between and within society and the economy. Lastly, contextual factors refer to the institutional environment, social capital and wider conditions and influences, such as national policies and global market conditions (Martin and Sunley 2015).

The following paragraphs attempt to break down the complexities underlying resilience. Doing so, I use the compositional, collective and contextual factors identified by Martin and Sunley (2015) to categorize resilience determinants established in theoretical and empirical studies: economic structure, human capital,



Fig. 1 Interactions of processes which determine regional resilience, as identified by Martin and Sunley (2015)

innovation, networks, accessibility, institutions and public policy. Under compositional factors fall the economic structure as well as the composition of human capital and knowledge. The role of networks for resilience falls under the category of collective factors. Lastly, institutions and public policy are contextual factors for regional resilience. Here I want to stress, that empirical studies which try to assess resilience determinants adopt a large variety of methods. Most mentioned studies use the last economic crisis of 2007 as a shock, focus on the regional scale and on measuring recovery, therefore adopt an engineering view on resilience.

Compositional Factors: Economic Structure

It is widely accepted, that the economic structure, such as the sectoral composition, is central for regional resilience, but the exact mechanism is unclear: regional structural diversity enhances resistance as it spreads risks among many sectors and avoids dependence on a single specialised sector. Yet, regional industrial diversity increases exposure as the overall likelihood to be hit by a crisis increases with the number of sectors. Contrary, a specialized region may be less exposed to many idiosyncratic shocks, but more vulnerable once it is hit by a crisis (Boschma 2015). Furthermore, the modularity of sectors influences regional resilience: modularity is the degree to which different components of the regional economy are separable. Weakly connected sectors may contain shocks locally and block contagion to various industries and other regions (Martin and Sunley 2015). However, relatedness and regional related variety, which refers to complementarities among the industrial structure, such as similar skill- and knowledge bases and material inputs have the potential to promote innovation and adaptability of the local economy (Boschma 2015). Yet since related variety reduces modularity, its impact on regional resilience is theoretically ambiguous (Martin and Sunley 2015). Boschma (2015) concludes that a variety of skill-related industries, which however have only little input–output relations, increases the capacity to accommodate shocks.

There are a number of empirical studies, which emphasise the role of economic structure for resilience: Groot et al. (2011) studied the sectoral composition on

NUTS 1 and NUTS 2 level¹ and found that countries and regions with high shares of cyclical sectors, such as manufacturing, were more affected by the last global economic crisis. This finding is also supported by Giannakis and Bruggeman (2017) and Cuadrado-Roura and Maroto (2016) who observed the negative influence of manufacturing in Greece and Spain respectively. Evans and Karecha (2014) suggest, that Munich's economic resilience is largely attributed to its diverse industrial structure. Similarly, Doran and Fingleton (2013) find that those US metropolitan areas with more industrial diversity were more resilient towards the recent economic crisis. Also, Cainelli et al. (2018) showed that industrial diversification increased the probability of regional resilience of Italian areas. Giannakis and Bruggeman (2015) concluded that the agriculture and food industry contributed to the relative resilience of Greek rural areas as well as tourism in island regions. This is in line with the findings of Sanchez-Zamora et al. (2014) for Spain. Lastly, Xiao et al. (2018), who formalise the evolutionary conception of resilience, find, that related and unrelated variety are strong predictors of industrial resilience in Europe. To summarize, the important role of sectoral diversity for regional resilience is supported by most empirical studies in the context of the last economic crisis.

Compositional Factors: Human capital and Knowledge.

The composition of human capital, meaning the configuration of knowledge, habits, social and personality attributes and creativity, is central to regional development: a well-educated population facilitates the generation of new knowledge and the absorption of externally generated knowledge and has an important role in the adaptation of a region to sudden economic shocks as well as to long-term changes (Martin and Sunley 2015; Di Caro 2017; Rodríguez-Pose 2013; Glaeser 2005). Rich human capital and knowledge, in particular complex knowledge (Balland and Rigby 2017), are main inputs for innovation processes, which in turn are a critical adaptive behaviour of regional economies, even in the absence of major shocks and disturbances (Bristow and Healy 2018). However, people endowed with high human capital tend to be very mobile, if they find themselves in a region ravaged by crisis or recession, they may easily move to more attractive places. This can have long-term negative hysteric effects on the affected region, particularly if it involves outmigration by the educated young (Martin and Sunley 2015). Thus, not only the current composition of human capital but also a regions' ability to attract and retain highly educated people matters for regional resilience.

¹ Nomenclature of territorial units for statistics (NUTS) is a hierarchical system for dividing up the economic territory of the EU in three spatial levels in order to create coherent European regional statistics.

There are several empirical studies which investigate the effect of human capital on regional economic resilience: Glaeser (2005), while not referring to the concept of resilience, argues, that human capital is key factor for Boston's success despite suffering many shocks throughout history. Fratesi and Perucca (2018) examine, how specific territorial capital, including human capital, influences resilience of EU NUTS 3 regions. They did not find a direct positive association of human capital and resilience and assumed that increasing mobility of highly educated people may be reason for their finding. Giannakis and Bruggeman (2017) on the other hand, found a strong positive relationship between regional education level and resilience in European regions. Bristow and Healy (2018) focus on the innovation capacity of European regions, which is directly related to the quality of human capital. They conclude that regions endowed with high innovation capacity were significantly more likely to have either resisted the crisis or recovered quickly from it.

Collective Factors: Networks

The structure of regional socio-economic networks and their connectivity to the outside world impact the sensitivity of regions to shocks but also the capacity of regions to develop new growth paths (Boschma 2015). Boschma (2015) and Crespo et al. (2013) argue that in particular knowledge networks play an important role for regional resilience, as they facilitate the generation and distribution of knowledge and are therefore central for innovation and adaptability. The regional economy as a knowledge network consists of industries and organizations which represent the nodes and the relatedness between them. Relatedness refers to the kind of technology, knowledge and other inputs which related economic activities share (Hidalgo et al. 2018). Levels of proximity between nodes and features of key agents are important aspects of knowledge networks through which resilience is mediated (Boschma 2015). In particular the structural properties of the networks matter, where core/periphery structures are especially conducive to resilience: high level of connections between the core and the periphery enhance the flow of information and knowledge through the network, which boosts innovation. However, shocks on core members do not weaken the whole structure, as innovative and adaptive behaviour can still diffuse easily from periphery to core members, which secures adaptability (Crespo et al. 2013).

There is only little empirical work done on the role of networks for regional resilience. Balland et al. (2015) is the only study focussing on knowledge networks and resilience. They analyse the technological resilience of US cities using patent data to model the knowledge networks. They find, that cities with high levels of relatedness to the set of technologies in which they do not yet possess comparative advantage are more likely to avoid crises and have a greater capacity to recover. Diodato and

Weterings (2014) on the other hand, use a network of input–output relations and skill-relatedness among industries to study labour market recovery. Using Dutch data, they find, that labour markets in centrally located and service-oriented regions recover faster, as they benefit from high connectivity to other regions as well as from higher levels of skill-relatedness. Connectivity and skill-relatedness positively impacts recovery as laid-off workers are reabsorbed faster by the labour market. Lastly, Han and Goetz (2019) used national input–output network and exploited county employment data to proxy local interconnectivity and they concluded, that highly interconnected US counties were more resilient to economic shocks.

Collective Factors: Accessibility

The mentioned determinants so far are inherently a-spatial and static, as they only represent internal regional characteristics, which disregards spatial interactions. However, the contemporary spatial economy is strongly interconnected through transactions, input–output relations, flows of people and goods (Overman et al. 2010). This suggests that resilience factors are not only exchanged within, but also among regions, superseding administrative borders. Consequently, what determines regional economic resilience are internal, stationary factors as well as interaction based, mobile factors. Östh et al. (2015) suggest accessibility as a measure, which captures spatial interactions and connectivity. Accessibility is generally defined as the potential for reaching spatially distributed opportunities, such as employment, recreation and social interaction. Accessibility is the joint result of a transportation network and the geographical distribution of activities (Hansen 1959). Favourable accessibility is often connected with spatial openness, which can make a region more exposed to economic shocks as well as enhance shock propagation. But a high degree of accessibility is also related to positive long-term development, as it boosts productivity through the attraction of human capital, knowledge exchange and innovation, which in turn enhances economic resilience (Östh et al. 2017).

The role of spatial interaction and connectivity has often been overlooked in the analysis of regional economic resilience (Modica and Reggiani 2015), thus there is only limited empirical evidence: Östh et al. (2015) study the resilience of Swedish municipalities using a composite indicator and combine it with measures of job accessibility. They find a non-linear relationship between the two measures: while most areas with high resilience are also the most accessible and the other way around, this does not hold for commuting areas, which often lack resilience capacity but are still very accessible. Östh et al. (2017) compare the results from Sweden with the analysis of resilience and accessibility of Dutch municipalities. Contrary to Sweden, The Netherlands is a densely populated country. They conclude that accessibility is more relevant for resilience in a sparsely populated country like Sweden. Both

studies suggest that the joint analysis of static and mobile factors provides a more complete insight into the economic investigation of resilience.

Contextual Factors: Institutions, Social Capital and Public Policy

The role of institutions for regional development is well established (Tomaney 2014; Rodríguez- Pose 2013; Gertler 2010; Amin 1999), yet resilience research has been criticized for paying too little attention to the role of institutions as well as public policy (MacKinnon and Derickson 2013; Wink 2012; Bristow 2010; Hassink 2010; Swanstrom 2008). Boschma (2015) argues that the resilience of regions is strongly rooted in their past legacies and institutions are the carrier of history. Thus, formal and informal institutions and social capital may be key intermediaries between short-term recovery efforts and long-term development after a shock. Adger (2000) even argued that institutional contexts and social capital are the most important determinants of resilience, which should therefore be examined on the community level. Also, public policies and governance can assist in coping with crisis and change in the short- and long-run: during an acute crisis phase welfare policies and automatic stabilizers, such as unemployment assistance, health care and housing support, can bring immediate relief to a region.

In the long-run regional policies can strengthen resilience through infrastructure investment, education policies and industrial policies such as smart specialisation (Christopherson et al. 2010). On the other hand, certain institutions and governance structures also have the power to greatly diminish resilience, if a region finds itself in an institutional or political lock-in situation (Grabner 1993).

Empirical studies on institutions and public policies have mixed conclusions: Groot et al. (2011) find only a minor role of public and labour market institutions for resilience in European regions. Gherhes et al. (2017) concluded, that negative institutional hysteresis lowered the resilience of peripheral cities in the UK. Davies (2011) concluded that institutions influenced the resilience of European regions during the last crisis because they channelled fiscal policies. Eraydin (2015) looked at the role of regional policies in Turkey and found that existing policies made only a limited contribution to build resilient regions but emphasizes that regional policies and governance do have the potential to enhance resilience if well-designed. Kakderi and Tasopoulou (2017) studied West Macedonia in Greece, a region particularly severely hit by the crisis. They found that national policies were both, the cause of regional resilience against previous crisis and the source of vulnerability towards the still ongoing crisis. All these studies emphasize the need for better targeted and differentiated regional development policies, which take local compositional and contextual conditions into consideration.

Table 3 Determinants of regional economic resilience

Factor	Mechanisms	Theoretical References	Empirical References
<i>Compositional Factors</i>			
<i>Economic Structure</i>	Diversity in the sectoral composition avoids dependence on pro-cyclical sectors and absorbs shocks; Modularity stops shock contagion from one sector to another; Regional related variety among sectors foster cooperation, innovation and increases adaptability, but diminishes modularity. Variety of skill-related industries with little input–output relations is likely to be best economic structure to accommodate shocks	Martin and Sunley (2015), Boschma (2015)	Martin et al. (2016), Groot et al. (2011), Giannakis and Bruggeman (2017), Giannakis and Bruggeman (2015), Evans and Karecha (2014), Doran and Fingleton (2013), Cainelli et al. (2018)

(continued)

The empirical studies mentioned in this section, focus almost exclusively, with the exception of Xiao et al. (2018), on the easier to quantify engineering resilience, thus assessed the recovery of regions. Ecological and evolutionary resilience are under-researched and it is not well understood, whether all these determinants are equally important for short and for long-term resilience. Moreover, since empirical studies overwhelmingly focused the economic crisis of 2007, their findings are specific to the context of the last crisis. The majority of studies analyzed the regional scale on NUTS 2 or 3 level, thus not representing city or local scales. Lastly, collective forces, such as knowledge networks, require much more attention from an empirical perspective. To wrap up, compositional, collective and contextual factors are highly interdependent, path-dependent and reflect underlying local perceptions and expectations (Martin and Sunley 2015). Due to this

Table 3 (continued)

Factor	Mechanisms	Theoretical References	Empirical References
<i>Human Capital and Knowledge</i>	High human capital enables the generation of new knowledge and the absorption of externally generated knowledge and has an important role in the adaptation of a region to sudden economic shocks as well as to long-term changes. Knowledge is essential for innovation which in turn drives the economy and secures constant learning and adaptation	Bristow and Healy (2014), Boschma (2015), Martin and Sunley (2015)	Bristow and Healy (2018), Fratesi and Perucca (2018), Giannakis and Bruggeman 2017b, Glaeser (2005)
<i>Collective Factors</i>			
<i>Knowledge Networks</i>	Regional structure of networks and their connectivity to the outside world impact the sensitivity of regions to shocks but also the capacity of regions to develop new growth paths. Knowledge networks facilitate the generation and diffusion of knowledge and are therefore central for innovation and adaptability	Boschma (2015), Crespo et al. (2013)	Balland et al. (2015), Diodato and Weterings (2014)

(continued)

Table 3 (continued)

Factor	Mechanisms	Theoretical References	Empirical References
<i>Accessibility</i>	Favorable accessibility can enhance shock propagation., but is also related to positive long-term development, as it boots productivity through the attraction of human capital, knowledge exchange and innovation, which in turn enhances economic resilience	Östh et al. (2015), Modica and Reggiani (2015)	Östh. et al. (2017), Östh et al. (2015)
<i>Contextual Factors</i>			
<i>Institutions, Social Capital and Public Policy</i>	Institutions and social capital are the facilitators between short-term recovery and long-term development after a shock. National and regional policies can assist (or also hinder) in coping with crisis and change, both in the acute crisis phase as well as for long-term (re-)development. E.g. support measures for affected industries, welfare policies, education and infrastructure investments	Boschma (2015), Bristow (2010), MacKinnon and Derickson (2013), Pike et al. (2010), Lang (2012);	Osth et al. (2017), Hudec et al. (2017), Davies (2011), Gherhes et al. (2017), Eraydin (2015), Kakderi and Tasopoulou (2017);

complexity, there are still many more question marks than answers to what determines regional resilience and much research about it is yet to be done. The next section identifies one of these question marks, namely the role of urban and rural differences for regional economic resilience.

4 Resilience and the Socio-Economic Differences of Urban And Rural Areas

Urban and rural economies are different in many aspects, ranging from the economic structure to human capital and institutions. Cities are often referred to as the engine of the economy, while rural and peripheral areas are depicted as *places that don't matter* (Rodríguez-Pose 2018). Empirical trends show us that economic activity is increasingly concentrating in already agglomerated areas (Florida et al. 2008), which receives much attention in models of urban economics, new economic geography and regional science as well as in regional policy debates. Contrary, much of the resilience literature refers to regions in a generic way, without distinguishing between agglomerated and non-agglomerated areas. This section argues that research on regional economic resilience needs to focus more on the specific characteristics and dynamics between urban and rural areas, in order to contribute to theoretical and policy debates on contentious contemporary issues, such as regional inequality. The following section, first, outlines urban–rural differences in the light of resilience determinants, second, presents the contradictory role of urbanisation externalities on regional resilience and third, reviews empirical papers on regional economic resilience, which explicitly differentiate between urban and rural areas.

Differences Between Urban and Rural Economies and Resilience Determinants

Cities² and rural areas exhibit distinctive socio-economic features which affect the determining factors for resilience. Perhaps the most conspicuous urban–rural differences can be found in the compositional factors: the economic structure and human capital. Urban areas tend to have a more diversified economic structure, whereas rural areas are more specialised. Cities' economies are mostly based on the service sectors, especially producer services, and high-technology manufacturing (OECD

² The urban-rural divide is an oversimplification of the spatial economy. In reality, we observe an urban-rural continuum and linkages in space, which make areas interdependent (Partidge et al. 2007). Being aware of this oversimplification, this paper still uses the urban-rural dichotomy as a metaphor to distinguish between two types of economic space.

2011). In rural areas, the agricultural and food sector represent an important backbone of the economy, even though most employment is in the low-end consumer services (Bosworth and Venhorst 2017). Urban areas concentrate high value-added and technologically complex economic activities, because they require a deeper division of knowledge. Cities also provide multiple interaction opportunities, which minimizes the coordination costs associated with knowledge division (Balland et al. 2018). Thus, urban knowledge networks contain more complex, tacit knowledge, which are an important collective factor for regional resilience. Cities also tend to attract and retain human capital, and urban populations attain higher levels of education (Glaeser 2005, 2011). This makes cities hubs of creativity, innovation and entrepreneurship (Wolfe and Bramwell 2008; Florida 2003).

Contrary, rural areas are more specialized in the production of primary and mature products in terms of product life cycle. These lower value-added activities are less likely to require complex knowledge and therefore tend to employ low-skilled labour (OECD 2011). In terms of accessibility, it is usually cities that act as transportation nodes, whereas rural areas far from cities often lack adequate accessibility. Moreover, urban and rural areas face different institutional contexts. Glaeser and Steinberg (2017) claim that urbanisation could promote democratic change, positive institutional transformations and the development of specific civic capital, which rural areas may lack. On the other hand, classic sociologists such as Tonnies (1887) and Durkheim (1893) argued, that rural areas possess higher social capital, for example with regard to trust. Putnam (2001) distinguished between bonding social capital between homogeneous groups and bridging social capital between socially heterogeneous groups. Among others, Sørensen (2016) show that cities score higher in bridging social capital, while rural areas have high bonding social capital³.

Urbanisation Economies, Regional Policy and Resilience

According to urban economics and new economic geography, urban increasing returns, the so-called urbanisation economies, are an important force behind the socio-economic differences between urban and rural areas. Urbanisation economies consist of a combination of factors such as agglomeration, density, diversity and spatial transaction costs, which provoke several positive externalities (McCann 2013): increased productivity as agglomeration and density enable the pooling and matching of labour, sharing of infrastructure and suppliers and a concentration of demand. Improved accessibility and declines in transportation costs attract firms

³ Discussing the sociological literature on urban and rural differences, albeit interesting to explore with regard to regional economic resilience, is beyond the scope of this paper.

Table 4 Determinants of resilience and characteristics of urban and rural areas

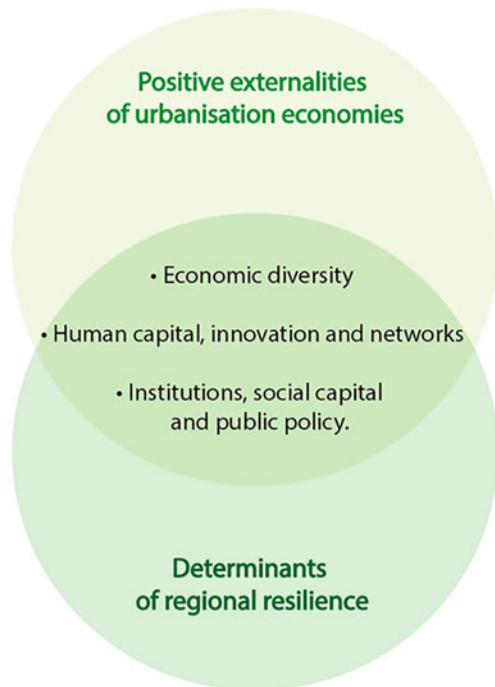
Factors for Resilience	Urban-Metropolitan	Rural-Remote	References
<i>Compositional Factors</i>			
<i>Economic Structure</i>	Highly diversified economy, high value-added and high-technology intensive sectors	Limited diversification, low value added and lower technology sectors	OECD (2011)
<i>Human Capital and Knowledge</i>	Highly skilled workforce and in-migration, innovative and productive; Un-ubiquitous, complex knowledge base	Lower skilled population, out-migration, low productivity and little innovation; Ubiquitous knowledge base	Balland and Rigby (2017), Glaeser (2005 2011), Wolfe and Bramwell (2008), Florida (2003)
<i>Collective Factors</i>			
<i>Knowledge Networks</i>	Proximity enhances the formation of knowledge networks	Remoteness and dispersion hinder networks formation	Balland et al. (2018)
<i>Accessibility</i>	Central transportation node, thus highly accessible; Good information and communication networks	Less accessible if remote; Weaker transport, information and communication infrastructure	Östh et al. (2015), Hudec et al. (2017)
<i>Contextual Factors</i>			
<i>Institutions, Social Capital and Public Policy</i>	Bridging social capital	Bonding social capital	Sørensen (2016)

and human capital to cities. Furthermore, closer interaction of economic agents and proximity facilitate the generation, distribution and assimilation of knowledge and innovation (Duranton and Puga 2004). These positive externalities of urbanisation and the characteristics of urban economies outlined in Table 4, seem to largely coincide with many of the resilience determinants outlined in the previous section: cities are more diverse, endowed with high human capital and knowledge, and are therefore more innovative and adaptable than rural economies (Fig. 2).

However, urbanisation economies also provoke a number of negative externalities: congestion, crime, high land rents and pollution are among the most prominent diseconomies of agglomeration (Glaeser 2012). Also, urban poverty and in-equality is increasingly problematic (Cassiers and Kesteloot 2012). Moreover, urban economies host specific sectors, which are prone to instability and crisis, such as banking, finance, real estate and construction (Sassen 2011; Harvey 1978). Cities also tend to be more connected to global markets than rural areas, which makes them more exposed to external economic shocks (Hudec et al. 2017; Fratesi and Rodríguez-Pose 2016). According to the European Commission (2014), urban areas in Europe indeed have been more prone to 'boom and bust' cycles, while rural growth is smoother.

Lastly, Rodríguez-Pose (2018) and Iammarino et al. (2018) point out a commonly overlooked or understated negative externality of urbanisation economies: territorial inequality and social and economic distress in non-agglomerated areas. Urbanisation economies generate a cumulative self-reinforcing process of innovation, growth and concentration, which causes economic activity to further spatially

Fig. 2 Overlapping of positive urbanisation externalities and resilience determinants



concentrate in large and dense urban areas at the expense of rural-peripheral areas (Rodríguez-Pose and Crescenzi 2008). Empirically we indeed observe a spiky world (Florida et al. 2008), where regional economic inequality causes persistent poverty, decay and lack of opportunities in many lagging-behind regions (Iammarino et al. 2018). The focus on cities as the engines of the economy, which increasingly posits economic dynamism as dependent on urbanisation economies, created a sense that peripheral areas are places that don't matter (Rodríguez-Pose 2018). This is not only causing the discontent of their inhabitants, resulting in political revolt, but also overlooks the economic potential of peripheral areas (Rodríguez-Pose 2018). Consequently, perpetual territorial inequality has become a threat to economic progress, social cohesion and political stability (Iammarino et al. 2018).

From a resilience perspective, the negative urbanisation externalities, in particular the concentration of crisis prone sectors in cities, exposure to external shocks due to international connectivity and regional inequality, may represent potential threats to regional resilience (Fig. 3). Various regional development policy approaches are concerned about urban–rural differences and the externalities resulting from agglomerations: traditional supply-led regional development intervention focuses on lagging-behind regions and is based on inter-regional transfers, the welfare state, income support and large investment projects (OECD 2011; Barca et al. 2012).

Space-blind policies, on the other hand, favour the investment of resources in the largest and most productive cities, in order to fully exploit urbanisation economies. This narrative assumes that territorial inequality is inevitable and therefore encourages people to relocate to large cities to escape economic decay and stagnation (World Bank 2009). Both approaches have been heavily criticized: first, traditional top-down policies have often failed to deliver local development, and quite the opposite, even contributed to making rural-peripheral areas permanently depend on welfare and transfers from the central government (Rodríguez-Pose and Fratesi 2007; Barca et al. 2012). Second, Rodríguez-Pose (2018) argues, that space-blind approaches over-estimate the capacity and willingness of individuals to move and under-estimate the problems associated with regional inequality, such as forgone economic potential in peripheral areas, discontent and political revolt. Since neither of these two policy approaches seem to alleviate negative externalities of agglomerations, while also supporting their desirable features, another set of regional development policies has been suggested: the place-sensitive approach aims to target the potential of every region via differentiated policies that take place-specific contexts, such as local institutions, into consideration (Iammarino

et al. 2018). A combination of top-down and bottom-up policies should strengthen leading metropolitan regions as well as promote the utilisation of untapped economic potential and development in peripheral areas (Iammarino et al. 2018).

As this short review demonstrates, significant effort within economics, regional science and regional policy has been devoted to understanding the socio-economic differences between rural and urban economies. Evidently, urban–rural differences shape the economic landscape and influence regional development. Thus, it is surprising, that the theoretical literature on regional economic resilience has not yet focused on how the different characteristics and dynamics of urban and rural areas impact regional resilience. Many of the positive externalities connected to agglomerations coincide with the determinants of resilience outlined in Sect. 3 (Table 3). Cities tend to score high in most determining factors for resilience: economic diversity, human capital and knowledge, and potentially also in institutions and social capital (Glaeser and Steinberg 2017; Sørensen 2016). While

Fig. 3 Negative urbanization externalities and possible threats to resilience



rural areas often lack highly skilled human capital and innovation processes and exhibit lower sectoral diversification. On the other hand, the negative externalities of agglomerations may not only jeopardize resilience of urban areas, but also of rural ones: international connectivity and crisis-prone sectors may make cities more exposed to global economic disruptions, while territorial inequality deprives peripheral areas the resources to develop the adaptive capabilities to deal with change, which inevitably locks them into decline. As Fig. 4 illustrates, conceptually it is unclear, whether the fate of resilient regions depends on the economic dynamism of cities, or if negative urbanisation externalities compromise the short and long-term resilience of all types of areas.

Socio-economic differences between different types of areas and urbanisation externalities, have to be central elements of a future research agenda in regional economic resilience. If done so, resilience thinking can further contribute to the design of effective regional development policies, which tackle contemporary challenges such as territorial inequality. This seems to be particularly relevant in the face of looming economic uncertainty and the spatially differentiated impacts of the Covid-19 pandemic. Moreover, as resilience has already proven to be a

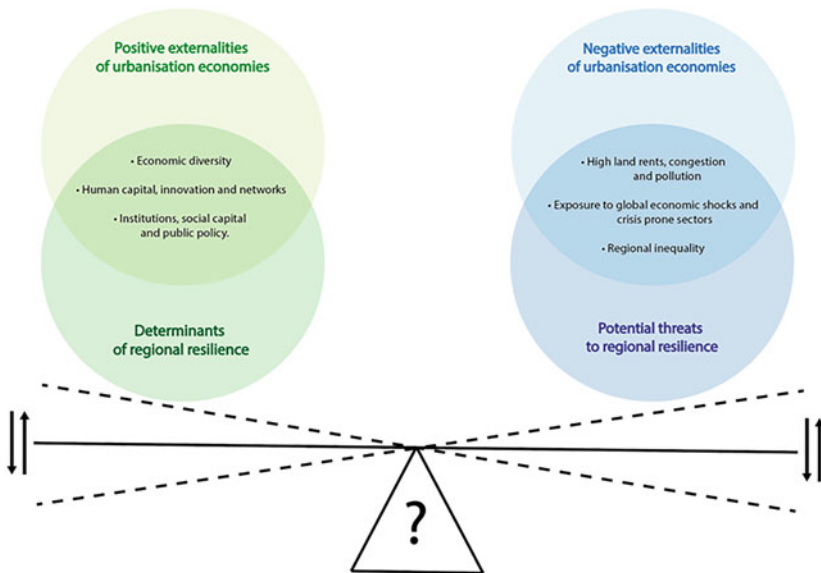


Fig. 4 Ambiguous effects of urbanization externalities on resilience

key feature to ensure sustainable regional development, the concept can potentially provide more important insights and reasons for a place-sensitive policy approach: linkages across space make cities and peripheral areas interdependent as they are connected via migration flows, input–output relationships, financial flows and demand (Overman et al. 2010). Therefore, if the resilience of one type of area is compromised, economic linkages may spread economic distress and crisis to the whole region and further. Since place-sensitive policies aim for more balanced development and cohesion between all types of areas, they may as well support overall resilience.

To summarize, it is conceptually unclear how specific characteristics and dynamics between urban and rural areas impact regional resilience, as much of the conceptual literature on regional resilience refers to regions generally. There are, however, a limited number of empirical studies on regional resilience which explicitly differentiate between different types of space, that might shed some light on this issue. The next sub-section provides a review on their findings.

Empirical Evidences on the Effect of the Global Financial Crisis on Urban and Rural Areas

This section surveys the findings of recent empirical studies, which assess regional economic resilience and are particularly interested in urban and rural dimensions of the last economic crisis. Each of the following empirical studies analyzes European regions on various spatial scales and all focus on recovery, thus adopt an engineering view on resilience. They use data differentiated by urban and rural areas for their analysis, but do not include measures of urbanisation externalities. Similar studies, which use proxies of urbanisation, such as population density, as an explanatory variable (e.g. Faggian et al. 2018; Fratesi and Perucca 2018; and Kitsos and Bishop 2018), are not surveyed here because their main objective refers to areas more generally and rather than specific urban and rural effects of the crisis.

Giannakis and Bruggeman (2019) recently aimed to empirically explore the relationship between regional resilience and the degree of urbanization, as well as the different drivers of resilience across the territorial hierarchy (country, NUTS 2 and NUTS 3 level). Using three different resilience indicators based on employment changes, they find evidence of highly heterogeneous resilience outcomes of urban, intermediate and rural European regions to the 2008 economic crisis, as well as statistically significant differences in the determinants on regional resilience across the urban–rural and territorial hierarchy. While there are differences in the findings depending on the used resilience indicator, they generally find that migration has the greatest positive effect on regional resilience in all types of regions but particularly in rural ones. Also, the level of initial development is a significant driver of resilience

in rural and urban regions, whilst agriculture contributes positively to the economic resilience of intermediate and rural regions, but not in urban regions.

Brakman et al. (2015) use a data set from 207 NUTS 2 regions from 22 different European countries. They analyse the relevance of urbanisation and industrial specialisation for short-term resilience after the financial crisis of 2008. They distinguish between cities, commuting and rural areas and analyse six different sectors: agriculture, food, low technology, medium and high technology, financial and business services and other. They adopt GDP and unemployment as a resilience proxy. The main finding of Brakman et al. (2015) is that regions with a large share of their population in commuting areas were more resilient in the period of 2008–2012 compared to cities. Additionally, they confirm that sectoral composition impacts resilience, as regions with a higher share of output in medium and high technology industries proved to be more resilient. Brakman et al. (2015) mention, that the resilience of commuting areas could be explained, if commuters worked mostly in medium and high-technology sectors but do not further investigate this result.

Also, Giannakis and Bruggeman (2015) have a particular look at sectoral composition and combine a shift-share and input–output analysis for Greek regions, using unemployment as a resilience proxy. On NUTS 3 level only the regions hosting Athens and Thessaloniki classify as urban. They distinguish between 11 sectors, among which the agricultural and food sector were the strongest source of resilience for Greek regions. Since these are rural sectors, Giannakis and Bruggeman (2015) conclude, that rural areas were more resilient against the last economic crisis than Greek urban regions, which were left with severely hit sectors, such as manufacturing, construction and banking. This result could be attributed to strong foreign demand for Greek agricultural goods.

Dijkstra et al. (2015) use a set of stylised facts on GDP, unemployment and productivity on NUTS 3 level of European regions. They distinguish between urban, intermediate, rural areas close to cities and remote rural areas. Their results indicate that urban and rural remote areas were hit harder by the last crisis, particularly capital metro regions, and recovered significantly slower than intermediate and rural regions close to cities. Dijkstra et al. (2015) assume that due to the proximity to cities, intermediate and commuting areas benefit from positive urbanisation externalities but do not experience any of the negative. This finding is largely in line with Brakman et al. (2015).

Capello et al. (2015) analyze the long-term development of GDP and unemployment on NUTS 2 level of European regions. They exploit a macroeconomic regional growth forecasting model (MASST) to forecast developments until 2030. They differentiate between five regional topologies: agglomerated, urban and rural, as well as MEGA and non-MEGA regions. A region is classified as MEGA, when it hosts

at least one functional urban area (FUA), which is identified based on indicators such as population, accessibility, manufacturing specialisation, education and distribution of headquarters of top European firms. Their main finding is that the presence of large cities in MEGA areas is associated with a lower loss of GDP growth and a faster recovery. They show that regional resilience improves with increasing size of the city and due to the higher value-added activities they host. Capello et al. (2015) also claim that the higher density of external linkages and cooperation networks of cities enhances regional resilience.

This impact of connectivity on resilience is further investigated by two country level studies, Hudec et al. (2017) on Slovakia and Östh et al. (2015) on Sweden. Both use statistics based on indices to assess the resilience of regions. They measure resilience with the help of the Resilience Capacity Index (RCI), originally developed by Foster (2007). Hudec et al. (2017) additionally create a vulnerability index based on unemployment rates. They found, that the RCI shows higher values for urban areas, particularly the capital of Slovakia, Bratislava. But the vulnerability index also showed higher values in cities, due to their high connectivity to international markets. In addition to the RCI, Östh et al. (2015) study the accessibility of places. They analyze Swedish municipalities and found as well that the RCI favours urban areas, which are also the most accessible areas. This positive relationship between resilience and accessibility does not hold for commuting areas. Here the RCI indicated low resilience, yet high accessibility. This is at odds with Brakman et al. (2015) and Dijkstra et al. (2015), which both pointed out the resilience of commuting areas and areas close to cities (see Table 5).

This consultation of empirical studies aimed to shed light on a question which is conceptually unclear: does the fate of resilient regions depend on the economic dynamism of cities, or do negative urbanisation externalities compromise the short and long-term resilience of all types of areas? To summarize, there is no consensus among the surveyed studies: Brakman et al. (2015) and Dijkstra et al. (2015) concluded that the most resilient places are commuting areas and areas close to cities, but Östh et al. (2015) found low values of resilience capacity in commuting areas. Giannakis and Bruggeman (2015) confirm that rural areas were more resilient in Greece due to the performance of the agricultural sector. Similarly, Hudec et al. (2017) found that urban areas in Slovakia performed worse during the crisis due to the negative impact of international connectivity of cities. Capello et al. (2015), contrary to all other studies, show that large cities are a source of regional resilience.

There are several limitations of this survey, which inhibit drawing definite conclusions: first, the insufficient number of just seven studies which use data differentiated by urban and rural areas for their analysis. Moreover, none has

Table 5 Empirical studies on the impact of the 2008 financial crisis on regions and cities

Paper	Region	Method	Resilience Proxy	Key Finding
Giannakis and Brugge- man (2019)	EU Countries, NUTS2 and 3	Multilevel logistic and multinomial regression	3 different indicators using employment changes	Significant differences of resilience outcomes in urban, intermediate and rural areas. Determinants vary across types but migration is the most important factor in all regions
Brakman et al. (2015)	EU, NUTS 2	Univariate Regressions	GDP and Unemployment	Most resilient regions are commuting areas, whereas cities and rural areas were less resilient
Capello et al. (2015)	EU, NUTS 2, MEGA areas	MASST3 Long run Simulations	GDP and Unemployment	In the long run large metropolitan cities are more resilient due to specific territorial capital
Dijkstra et al. (2015)	EU, NUTS 3	Descriptive Statistics	GDP, Unemployment and Productivity	Capital cities were less resilient against the crisis, instead intermediate and rural regions close to cities were most resilient

(continued)

Table 5 (continued)

Paper	Region	Method	Resilience Proxy	Key Finding
Giannakis and Brugge- man (2015)	Greece, NUTS 3	Shift-Share and Input–Output Analysis	Unemployment	Greek rural areas were more resilient than the two predominantly urban regions, Athens and Thessaloniki, due to the performance of agriculture and food sectors
Hudec et al. (2017)	Slovakia, NUTS 2/3	Statistics based on indices	Resilience Capacity Index and Vulnerability Index	The Resilience Capacity Index favours urban areas, yet they also found that urban areas were more vulnerable to the crisis
Östhet al. (2015)	Sweden, Municipality Level	Statistics based on indices	Resilience Capacity Index and Accessibility Measures	Proxies of resilience, accessibility and urbanization are positively related. Commuting areas on the other hand show high accessibility but low resilience capacity

explicitly dealt with positive and negative urbanisation externalities and institutional contexts. Second, all the surveyed studies focused on European countries and engineering resilience, as well as on one specific economic shock, the last global economic crisis. Therefore, like the studies on resilience determinants (Sect. 3), their findings should not be generalised. Third, the surveyed studies present very interesting results but were often unable to provide a convincing explanation for their findings, which urges the need for further research.

Yet, some important insights can be drawn from this review: Hudec et al. (2017)'s study on Slovakia, found that urban areas were both, resilient and highly exposed to global crisis due to international economic connectivity. This hints to a complex relationship between resilience and socio-economic networks on various scales. Therefore, further incorporating considerations of networks and connectivity in the analysis of resilience could be particularly fruitful with regard to urban and rural areas. Moreover, Brakman et al. (2015), Giannakis and Bruggeman (2015) and Capello et al. (2015) all showed that the different sectoral composition of cities and rural areas are a cause of heterogeneous resilience, which invites further research into compositional factors for resilience. The most important point gained from this survey is that these studies clearly indicated that socio-economic differences between urban and rural areas matter for regional resilience, which have to be more systematically addressed in future research.

5 Conclusion

In this chapter, I tried to trace the evolution of resilience thinking in regional science and economic geography, to highlight the accomplishments of the literature to define regional resilience and to create empirical evidences on what determines resilience. Subsequently, I sketched potential new directions based on some shortcomings of past research:

The conceptual development of resilience has been marked by much criticism towards the malleability of its meaning (Gong and Hassink 2016; Pendall et al. 2010; Davidson 2010; Hassink 2010). Therefore, I aimed to show that the main interpretations, engineering, ecological and evolutionary resilience, are complementary, rather than mutually exclusive. Each interpretation has its own merit, depending on the shock and time scale it seeks to analyse. Engineering resilience, which evaluates a region's ability to recover, has a short-term focus and is suitable for analysis of smaller emergencies and business cycle fluctuations, which cause no changes to the local economic structure. Ecological resilience assesses whether a shock caused a system to adjust and how efficiently it reaches the new equilibrium. Thus, ecological resilience is applicable for understanding larger crisis, which cause some permanent alterations to the local economic system in the short and medium-term. Evolutionary resilience emphasizes adaptability and continuous transformation of the economy, which makes it especially applicable to analyze shocks and stresses that cause significant long-term alterations of the local economy, such as incremental structural or technological change (Evenhuis 2016).

Then, the chapter attempted to break down the complexities which underlie regional resilience by categorizing empirically established resilience determinants. Regional economic resilience is produced by a complex interplay of compositional, contextual and collective factors (Martin and Sunley 2015). The local economic structure, human capital and knowledge falls under compositional factors: industrial diversity, skill-related sectors, high human capital and complex knowledge bases are well established features that foster resilience (Martin and Sunley 2015; Boschma 2015; Bristow and Healy 2018). Collective factors for resilience are embodied in local socio-economic networks, in particular knowledge networks: they facilitate the generation and diffusion of knowledge, which is central for innovation and adaptability (Crespo et al. 2013). Lastly, contextual factors include local institutions, social capital and public policies. They are the carriers of history and since resilience is strongly rooted in a region's past legacies, these factors are key intermediaries between short- and long-term resilience processes (Boschma 2015; Pike et al. 2010). However, the exact mechanisms on how these determinants impact resilience, particularly in the long run, are still unclear. Empirical studies on resilience determinants overwhelmingly focus on engineering resilience, European regions and the last global economic crisis. Further research on this issue would greatly benefit from investigating more variegated contexts.

One of which, are specific urban and rural contexts: much of the surveyed literature refers to regions generally, without differentiating between different types of areas. Thus, the key contribution of this chapter is the discussion of socio-economic differences between urban and rural areas and urbanisation externalities from a resilience perspective. Cities tend to be endowed with great economic diversity, rich human capital and complex knowledge bases, which makes them hubs for innovation (OECD 2011). These are all critical factors for resilience. Contrary, rural and peripheral areas are less diversified, the lower-skilled workforce prompts little innovation. They often suffer from out-migration and economic decline and seem to be doomed as places that don't matter (Rodríguez-Pose 2018). Externalities arising from urban density, known as urbanisation economies, may be the source of both, cities' success and periphery's decline. As a result, persistent or increasing spatial inequality between urban cores and rural peripheries threaten economic progress and social cohesion (Iammarino et al. 2018). At this point it is unclear, whether the economic dynamism of cities is a reliable source of regional resilience, or if certain urbanisation externalities undermine resilience of cities and rural areas. Socio-economic differences between different types of areas and urbanisation externalities, have to be central elements

of a future research agenda in regional economic resilience. If done so, resilience thinking can substantially contribute to the debate on regional development policies and contemporary challenges such as territorial inequality.

In a nutshell, the survey of the literature on regional economic literature results in three suggestions for future research: i.) diversifying the focus of empirical studies by investigating longer-term, evolutionary resilience, different crisis or stress contexts, and regions beyond Europe. ii.) putting more empirical effort into understanding mechanisms of resilience creation. iii.) incorporating socio-economic differences between urban and rural areas and the role of urbanisation externalities into the analysis. In times of profound socio-ecological changes and recurring economic crisis, resilience thinking provides a unique framework for academics and policy makers to grasp how systems respond to such shocks and stresses (Pendall et al. 2010). Advancing research on regional resilience along the identified directions will be essential to fully realise how regions, urban and rural, deal with change and how this knowledge can be used to design effective regional policies.

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The Resilience of Britain's Core Cities to the Great Recession (with Implications for the Covid Recessionary Shock)

Ron Martin and Ben Gardiner

Resilience is the capacity of any entity—an individual, community, an organisation, or a natural system—to prepare for disruption, to recover from shocks and stresses, and to adapt and grow from a disruptive experience. As you build resilience, therefore, you become more able to prevent or mitigate stresses and shocks you can identify and better able to respond to those you can't predict or avoid. You also develop greater capacity to bounce back from a crisis, learn from it, and achieve revitalization.

(Judith Rodin, *The Resilience Dividend*, 2012)

1 Introduction

We are living in volatile and turbulent times. From natural disasters to economic crises, to political turmoil to climate change to global pandemics: it seems as if disruption has become the 'new normal'. Over the past decade and a half, a new field of enquiry and a new agenda have emerged, focused on *resilience*: the

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ability of individuals, communities, organisations and economies to maintain their core purpose and integrity amid unforeseen shocks and perturbations. The idea of resilience not only helps in understanding how social, economic, political and environmental systems adjust to shocks, but is also a way of thinking about how to build better shock absorbers, to improve the ability of such systems both to resist and recover from disruption and to emerge stronger and more sustainable. In this paper, we focus on one particular instance of resilience, how major British cities were impacted by the Great Recession that was triggered by the global financial crisis of 2008–2009.

How city and regional economies react to major shocks is of interest—and importance—for a number of reasons. Recent research across several countries has shown how over the past few decades inequalities in city and regional economic performance and welfare have increased, and cities and regions have diverged on such indicators as income per head, productivity and quality of jobs. While some cities and regions enjoyed rapid growth over the two decades or so prior to the Great Recession, others were left behind. This divergence has not only stimulated research into the possible causes involved but has also generated social and political discontent and resentment within left behind places. Policymakers have in consequence become exercised by the challenge of what to do to improve the economic conditions and opportunities in those cities and regions which have not shared in the prosperity enjoyed by those that have pulled ahead. The issue of how the Great Recession impacted across cities and regions assumes importance in this context because not only may the recession itself have hit different cities and regions differently, resulting in different temporary short-run outcomes and challenges, it may have had differential permanent longer-run consequences. For example, cities and regions that are more severely impacted by a shock, and which recover but slowly from it, may experience lower long-run trend growth rates as a consequence. In other words, major economic shocks can have non-transitory effects, and can contribute to the differential evolution of city and regional growth paths (see Martin 2012, 2018; Martin and Gardiner 2019). If left behind places (cities and regions) have lower resilience than more prosperous places, a major shock, like that of the Great Recession, may serve to intensify the inequalities between them.

In the case of Britain, there has been considerable concern over the growing economic disparity between an increasingly prosperous London and surrounding parts of the South East on the one hand, and many of the country's northern cities that have lagged behind, on the other. How far this divergence both influenced the resistance of different cities to the recessionary shock of 2008–2010, and their recoverability from it, are therefore pertinent questions. The more so

since two new shocks are now under way, the dislocation associated with Brexit and what has proved to be an unprecedentedly deep recession associated with the economic consequences of the Covid-19 global pandemic. Barely a decade after one momentous shock, Britain's cities and regions are having to confront the combined impact of two new shocks of potentially historic proportions.

The Great Recession of 2008–2010 was at the time widely acknowledged to have been the deepest economic contraction since the Great Depression of the early-1930s. Both contractions originated in financial crises, which then quickly reverberated through the wider economy, leading to historic falls in economic activity and national output. In the British case, the depth of the fall in output in the Great Recession was almost on a par with that in the Great Depression, but the recovery from the shock was actually slower and took considerably longer than was the case in the latter (see Fig. 1). At the time, it was widely predicted that the impact of the 2008–2010 downturn—given its origins in the financial system—would be most severely felt in London, where the nation's major banks and financial markets are concentrated. But in the event, such predictions proved

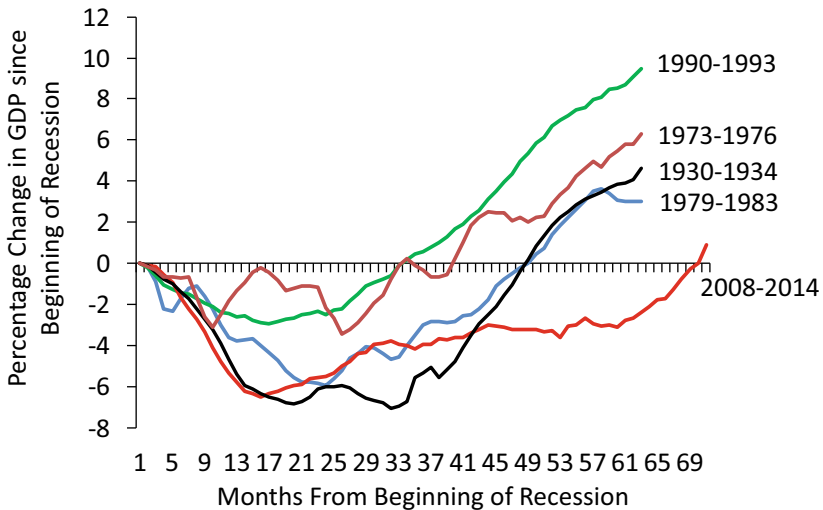


Fig. 1 The Great Recession of 2008–2010 with previous major recessions for comparison. **Source** of data: Office for National Statistics. **Note:** The dates refer to the interval between the year of the onset of the recession and the year in which national output (GDP) returned to its pre-recession level

unfounded, and London's economy did not contract unduly and recovered quite quickly, in part because London was the most prosperous part of the country, and in part because of the decision of the UK government to bail out the nation's financial system. Other major British cities were at a disadvantage on both counts. The aim of this paper is to examine just how far and in what ways these other cities differed in their resilience to the Great Recession, in terms of both their comparative resistance and their recoverability. We focus on the so-called *core cities*, Core Cities a group of major regional centres that collectively account for 52% of the national economy in terms of output, and which see themselves as significant players in current policy debates about 'rebalancing' the national economy away from its long-standing bias towards London (see <https://www.corecities.com/cities>). Most studies of regional and city economic resilience have focused on employment or unemployment. These aspects of local economic resilience are certainly crucial. But we focus in this paper on output, for two main reasons. First, because the proportionate fall in UK output in the Great Recession far exceeded the fall in employment. Second, because when we turn, towards the end of the paper, to briefly speculate on the economic impact of the global Covid-19 Pandemic on the UK's Core Cities, it is the fall in output that has arguably been the most severe ever experienced in the UK.

2 On Economic Resilience

As the notion of resilience has spread across various social sciences in recent years, so it has acquired a variety of interpretations and specifications (Zoli and Healy 2012; Martin and Sunley 2015; Modica and Reggiani 2015; Rodin 2015; Martin 2018). In engineering, resilience usually refers to the degree to which a structure can return to its (pre-shock) baseline state after having been disturbed. In emergency response studies, it suggests the speed and success with which critical systems can be restored after a natural or man-made disaster. In ecology the term is used to describe an ecosystem's capacity to absorb shocks and disruptions without being irrevocably degraded. In psychology, it denotes an individual's ability to deal with and recover from trauma. In business and management, the term is used to signify the existence of organisational strategies and flexibility within firms (for example, in their use of resources and inputs) that enable continued operation in the face of disruptions to demand, supply or technology. And in climate change research and policy, resilience refers to how well socio-economic systems are adapting to and mitigating the effects of global warming and accompanying extreme weather events.

Curiously, in economics the term resilience is much less used, despite a long-standing interest in the impact of cyclical and other shocks on economic performance, usually as measured by some such indicators as output, employment, unemployment, inflation or monetary conditions. In discussing the impact of such shocks, however, economists often deploy certain notions that relate closely to the idea of resilience, in particular ‘bounce back’ and ‘hysteresis’, and these can be applied to the economies of cities and regions (see Martin and Sunley 2015).

As the term itself suggests, ‘bounce back’ typically refers to a situation where a system or entity—here a city’s economy—returns to its pre-shock state or growth path following a disruption of some kind (such as a recession). The term is not without ambiguity, however. In his influential ‘plucking model’ paper, Friedman (1993) argued that shocks to an economy ‘pluck’ it down from its underlying ‘full employment growth ceiling’ or path, which he assumed to be determined by the growth in the economy’s human and natural resources, its productivity and other such factors.¹ Further, he argued that shocks to this ‘ceiling’ typically trace out an asymmetric ‘V-shape’, with the speed of the recovery upswing back to the long-run growth ceiling being slower than the speed of the contractionary downswing from it. Sooner or later, however, the economy reaches—‘bounces back’ to—its underlying growth ceiling (where the economy ‘would have been’ in the absence of the shock), and thereafter it resumes the growth rate determined by that (upward-sloping) growth ceiling (see the path a–b–c–d–e in Fig. 2). The focus of attention in this model is typically on the speed of ‘bounce back’—the rate at which, per unit of time, the economy returns to its pre-shock growth trajectory.²

However, there are issues with this conception. First, for example, a city’s recovery from a shock may be so slow and take so long that its economy fails to reach the city’s ‘underlying growth path’ (however that is defined) before another shock (such as another recession) occurs. If repeated over time, such a city would trace out a trajectory that is upward sloping but in a ‘stepped’ pattern, with, for example, each successive recession-induced ‘downward step’ representing a real and permanent loss in output. Second, it assumes that shocks have no lasting impact on a city’s economic growth path—in essence, that the latter is somehow autonomous, and that shocks are merely transient, having no effect on the economy’s structure or function. This assumption might be true for minor shocks,

¹ The following discussion draws on Martin and Sunley (2015), Martin (2018) and Martin and Gardiner (2019).

² This is essentially the ‘impulse response function’ often used in economics to trace how the impact of a shock in some chosen independent or exogenous variable on a specified dependent variable dissipates over time.

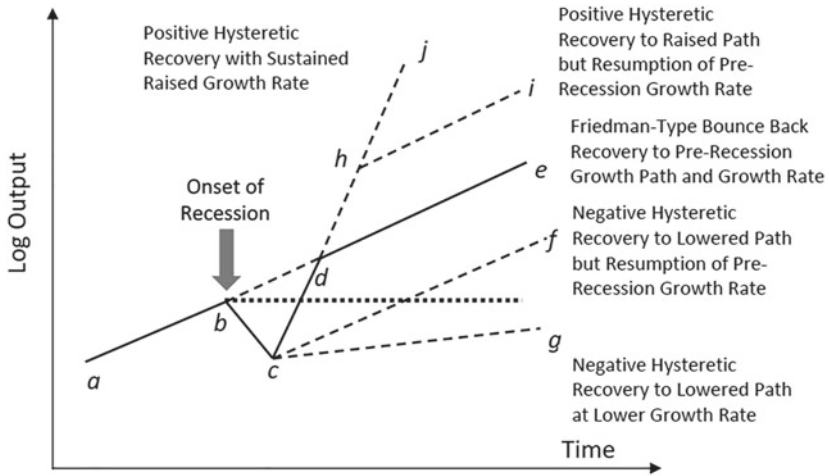


Fig. 2 Stylised city recovery paths from a major recessionary Shock. **Note:** Based on Martin and Gardiner (2019)

but much less so for major disruptions. In short, the Friedman model of resilience to recessions is something of a special case, and probably not that common.

Indeed, the idea of hysteresis may be more relevant. By hysteresis is meant a situation where a shock or disturbance to a system has a lasting impact of some sort—what is also known as remanence—that is, effects that remain even after the shock has passed (see for example, Cross 1993; Romer 2001; Setterfield 2010). A major recession or similar disturbance can have permanent negative effects on an economy’s growth path. Fig. 2 shows two stylised cases of negative hysteresis. In one, the city’s economy undergoes a regime shift, in which it resumes its pre-shock growth rate coming out of recession, but on a path (c-f in Fig. 2) that is parallel to but below the original trend (a-b-d-e). A second, more pathological instance of negative hysteresis would be where a recession is so deep it destroys much of a city’s productive base and shifts its economy onto a new growth path that is both lower and less steep (c-g), that is to a lower growth rate, than the original. Such a city economy may take a very long time for its output to recover to its pre-recession level of economic activity (b).

On the other hand, it is not inconceivable that a recession sets off various Schumpeterian-type “creative destruction” processes which give the economy a phase of rapid recovery out of recession before settling down at a growth path

(‘growth ceiling’) parallel to but above its pre-recession path (c-d-h-i). If the reorientation of the economy towards new growth sectors, technologies, products, markets and skills is sufficiently transformative, the rapid recovery from recession may possibly be maintained as a new growth path, a trend rate of growth greater than the pre-recession trend rate (c-d-h-j). Both possibilities might be called examples of ‘bounce forward’ positive hysteresis.

The precise nature of such hysteretic outcomes will clearly depend on a system’s—here a city’s—capacity to absorb shocks and to adapt to them. The issue of absorption capability is at the centre of the notion of so-called ‘ecological resilience’, where attention focuses on the preservation of system structure and function in the face of shocks. A problem with this definition in the case of an economy is that certain structural and organisational changes among firms and industries, in the labour market and in institutions and policies seems inevitable during major shocks, and may in fact be required *in order* to absorb a shock and to recover successfully from it, perhaps even to just ‘bounce back’. The extent and nature of such changes will determine the scale and nature of the hysteretic effect of a shock. This is what the idea of ‘adaptive resilience’ connotes, the ability of an economy to adapt and re-orientate so as to emerge revitalised from disruptions. If this process is extensive, across much of an economy and its social and institutional foundations, it may be appropriate to invoke the notion of ‘transformational resilience’. Resilience is thus a complex, multidimensional attribute; it is not simply a binary ‘all or nothing’ attribute—resilient or not resilient—but rather a matter of degree. Much depends on the nature of the shock—its origins, its geographical footprint, its depth or intensity and its duration (Fig. 3).

3 The Impact of the Great Recession on Britain’s Core Cities

The time paths of output across the Core Cities, plus London, over the period 1996–2018 are shown in Fig. 4 and Fig. 5.³ What is immediately striking in Fig. 4 is the marked divergence of city growth paths coming out of the Great Recession.

A clearer indication of how the individual cities reacted to the Great Recession, relative to the British economy as a whole, is given in Fig. 5. Four features

³ The Core Cities are defined in this paper as they are by Core Cities UK (see: See Appendix B of <https://www.camecon.com/wp-content/uploads/2019/05/Core-Cities-Final-Report.pdf>.) Consistent data for Belfast are currently not available beyond 2015.

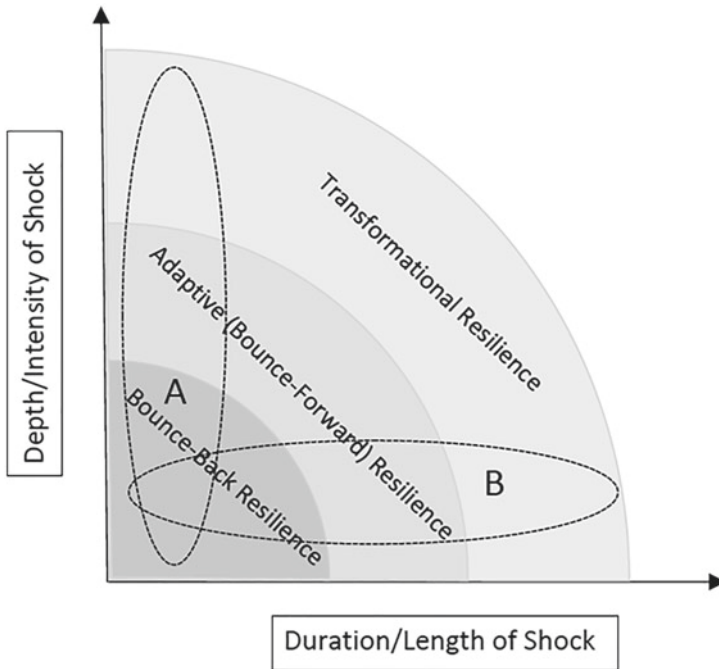


Fig. 3 Types of Resilience and Depth and Duration of Shocks. **Notes:** A short-duration shock will have different implications for resilience depending on its depth or intensity (A); likewise for a shock low in intensity but long in duration ('slow-burn') (B)

stand out. First, the cities vary in their resistance to the recession, in terms of the contraction of city output: compare Bristol, in which the scale of contraction was noticeably less than that in Birmingham or Sheffield. Second, the strength of the recovery also varies: compare Newcastle with Birmingham or London, for example. Third, the timing of the recession in certain cities was not coincidental with that nationally. Thus in both Glasgow and Belfast recovery lagged one year behind the national economy, while Newcastle led the national recession by a year. In the case of Newcastle, Liverpool, Glasgow Belfast recovery has been uneven, marked by interruptions in growth momentum.

Fourth, it would appear that in some instances the recession may have changed the underlying growth path of cities, in line with some of stylised patters shown in Fig. 2. In London, and to a lesser extent in Birmingham, the growth path coming

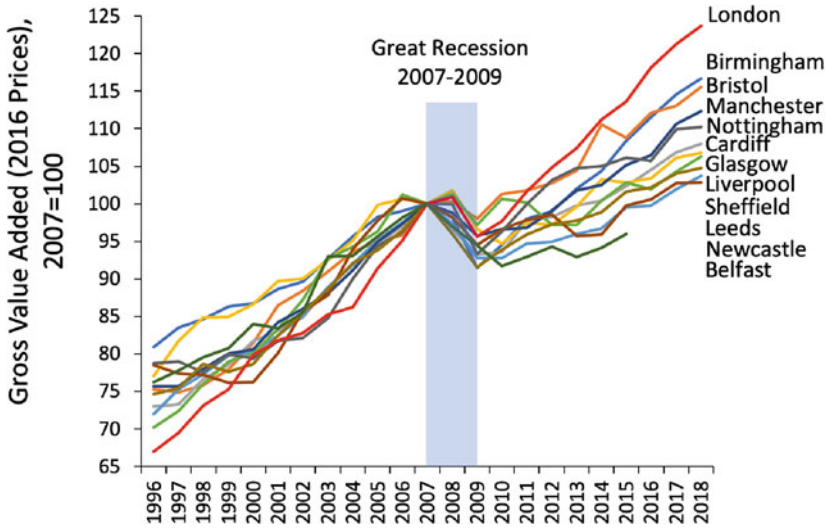


Fig. 4 Core City Output Growth Paths, 1996–2018. **Note:** Consistent data for Belfast not available beyond 2015

out of the recession is steeper than the pre-recession growth path, suggesting a positive hysteretic effect. In contrast, in Cardiff, Glasgow, Leeds Liverpool Newcastle, Sheffield and Belfast the recession would seem to have had a negative hysteretic effect, lowering growth paths compared to their pre-recession counterparts. This issue is discussed further below. Even a cursory inspection of Figs. 4 and 5 thus suggests that Britain’s core cities have varied in their responses to the Great Recession.

Although there is a growing literature on regional and city resilience, there remains no generally agreed methodology for how it should be measured (see Martin 2012; Martin and Sunley 2015; Martin and Gardiner 2019; Sensier et al 2016; Sensier 2018). The simplest is the time taken to return to the pre-shock level of activity (the horizontal pecked line in Fig. 2). The quicker a city’s economy returns to its pre-shock level of output (or employment, or whatever measure of activity is being used), the more resilient the city might be said to be. More sophisticated measures necessarily involve the specification of a counterfactual or expected position, that is some reference point against which to measure a city’s resistance to and recoverability from a shock, such as major recession. There are several possible approaches to this issue (see Martin and Sunley 2015), but given

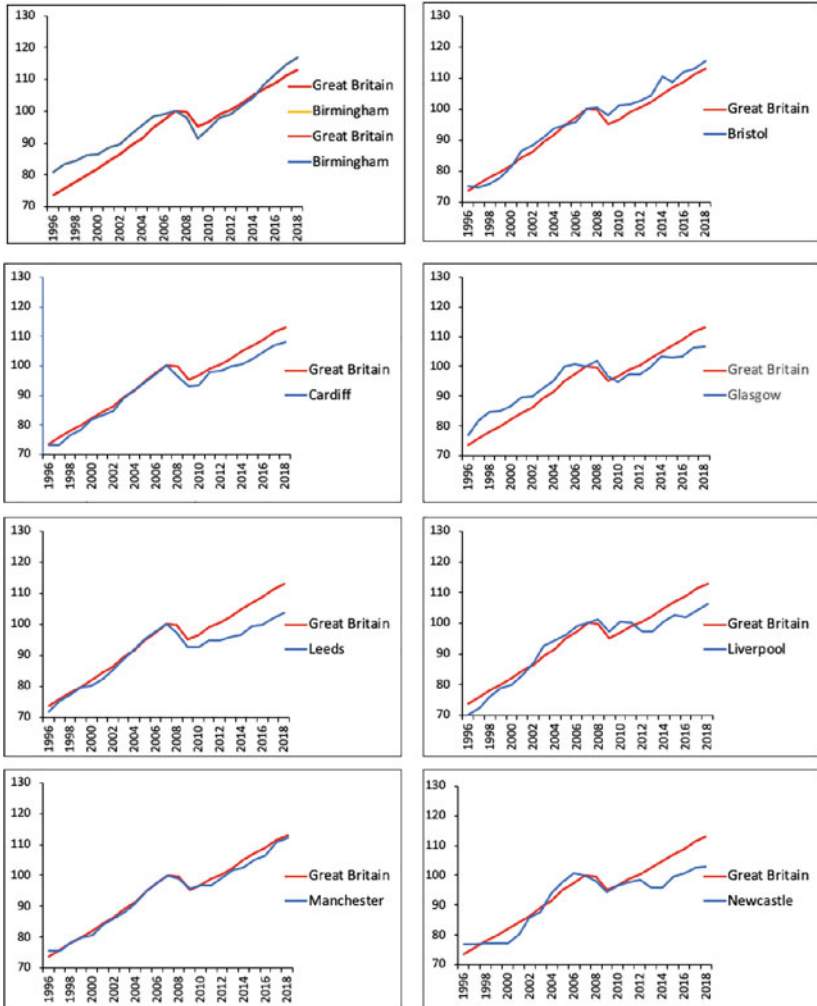


Fig. 5 Reaction of Britain's Core Cities to the Great Recession (Gross Value Added, 2016 prices, 2007 = 100)

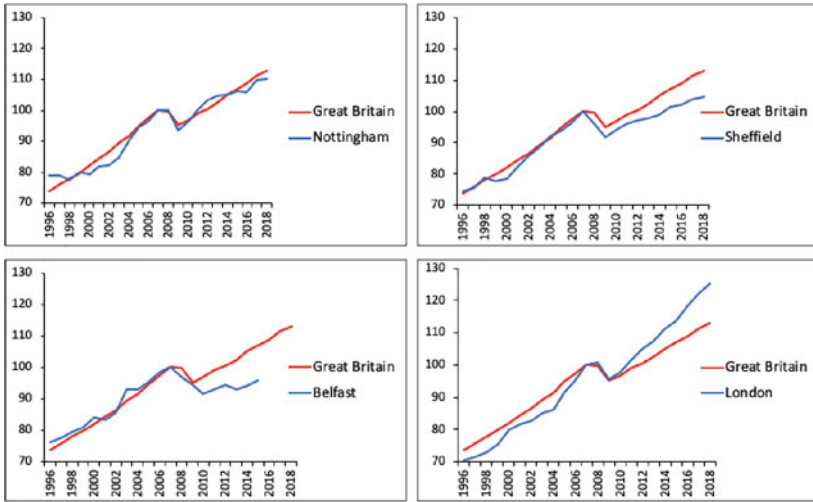


Fig. 5 (continued)

that a major national recession is an economy-wide event, a logical counterfactual or expectation is that each city should react in the same way as the national economy, which can thus be taken as the benchmark against which cities can be compared. Differences from this benchmark are therefore an indicator of each city's (or region's) *relative* resilience.

Martin (2012) suggests that two such measures can be defined: the *resistance* of a city's economy to the shock (the degree of contraction of its economy); and its *recoverability* from it (the extent to which its economy expands coming out of the shock). More specifically, our two measures of resilience for a given city, i , are:

$$RESIS_i^{t,t-k} = \frac{\Delta Y_i^{Contraction} - \mathbb{E}(Y_i^{Contraction})}{|\mathbb{E}(Y_i^{Contraction})|}$$

$$RECOV_i^{t,t-k} = \frac{\Delta Y_i^{Expansion} - \mathbb{E}(Y_i^{Expansion})}{\mathbb{E}(Y_i^{Expansion})}$$

where $\Delta Y_i/Y_i$ is the actual rate of change in the selected economic indicator, say output, and $\mathbb{E}(\Delta Y_i/Y_i)$ is the 'expected' (or counterfactual) rate of change of

output in city i during the downturn or recovery, of length k years, given as:

$$\mathbb{E}\left(\frac{\Delta Y_i^{t,t-k}}{Y_i^{t-k}}\right) = \left(\frac{Y_N^t - Y_N^{t-k}}{Y_N^{t-k}}\right)$$

and Y_N is the national (Great Britain) level of output in year t .

By definition, both measures are centred on zero, in which case a city would have the same resistance and recoverability as the national economy. If a city's economy contracts less than expected, then its resistance is >0.0 , and vice versa. Similarly, if a city recovers faster than expected from a recessionary downturn then its recoverability is >0.0 , and vice versa. This permits a four-way classification of cities by relative resilience (Fig. 6), relative that is to the national economy

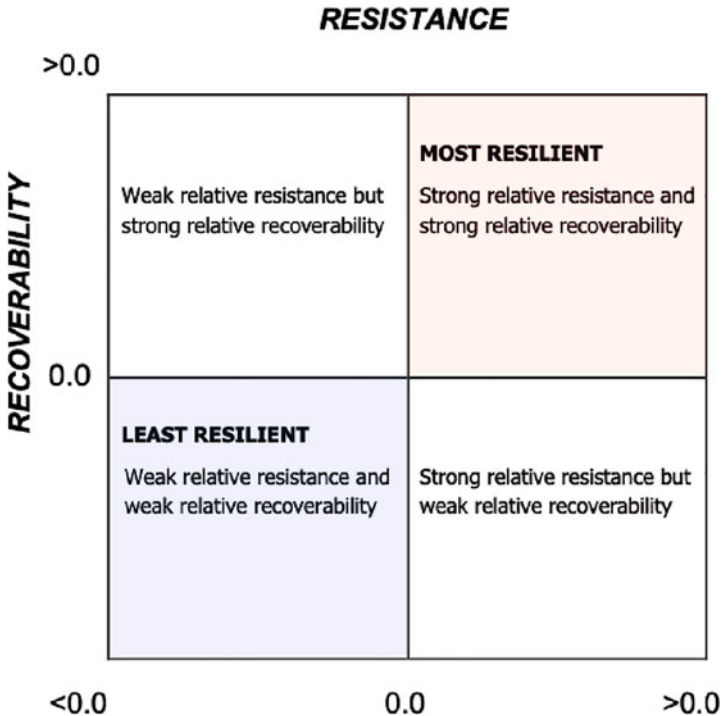


Fig. 6 Characterising a City's Relative Economic Resilience

as a whole. A city’s overall resilience might then be given as the sum of its relative resistance and its relative recovery.

In using even this simple approach, an immediate point that has been raised in some studies (see, for example, Sensier et al 2016) is that individual geographical areas—here cities—may lead or lag the recessionary movement in the national benchmark series, so that this needs to be taken into account when calculating resistance and recovery indices like those given above. This issue is particularly relevant where the city (or regional) series are quarterly or monthly. But even when the data are annual, as is the case here, lead and lag relationship may still arise. As was noted above, from Fig. 4, certain of the core cities display such differences in the timing of the downturn or recovery phases of the recession. Thus, in calculating the simple resistance and recoverability indices described above, we used the turning points specific for each city to compare its corresponding contraction and expansion against the contraction and expansion for the national economy (hence retaining a common expected outcome or counterfactual for all cities).

Using this approach, Fig. 7 shows the relative output resilience of Britain’s core cities to the Great Recession. Several features are immediately evident. Cities have clearly differed in both their resistance to and recoverability from

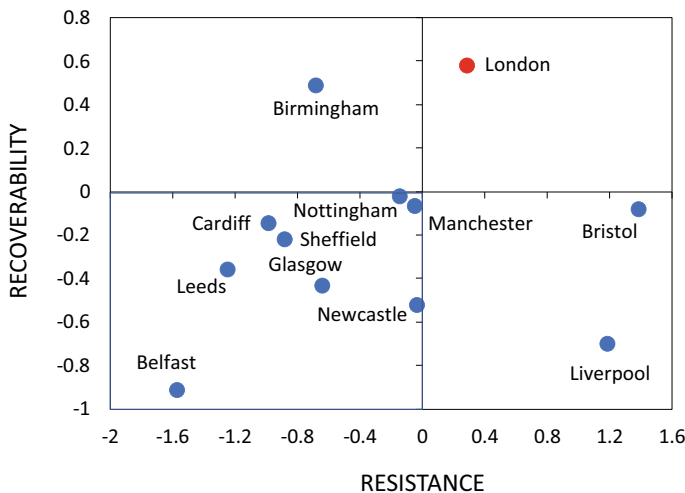


Fig. 7 Core city resilience to the great recession: Downturn 2007–2009, Recovery 2009–2018

the recession. Only one city, London, is in the top right-hand, ‘most resilient’ quadrant, and has the strongest recoverability from the Great Recession. Two of the core cities—Bristol and Liverpool, had above-national resistance to the recession, and, especially in the case of Liverpool, below average recoverability. Only Birmingham matched London in terms of recoverability, while Cardiff, Sheffield, Leeds, Glasgow and Belfast all had below average resistances and below average recoverability, and hence are in the bottom left-hand ‘least resilient’ quadrant of Fig. 7.

Adding the resistance and recoverability indices for each city gives the overall ‘resilience indices’ shown in Table 1, and the corresponding ‘ranking’ of the cities, including London. Also shown are the ‘return times’ or number of years each city has taken to return to its pre-shock recession level of output. The differences in ‘return time’ across cities are substantial, a mere 3 years in the case of London, to as many as 8, 9 or even 10 years in the cases of Sheffield, Newcastle and Leeds respectively. Clearly, in terms of output performance the UK’s core cities have varied significantly in their resilience to the Great Recession.

Returning to the issue of possible hysteretic effects of the recession on city growth paths, Table 2 reports a simple one-way t-test between the pre- and post-shock mean output growth rates for each city. Most cities appear to have recovered

Table 1 City resilience scores and ‘return times’

	ResilienceScore	Rank	Return Time (Yrs)
Bristol	1.306	1	3
London	0.858	2	4
Liverpool	0.486	3	7
Manchester	−0.113	4	6
Nottingham	−0.167	5	5
Birmingham	−0.196	6	6
Newcastle	−0.558	7	9
Glasgow	−1.073	8	5
Sheffield	−1.101	9	8
Cardiff	−1.131	10	7
Leeds	−1.607	11	10
Belfast	−2.483	12	N/A

Note: As Belfast data do not extend beyond 2015, ‘Return Time’ has not been calculated

Table 2 One-way t-tests for differences between pre- and post-shock output growth rates by city

	Mean growth rate Pre-recession	Mean growth Rate Post-recession	T-test for difference Between Mean Growth Rates
Bristol	2.29	1.78	0.4675
London	2.69	2.90	0.8907
Manchester	2.32	1.79	0.2010
Birmingham	1.83	2.66	0.0426*
Glasgow	1.89	1.52	0.5207
Liverpool	3.89	1.82	0.0031*
Nottingham	2.43	1.88	0.3541
Cardiff	2.39	1.81	0.2391
Newcastle	3.93	0.96	0.0011*
Sheffield	1.35	1.19	0.0584
Leeds	2.61	1.41	0.0113*
Belfast	2.61	0.92	0.0465*

Notes * Significant at 5 per cent level. Turning points for pre and post-recession growth periods as used in the calculation of resistance and recoverability indices

on a path with the same pre-recession growth rate, although displaced downwards: this is the classic 'L-shaped' recession-recovery pattern (see Fig. 8). Four cities—Liverpool, Leeds, Newcastle and Belfast—display negative hysteresis in that they have recovered from the recession on a lower growth rate path; while only one city, Birmingham, has recovered on a higher growth rate path, that is, has displayed positive hysteresis.

Such differences in recoverability point to an important aspect of city (and regional) resilience, namely that it can play a key role in accounting for the variation in long run growth paths between cities (or regions), contributing to patterns of divergence or convergence over time. This in turn suggests that 'resilience building' should be a key consideration in policies aimed at reducing spatial disparities in economic performance. All this, of course, begs the question of what causes cities (and regions) to differ in resilience.

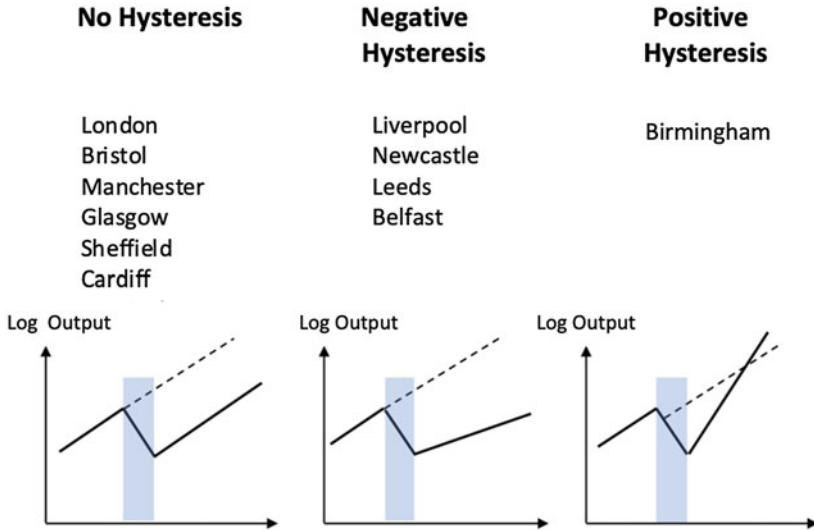


Fig. 8 Typology of core cities by type of recovery from the great recession. **Note:** Based on the results in Table 2

4 Does Economic Structure Explain City Resilience?

Several factors can be invoked to explain why some cities (and regions) might be more resilient than others to major shocks (Martin and Sunley 2015; Martin and Gardiner 2019).⁴ Of the various factors assumed to exert a formative influence on the sensitivity of regional and local economies to recessionary disruptions shocks, industrial structure has frequently been assigned key importance since it shapes a region's exports and hence exposure to externally-originating demand shocks. Indeed, in the past few years, the issue of regional economic structure has attracted renewed discussion and debate. In essence, the key question is whether specialisation is 'good or bad' for regional development. According to some economic geographers, industrial specialisation is *the* major driver of regional economic growth (Storper, 2013; Storper et al, 2015). Others, however, argue that it is the diversity—the complexity—of a region's or city's economic structure (its industries or its products) that imbues it with higher growth and greater stability (see for example, Hausmann et al 2013). Still others argue that what matters for

⁴ The following discussion draws on these papers.

regional economic growth and stability over the long run is ‘diversified specialisation’ (Farhauer and Kröll 2012), while yet others emphasise what they call ‘related variety’ (Frenken et al. 2007). Also, other possible determinants—such as the age structure of local firms, wage costs, workforce skills, workplace cultures, entrepreneurship and business formation rates, and the like—are to some extent themselves functions of a region’s industrial composition and its industrial history. It is interesting to note that the theory of complex adaptive systems also emphasises the importance of structural variety both for system stability and adaptability in the face of disruptions, particularly when that variety is associated with a high degree of structural ‘modularity’, that is low or modest interdependencies between system components, so that if some are severely impacted by a shock, others can still function relatively unaffected.

In an early study of regional business cycles, Conroy (1973) demonstrated in some detail how a region’s economic structure—what he called its ‘industrial portfolio’, the particular mix of economic activities and their interrelationships—can influence the reactions of a region’s economy to recessionary disturbances and fluctuations. Subsequent empirical studies have likewise assigned a similar importance to regional economic structure, and to the possible implications of structural diversity (or variety) versus specialisation for cyclical stability (for example, Sherwood-Call 1990; Siegel et al. 1995; Dissart 2003; Ormerod 2008). A recurring theme is that, other things being equal, a diverse or varied economic structure confers greater regional resistance to shocks than does a more specialised structure, since different industries themselves have different elasticities of demand, different export markets, different dependence on monetary conditions (exchange rates, interest rates, debt-financing), and so on (see, Garcia-Mila and McGuire 1993; Belke and Heine 2004). Put another way, a diverse economic structure should allow a regional economy to ‘spread risk’. Conversely, a highly specialised regional economy—say one heavily dependent on manufacturing—is potentially more vulnerable and unstable, since if its principal industrial specialism is badly hit by a downturn it has much less scope for other, less-sensitive (more resistant), industries to provide some measure of buffering against the contraction. For these reasons, according to Davies and Tonts (2010): “*The general contention is that those places with diverse economies are more resilient in socio-economic terms than those with a narrow economic base*” (p. 232).

Figure 9 shows the UK sectoral impact of the Great Recession, and the recovery that followed, with sectors ordered by the scale of impact in the downturn.

Some key few points emerge from this:

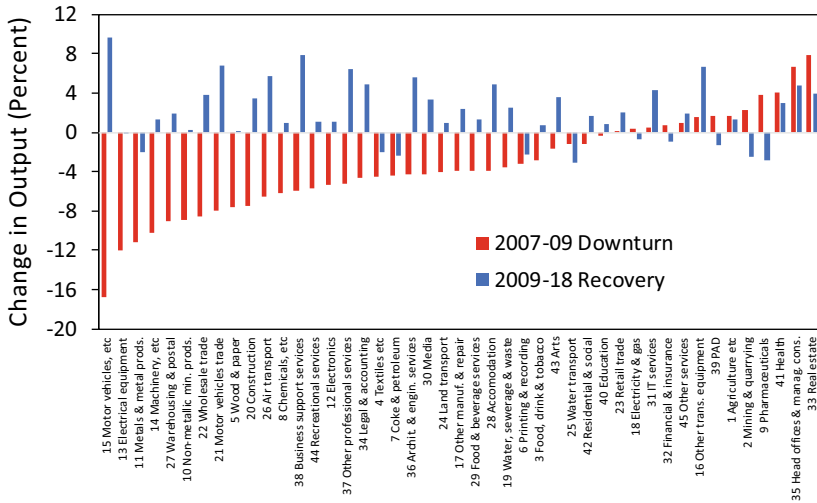


Fig. 9 Impact of the Great recession by economic sector

- The spread of impact was quite wide, ranging from motor vehicles (−17%) to real estate (+8%).
- The negative impacts were dominated by the manufacturing sector, although some business services related to transport and logistics also suffered through effects of indirect demand.
- Those sectors showing most resilience (positive growth) were typically service-based, either public (as might be expected in a recession) or market-oriented.
- There was little relationship between those sectors which did badly during the recession and those that prospered in the recovery.

How far then does economic structure help explain the differences in resilience across the core cities? The simplest way of exploring this issue is to use a version of the well-known shift-share method that has been used to study regional and city growth (typically of output or employment) patterns and to decompose those patterns into various effects. Here we use it to assess the contribution of a city's industrial structure to its resistance to and recoverability from the Great Recession, in terms of the city's contraction and recovery in output compared to the national contraction and recovery, which recall we used as the 'expected'

values for our cities. That is, we decompose a city's resilience (its resistance and recoverability respectively), into three parts:

- 1) a *national* ('*expected*') resilience component, which equates to the rate of change in output that would have occurred over the recession (downturn and recovery respectively) if a city's output had changed at the same rate as the national economy as a whole.
- 2) an *industrial mix* or *economic structure* component, which is the contribution to output change that can be attributed to the difference in industrial structure as between the city and the national economy; i.e. it reflects how far the city's share of nationally more and less resilient industries and activities differs from the nation as a whole; that is how far a city specializes in more and less resilient industries.
- 3) a *city shift* or *competitiveness* component, which measures the extent to which a city's industries are more or less resilient than their national counterparts. This is perhaps the most interesting, since it indicates the extent to which city-unique factors have influenced the resilience of its industries, for example some local competitive or comparative advantage (or disadvantage), such as agglomeration effects, the availability of particularly skilled labour, the presence of other sophisticated inputs, such as superior suppliers, or particular occupational advantages (for example associated with the concentration in a city of an industry's higher-order functions).

More formally, if we consider a variable Y , defined over industry i , city j , and time t , a temporal change between t and $t + n$ can be written as:

$$Y_{ij}^{t+n} - Y_{ij}^t = \Delta Y_{ij}^{t+n} = NS_{ij}^{t+n} + IM_{ij}^{t+n} + CS_{ij}^{t+n}$$

or

$$\Delta Y_{ij}^{t+n} - NS_{ij}^{t+n} = IM_{ij}^{t+n} + CS_{ij}^{t+n}$$

Where NS, IM, and CS respectively refer to the national, industry mix, and city competitiveness components, and each of these components can be written as:

$$NS_{ij}^{t+n} = Y_{ij}^t * g_n$$

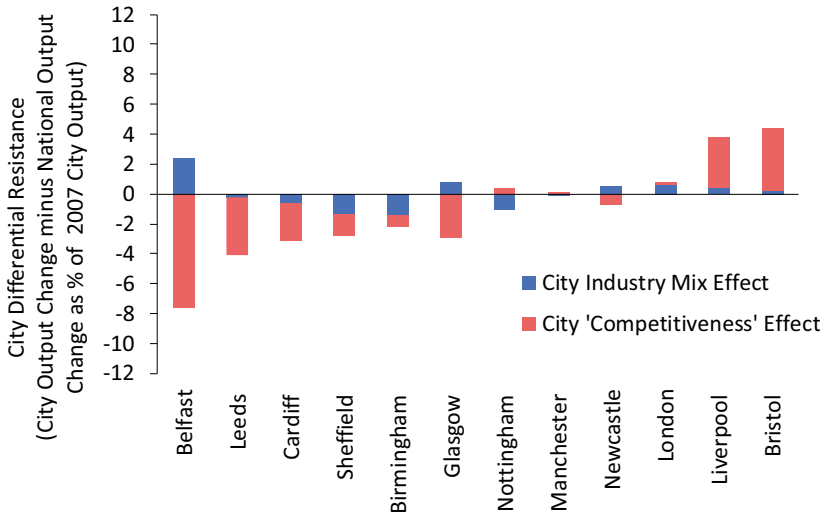


Fig. 10 Shift-share components of core city resistance to the Great Recession, 2007–2009

$$IM_{ij}^{t+n} = Y_{ij}^t * (g_{in} - g_n)$$

$$CS_{ij}^{t+n} = Y_{ij}^t * (g_{ij} - g_{in})$$

where.

g = change of output between t and $t + n$

g_n = national (%) change in output over the same period;

g_{in} = national (%) change in output by industry i during this period; and

g_{ij} = city (%) output change by industry i during this period

Figures 10 and 11 show the results of applying the above-described shift-share technique⁵ to the change in output over the 2007–2009 national downturn and recovery periods. Since the national (or ‘expected’) component is the same for all

⁵ The method described and applied is a static shift-share, which has sectoral fixed weights, as opposed to the dynamic shift-share where the weights change over time (annually) to reflect the changing structure of the economy. Over such a short period of time, however, there was no point in using the dynamic approach.

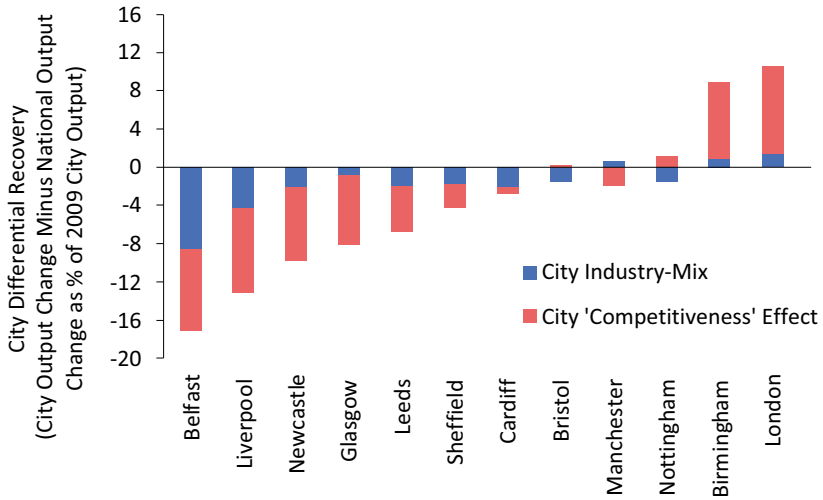


Fig. 11 Shift-share components of core city recoverability from the Great Recession, 2009–2018

cities, Figs. 10 and 11 focus on the two other components, which account for the difference, by city, of its difference between the ‘expected’ and actual resilience. with the three components calculated as percentages of the initial level of GVA (2007 in the case of the downturn, and 2009 in the case of the recovery).

What is clear is that it is the city ‘competitiveness’ component that has been the main contributor determining a city’s resilience, both for resistance and recoverability. The industry-mix effect is more varied. It had no consistent influence across cities on their resistance to the Great Recession. However, although in general less important than the ‘competitiveness’ component in shaping the recoverability of the cities to the recession—the exceptions being Belfast, Nottingham and Cardiff—the two components do appear to have been correlated; the lower a city’s relative recoverability the more negative both components, and vice versa. In Belfast, industrial structure appears to have played a significant role in explaining its weak recoverability (though our data for this city extend only to 2015); in the case of Liverpool and Newcastle, in contrast, the city ‘competitiveness’ component far outweighed industrial structure in determining their weak recoverability. The strong recoverability of London and Birmingham has been almost entirely due to the ‘competitive’ strength of their industries.

Comparison of the city ‘competitiveness’ component of recovery, by sector, between Liverpool and London is particularly instructive (Fig. 12). In London, finance, insurance, IT, real estate, professional services and PAD services all display a large positive ‘competitiveness’ component of the recovery of output from the recession. This is in contrast to Liverpool, where most of these same sectors display significant negative ‘competitiveness’ effects. These differences no doubt have several locally specific causes, but the fact that London hosts many of the headquarters or main offices of these sectors of activity (their ‘high order functions’), the strong intersecting and interacting ecosystems they form there, and that they also tend to be global-facing rather than simply local or purely domestically orientated, all differentiate it from Liverpool and the role that these activities play there. In addition, much of the UK Government’s support to the banking sector during and after the financial crisis of 2007–2008 (which at its peak was over £1.16 trillion of credit, guarantees and capitalisation) served directly and indirectly to bolster the London-based financial market and institutions to a degree not shared by Liverpool, thereby aiding London’s strong recoverability from the recession.

Notwithstanding the limitations of this sort of decomposition analysis, it would seem that policies concerned with ‘resilience building’ in the UK’s major core cities should look beyond sector structure as such, and take explicit account of other local characteristics that influence the robustness and adaptability of their industries and services in response to major recessionary shocks, such as their functional specialisms, labour skill levels, firm innovativeness, firm age and ownership structures, and so on.

Against these findings, given that barely a decade after the Great Recession the world has been plunged into another crisis, associated with the Covid-19 pandemic, it seems highly relevant to consider briefly what the implications of the Covid-19 Recession might be for the UK’s core cities. Since, at the time of writing, data are not yet available on the impact of the pandemic on local output, necessarily our comments have to be speculative in nature. A key issue is whether this latest recession will be different, and whether our finding for the Great Recession, that a city’s sectoral composition proved less important than the ‘competitiveness’ of its sectors, will also hold this time round.

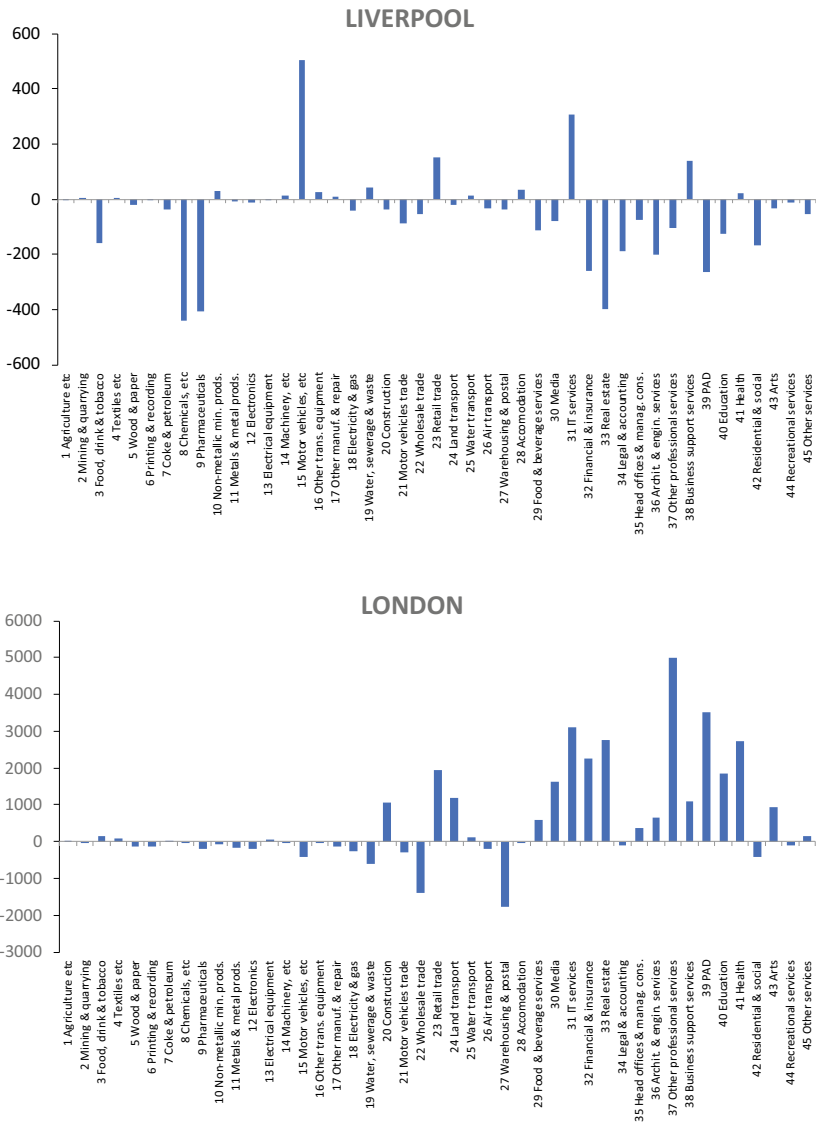


Fig. 12 City ‘competitiveness’ component, by sector, of recovery from the Great Recession (2009–2018): Liverpool and London compared (€million GVA)

5 From the Great Recession to the Covid-19 Recession

Beginning in December 2019, if not earlier, in the Chinese city of Wuhan, the Covid-19 virus then quickly spread beyond China into almost every other country in the world, causing governments in many countries to introduce stringent ‘lockdown’ measures on social and economic activities, involving the cessation of production in many industrial sectors, the curtailment of large sections of private service provision and the furloughing or laying off of vast numbers of workers. Not surprisingly, these extraordinary events and measures have resulted in sudden and dramatic drops in output almost everywhere. The spectre of an unprecedentedly deep recession, far more serious than the Great Recession of 2008–2010, and more acute than even that of the Great Depression in the early-1930s, hangs over the global economy.

The fall in output in the UK economy was dramatic. National gross value added fell by a staggering 25.07% over just March and April 2020; this compares with a contraction of 6.91% during the *whole* of the Great Recession (Figs. 1 and 9). At the time of writing, predicting how the recession will evolve is very difficult—especially since the UK finally left Europe (Brexit) at the end of 2020, which could exacerbate the economic downturn. Given that the Covid-19 recession is quite different, being the direct result of the lockdown and consequential sudden shutdown of much of the supply side of the economy, there has been talk of a rapid V-shaped ‘bounce back’ once the economy is ‘de-locked’ and consumption resumes in earnest (the recovery path labelled A in Fig. 13).

This appears to be the view of the Bank of England. But this optimistic outcome depends on there being no significant new waves or resurgences of the virus, that ‘social distancing’ measures are removed entirely, that there has been no significant permanent loss in productive capacity, and that the global economy as a whole resurges. These are bold assumptions.⁶ It seems equally if not more realistic that following ‘de-locking’, the recession will be more ‘normal’ in nature, in the sense of being dependent on how fast demand recovers, so that a likely ‘most favourable’ recovery path will be more like that labelled B in Fig. 13. However, if the recovery takes the sort of ‘L-shaped’ pattern that characterised the Great Recession (and which indeed is the usual pattern in most recessions), then the economy could recover its pre-Covid growth rate, but on a path below its pre-Covid path (C in Fig. 13; see also Figs. 2 and 8).

⁶ Indeed, at the time of writing a number of city-specific spikes in Covid-19 cases have emerged, including Manchester, causing the Government to impose local ‘place lockdowns’ and social restrictions in an attempt to contain those spikes from spreading geographically into a new nation-wide wave of the pandemic.

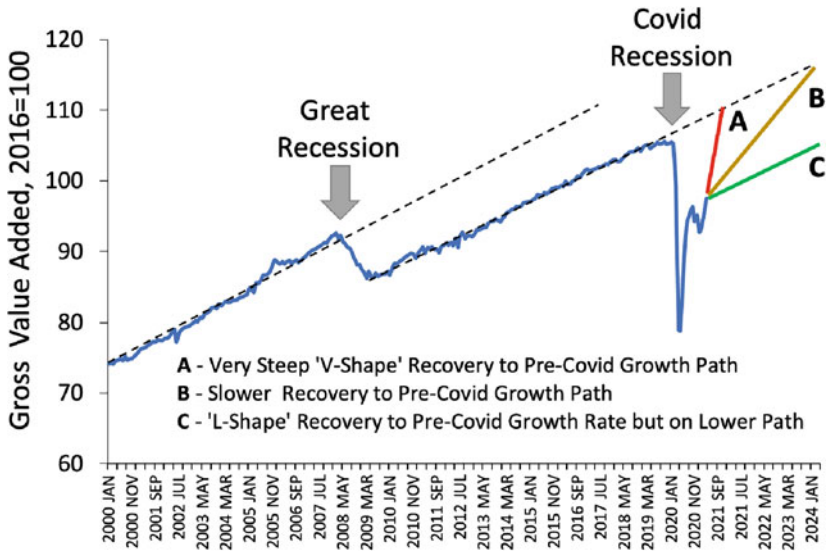


Fig. 13 The dramatic fall in output in the Covid-19 recession, and possible recovery scenarios. **Source of Data:** Office for National Statistics, Monthly GVA Estimates (Seasonally Adjusted). Actual data up to April 2020.

What is striking is just how much greater the sectoral impacts of the Covid Recession have been thus far compared to the corresponding initial period of the Great Recession (Fig. 14): accommodation and restaurants, education, transport, construction and wholesale and retail trades have all been very severely affected by the imposition of lockdown compared to their downturn in the Great Recession. But significant sections of manufacturing have not escaped. Indeed, the fall in output in manufacturing as a whole in April 2020, of some 24.3%, exceeded the contraction of 19% for services. The fall in output in vehicle manufacturing was a staggering 90.3% (ONS 2020a). Other substantial sectoral falls included furniture (69.7%) and leather goods (59.2%).

Since, at the time of writing (June 2020), the full impact of the Covid Recession is still unknown and unfolding, and detailed output data at the local or city level are not yet available, it is not possible to conduct any resilience analysis comparable to that undertaken above for the Great Recession. Our analysis of the resilience of the Core Cities to the Great Recession suggests that to the extent that economic structure matters, it influences the recoverability of cities from shocks

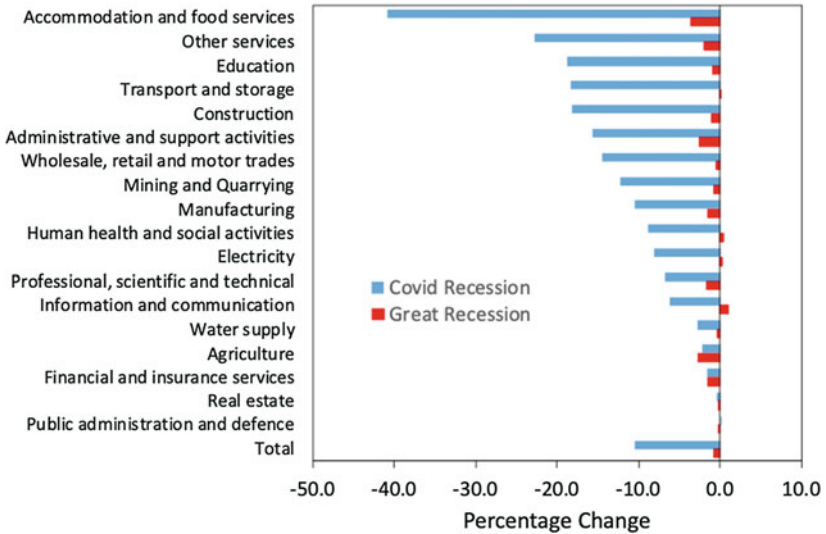


Fig. 14 The contraction of output, by sector, in first three months of the Covid Recession and Great Recession compared **Note** Quarters refer to the months of February to April 2020 for the Covid Recession, and April to June 2008 for the Great Recession. **Source** of Data: Office for National Statistics, Monthly GVA Estimates

rather than their resistance to them. Table 3 shows the sectoral output location quotients for each of the Core Cities in 2018. Values greater than 1.0 indicate higher than national sectoral shares; highlighted values are those sectors with relative shares 10% or more above the national average. Although this table only gives a coarse picture of the sectoral composition of the Core Cities’ output, some features are evident. Most of the Core Cities have similar relative concentrations of accommodation (hotels), restaurants, retail, personal services and such activities. These sectors have been drastically affected by the lockdown, with many businesses facing potential bankruptcy when the Government’s support schemes end. Most of the cities show above-national dependence on public administration, education and health activities, as would be expected. In contrast, however, there are notable differences across cities in the contribution to their output of manufacturing, wholesale, retail and motor trades, and transport, sectors that have been badly hit by the Covid Recession, and which have already laid off thousands of workers and could well emerge from the recession in a much-slimmed down form.

Table 3 Sectoral structures of the core cities, 2018: Location quotients

	Belfast	Birmingham	Bristol	Cardiff	Glasgow	Leeds	Liverpool	Manchester	Newcastle	Nottingham	Sheffield	London
Agriculture	0.02	0.35	0.28	0.44	0.38	0.67	0.11	0.07	0.12	0.41	0.69	0.02
Mining and Quarrying	0.00	0.11	0.21	0.59	0.38	0.50	0.14	0.17	0.98	0.56	0.84	0.16
Manufacturing	0.48	1.57	0.75	1.76	0.93	1.24	1.30	1.00	1.00	1.03	1.27	0.19
Electricity	1.96	1.71	0.74	1.66	2.16	1.37	0.27	0.80	0.28	2.87	0.69	0.36
Water supply	1.35	1.13	1.35	1.26	1.39	1.29	0.98	1.03	0.65	0.63	0.92	0.34
Construction	0.41	0.98	1.10	1.02	1.08	0.93	0.93	0.93	0.77	0.81	1.15	0.74
Wholesale, retail and motor trades	0.95	1.13	0.92	0.86	0.95	1.07	1.01	1.07	0.80	1.23	1.21	0.70
Transport and storage	0.66	1.14	1.04	0.61	1.08	1.09	1.17	1.19	0.81	0.57	1.26	0.99
Accommodation and food services	0.79	0.94	0.93	0.90	0.86	0.89	0.86	0.87	1.30	0.84	0.93	0.98
Information and communication	1.00	0.63	0.82	0.50	0.79	0.63	0.78	0.78	1.23	0.98	0.53	1.73
Financial and insurance services	1.03	0.70	0.86	0.89	0.85	0.95	0.58	0.82	0.67	0.47	0.44	2.05
Real estate	0.54	0.76	1.01	0.79	0.85	0.96	0.82	1.01	1.05	1.03	0.70	1.40
Professional, scientific and technical	0.78	0.71	0.92	0.52	0.72	0.80	0.67	0.93	0.78	0.77	0.54	1.62
Administrative and support activities	1.04	0.99	1.74	0.78	1.04	0.95	0.96	1.24	1.03	1.09	0.85	1.14
Public administration and defence	3.22	0.88	1.54	1.60	1.51	1.00	1.41	1.06	1.43	1.05	1.16	0.82
Education	1.12	1.10	1.11	1.07	1.23	1.19	1.19	1.04	1.10	1.30	1.59	0.79
Health and social activities	1.35	1.03	0.95	1.35	1.48	1.11	1.51	1.21	1.45	1.34	1.45	0.65
Other services	1.06	0.99	0.85	0.81	0.96	0.86	1.04	1.03	1.28	0.91	0.88	1.08

Notes: City Location Quotients of sectoral output shares, calculated using Great Britain's sectoral structure as benchmark. LQs equal to unity indicate that the sector in question accounts for the same share of a city's output as it does in the national economy. LQ values 10% or more above unity highlighted

London once again stands out in having a higher relative dependence on a range of activities quite different from the Core Cities, namely information and communications technology activities, finance and insurance services, and professional scientific and technical services, which thus far appear to be much less affected by the Covid downturn (Fig. 14). How far the relative structural specialisations across cities evident in Table 3 will shape their recovery paths from the Covid Recession remains to be seen, though other things being equal, London looks to be in a more favourable position. What is also likely to be important is that the Core Cities have long had productivity levels well below that of London. If our findings are any guide, the weaker ‘competitiveness’ effects that dented the recoverability of the Core Cities from the Great Recession (except in the case of Birmingham) could well hold back their recovery from the Covid Recession. One factor that could well prove to have permanent effects on the Core Cities is the extent to which their office activities retain some degree of homeworking for their staff. If office activities have found that having their staff working from home in the pandemic has had no material negative impact on productivity, it could be that this option becomes built in to their post-Covid employment structures, allowing activities to have smaller offices in expensive city centres locations. Some city companies have already indicated they are considering slimming down their city centre presence. This could have major negative impacts on city-centre hospitality, restaurant, and retail activities.

6 Conclusions and Policy Challenges

Over the past decade and a half, the notion of resilience has attracted increasing attention across a range of disciplines, as a way of analysing and understanding the capacity of entities and systems to respond to shocks and disruptive change.

As a result, the notion of resilience has been referred to as a boundary object or a bridging concept that is able to facilitate communication and understanding across different scholars and analyses (see, Thorén 2014; Baggio et al 2015). In economic geography and regional studies, the idea of resilience is now recognised as a useful way of investigating how regions, cities and localities react to and recover from various types of economic shock, including recessions (for example, Martin 2012; Fingleton et al. 2012; Martin 2018; Gardner and Martin 2019; Sensier et al 2016; Sensier 2018). In this paper we have used the notion to explore how the UK’s major Core Cities were impacted by the Great Recession of 2008–2010, the result of the global financial crisis of 2007–2008, and at that time the worst downturn since the Great Depression, and to offer some preliminary

observations on the prospects for these cities in the current economic crisis that has been triggered by the global Covid-19 pandemic, another economic shock of historic proportions that could even eclipse the Great Recession.

Our analysis suggests a number of key findings. First, the eleven Core Cities varied significantly in their resilience to the Great Recession. But, second, notwithstanding these differences, all proved less resilient in terms of recoverability from the Great Recession when compared to London. Third, it would seem that differences in city sectoral structures have played a secondary role in accounting for the differences across cities in both their resistance to and recovery from the recession, and that in almost all cases other city-specific 'competitiveness' factors and features proved more important, though interestingly city sectoral structure effects tended to be positively correlated with these city 'competitiveness' effects during the recovery. Further detailed research is needed to identify what these 'competitiveness' effects are. Fourthly, when we turn to the current Covid Recession, given the lack of data on city output at the time of writing, we have been able only to speculate on its possible impact on the Core Cities. If its impact were to follow that of the Great Recession, then we might expect that the economic structures of cities will again prove less important than other city-specific factors, but also that London will once more recover more favourably. That the uncertainties associated with Brexit could impose yet a further shock to the UK economy will only compound this policy challenge.

Even before the Great Recession, and the subsequent Covid-19 Recession, the UK's Core Cities already faced underlying productivity challenges, stemming largely from deindustrialisation, poor infrastructure, low skill profiles and high levels of deprivation. Although the scale of these cities makes them vital to UK prosperity, their relatively low levels of productivity are unusual by international comparison. The Core Cities own estimates placed the post-Great Recession, pre-Covid-19 Recession gap between their combined average economic output and that of the UK at around £70billion, rising to £100billion when compared to the average outputs of similar groups of cities in the US, EU and Asia (Core Cities 2019). Following the Great Recession various Government policy measures were announced aimed at 'levelling' up the economy geographically, including the promotion of a 'northern powerhouse' of major northern cities including some of the Core Cities (Manchester, Liverpool, Leeds, Sheffield, Newcastle) to rival the London powerhouse in scale and dynamism (Martin and Gardiner 2018), a major infrastructure project (High Speed 2 Rail) to link them with London, and a 'place-based' new industrial strategy, among others (Martin and Gardiner 2019b). The Covid-Recession then hit the economy before these policy measures had barely

got underway. The latter, has, however, made the need for, but also the challenge of, major policy action even more urgent.

In 2019 the Core Cities Group commissioned the OECD (2020) to investigate this issue, and what policies might raise productivity in a manner that benefitted surrounding areas. The OECD's findings concluded:

- that the centralised nature of the UK state is holding back the ability of the Core Cities to achieve their full agglomeration benefits;
- Core Cities have low relative levels of infrastructure investment with some of the most congested transport networks in Europe, alongside an inability to regulate public transport provision;
- low skill levels exist in Core Cities' labour markets, alongside high levels of deprivation;
- the Core Cities are unable to direct much of public spending at the local level, having very limited revenue-raising powers and overly short budgeting periods; and
- a need for greater devolution of economic and fiscal powers to the Core Cities, and a new national/local government partnership

The Covid-19 recession has heightened these problems, also exposing the close ties between well-funded public services and a well-functioning economy. The lack of integration between health and social care, for example, has been particularly problematic. A major Covid-19 impact for Core City authorities has been the reduction in income alongside greatly increased expenditure, thus far only partially met by additional government funding. The issue of deprivation has also been thrown into sharp relief; COVID-19 deaths are far higher in deprived areas, and also in major urban than non-urban areas, compounding the vulnerability of deprived communities in cities (ONS 2020b).

Economic and behavioural shifts that were already happening both before the Great Recession and since have been accelerated by the Covid-19 crisis, including the retreat of retail in city centres, as has happened also for some towns. The shift to digital technologies, changes in travel patterns particularly on public transport, and home working, may also have long lasting impacts, although have also resulted in some environmental benefits, for example increased air quality, which cities would like to retain. These shifts will influence not only employment in the Core Cities, but also output. This does not mean that cities will decrease in importance either economically or socially, but to succeed, cities must respond positively, as the Core Cities are doing. How to build resilience, and adaptability, should be central to the design of policy. To that end, it is important that the Core Cities are

able to deploy major business support, skill, and employment interventions at the local level, focused on stable or growing sectors (Resolution Foundation 2020). This will require additional funding from central Government. The response thus far from government has been to announce what Prime Minister Boris Johnson has proclaimed is a 'New Deal for Britain' (Johnson 2020), of which £640 billion of public sector investment in infrastructure over five years is to be the main component (though it is not clear how much of this is a repackaging of pre-existing planned expenditures). There are additional monies for house-building and promoting a 'green' recovery'.⁷ The Government has even likened its 'new deal' to Franklin Roosevelt's historic New Deal introduced to lift the US economy out of the Great Depression of the early-1930s. However, it pales by comparison. Not only is it a fraction in scale, whether and to what extent it will help the Core Cities—and indeed other cities and towns—to recover and to build much needed economic resilience will depend on how far it is targeted at precisely those areas outside London that most need substantial, long-term investment and support.

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⁷ Since submitting this chapter to the book, the UK Government has expanded and consolidated various funds under a 'Building Back Better' Growth Plan, including the National Infrastructure Fund, the Shared Prosperity Fund, a Levelling Up Fund, a Towns Fund, and a Green Industrial Revolution Fund. Ascertaining the exact scale of monies that will be committed to this plan is not, however, easy to ascertain. It is most unlikely to be the equivalent of the \$7 trillion that US President Biden is promising to spend on post-Covid recovery in that economy. According to the UK Government, "cities will be the engines" for its 'Building Back Better' Growth Plan (see HM Treasury, 2021).

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Regional Economic Resilience of Resource-Based Cities and Influential Factors During Economic Crises in China

Juntao Tan

1 Introduction

RBCs depend primarily on the exploitation and primary processing of natural resources, such as minerals, energy and virgin forests. The industrial structure of RBCs is usually rigid and singular, and at the lower end of the industrial chain. High unemployment, singular employment structures, ecological deterioration and other social and eco-environment problems lead to more internal disturbance in RBCs. Furthermore, the fluctuation of international resource prices can further heighten the vulnerability of RBCs. RBCs in China have made momentous contributions to the development of the national economy, especially to large-scale industrialization, and flourished under the planned economy (Li H et al. 2013). In the 1980s, a recession occurred in many RBCs, and economic difficulties persisted and grew in magnitude through the early 2000s because of a large number of state-owned resource enterprises going bankrupt (Tan et al. 2016). RBCs have become “problem areas” in China and the economic crisis in 1997 and 2008 further exacerbated the economic recession. The economic crisis especially the global financial crisis in 2008 had profound impact on China’s economy and employment, and RBCs that rely on resource exports were more affected. In China, the crisis led to a drop of 4.6% in the rate of GDP growth between 2007 and 2011, and some RBCs declined more. For example, the GDP growth rate of Ordos and Hechi declined more than 10%, and some RBCs even experienced negative growth. Therefore, how to deal with the economic recession in RBCs has become an urgent problem to solve.

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It appears the word “resilience” has become the new buzz word of the 2000s and 2010s, to a certain extent, it has the same significance as the word “sustainability” did in the 1980s and 1990s (Faggian 2018). The concept of resilience was first developed in the fields of engineering and natural sciences to explain the capacity of systems to persevere when subjected to external shock disturbances (Folke 2006). Nowadays, resilience is applicable to a variety of disciplines with different meanings, functions, and relevance (Christopherson et al. 2010; Hassink 2010), and is becoming popular in the field of economics, especially in urban and regional economics and economic geography. The increasing frequency of financial crisis of economic systems in the 1980s had great impact on regional economic growth (Eraydin 2016). Different regions showed different responds to recessionary shocks in different ways and also in subsequent recovery periods, which has triggered many researches on the regional economic resilience, including conceptual debates and empirical research. At the same time, it has sparked research attempting to identify the underlying factors behind these differences, as well as whether it is possible to influence these factors. Studies on resilience, especially on regional economic resilience, provide a new perspective for recognizing economic growth and slowdown in RBCs. However, the researches on how the regions react to the economic crisis in China especially in the “problem areas” were so far not sufficient.

Therefore, using the framework of regional economic resilience to a recessionary shock, we quantitatively analyzed the economic resilience of RBCs in China in terms of resistance and recoverability during the Asian financial crisis and the global financial crisis, and then identified the main factors affecting economic resilience of RBCs in China. The remainder of the paper is organized as follows. In Sect. 2, literature review on the economic resilience and its empirical research, especially on Chinese old industrial cities and RBCs is provided. In Sect. 3, materials and methods are introduced. Subsequently, in Sect. 4, the main results including the resilience of RBCs to financial crisis, the resilience by type and main influencing factors are presented. Based on these analysis, Sect. 5 summarizes the major findings and discussed the main conclusions.

2 Literature review

With a multidisciplinary history, variants of the resilience definitions have been developed, such as engineering resilience, ecological/ecosystem resilience and social-ecological resilience (evolutionary resilience) (Folke 2006; Martin 2012), and the definitions can be broadly divided into equilibrium and evolutionary

approaches. Equilibrium approaches consider resilience as a return to pre-existing equilibrium points, namely engineering resilience or as a movement to a new state namely ecological resilience. (Walker et al. 2004; Kitsos et al. 2018). Evolutionary approaches define resilience as continuous adaptation to constantly changing conditions (Martin 2012; Kitsos et al. 2018). Disturbances or shocks are the basis of resilience research, and there are almost endless lists of shocks the resilience research has dealt with including natural disasters, global economic crisis, policy transformation and so forth. The disturbances can general divided into two types, namely short-term shocks and slow-burning challenges. Short-term shocks which refer to sudden and discrete events usually includes global economic crisis or trade war. Slow-burning challenges usually evolve more gradually, such as industrial, technological and institutional structures (Boschma 2015). Because of the global economic crisis, economic geographers are usually more concerned about short-term shock, especially on economic crisis.

Recently, especially after global economic crisis in 2008, an increasing number of studies have scrutinized the economic resilience characteristics of different regions, such as Australia, United Kingdom, Turkey and Italy, using indicators like GDP, employment and unemployment (Courvisanos et al. 2016; Dubé et al. 2016). Most existing empirical studies examined recessionary shocks as a disturbance to regional economic growth trajectories and explored the responses of regions to these shocks. Davies (2011) examined the impact of the 2008–2010 downturn across regions in Europe. Martin (2012) developed the idea of resilience and examined its usefulness as an aid to understanding the reaction of regional economies to major recessionary shocks and took British regions as exploratory examples. Martin understood economic resilience as a shock-induced process that can be divided into four components: resistance, recovery, renewal and re-orientation. Resistance refers to the first direct response to a recession and measures the intensity and the extent of the decline. In comparison, recovery refers to the velocity and degree of how the economy manages to bounce back from the downturn and return to its original growth trend (see the framework in Fig. 2). Empirical research on short-term shocks often focused on these two components and found some interesting results including the relationship between them. Pudelko et al. (2018) found a possible negative relationship between regional resistance and recovery in German regions during the Great Recession of 2008/2009, while Faggian et al. (2018) found that there was no significant correlation between resistance and recovery in Italy. In contrast, Martin et al. (2016) found that there has been a positive relationship between resistance and recoverability across regions in UK. Tan et al. (2017) observed a strong negative correlation in Northeast China.

Empirical studies based on this conceptualization proposed by Martin measured the economic resilience of different regions. Lagravinese (2015) investigated the economic crises that occurred in Italy between 1970 and 2011, focusing on particular the employment level and the different effects on the Italian regions. Angulo et al. (2018) evaluated Spanish regions' resistance to the economic crisis according to three main notions of resilience: adaptive, engineering and ecological. Faggian et al. (2018) presented a preliminary evaluation of regional economic resilience, focusing on resistance and recovery, in the case of Italian regions. In short, economic resilience in terms of the global economic crisis has sparked wide-ranging debate in Europe and other Western countries. The research of economic resilience in China especially on Chinese old industrial cities and resource-based cities, however, was still very limited.

The regional economic resilience responding to recessions is determined by a complex array of factors (e.g. labor, structure, relatedness, technological coherence, policy, and the quality of government) (Ezcurra et al. 2019; Rocchetta et al. 2019). These factors shape the vulnerability of a region's economy to recessionary shocks, its resistance to such shocks as well as its adaptability and its recoverability (Martin et al. 2016). The key research motive in most empirical studies on regional economic resilience focused on answering the question why some factors have more impacts on resilience in some regions while effects on regions differ. Martin and Sunley (2014) proposed a framework to distinguish impacts from industrial and business structures, labor market conditions, financial arrangement, government arrangement and agency and decision-making. Eraydin (2016) analyzed factors that distinguish the different categories of resilience in terms of vulnerability, resources, adaptive capacity, policies and measures of support. Martin and Sunley (2016) found that economic structures have some influence on the resistance and recoverability of certain regions. Empirical results in Italy suggest that regions with higher percentages of public employees and service industries were better able to 'resist' the negative phases of the economy (Lagravinese 2015), while Di Caro (2014) argued that regions having a larger industrial sector show stronger resistance to shocks than others with less manufacturing activity. Other possible determinants, such as location, policies, age structure of local firms, wage costs, and workplace culture, have aroused scholars' attention (Kitsos A et al. 2018). In general, the determinants of economic resilience vary across different areas and economic cycles, but the research so far has mainly focused on Western countries. Therefore, whether European and other Western countries' responds to recessionary shocks and its mechanisms can be adapted to China is a topic worthy of further investigation.

Because natural resources in RBCs are typically non-renewable, a resource-based city's economy inevitably proceeds through a process of exploration, exploitation, high yield and ultimately exhaustion. Therefore, since the late twentieth century, the sustainable development discourse has become hegemonic in the field of RBCs (Zhang et al. 2011; Tan et al. 2016). Most empirical research focused on the measurement of sustainable development capacity, urban transition and economic revitalization (Li et al. 2015; Hu et al. 2018; Hu 2017; Hu and Hassink 2017a; Li et al. 2019), furthermore, the research on economic resilience of RBCs in China was insufficient. Hu and Hassink (2017b) developed a novel conceptual framework of adaptation–adaptability to understand long-term uneven resilience and used it to explain the different resilience between Zaozhuang and Fuxin in China. By drawing on the institutional change and path development concepts, they explained how different modes of institutional change shaped path development processes in relation to economic resilience taking the two Chinese mining cities as example (Hu and Yang 2019). Guan et al. (2018) developed an analytical framework for the industrial structure evolution of old industrial cities and took Shenyang as an example. Li et al. (2019) examined regional economic resilience of Liaoning Province in China in terms of resistance and recoverability. Tan et al. (2017) quantitatively analyzed the economic resilience of RBCs in Northeast China in terms of resistance and recoverability. They draw the familiar conclusion that the regional economic resilience was low, and that the economy in Chinese old industrial cities and RBCs was more vulnerable to external shocks.

The effect of specialization on regional development has become an important issue for economic geographers. A recurring theme is that, other things being equal, a diverse or varied economic structure confers greater regional resistance to shocks than does a more specialized structure (Martin et al. 2016). Therefore, with singular industrial structures, RBCs are likely to have low economic resilience. Previous research showed that the RBCs in Northeast China demonstrated poor resistance during two economic recessions (Tan et al. 2017). These existing researches were very much case-based highlighting the role of industrial structure, state policy, SOEs and institutions but lacking macro view on all Chinese RBCs. Quantitative methods of measuring and analyzing resilience have been barely used to examine Chinese “problem regions” more broadly, and we do not know too much about key impact factors in China's RBCs in general. Therefore, quantitative research on the economic resilience of RBCs in China is imperative: clarifying the characteristics of resilience and its determinants and then proposing differentiated measures becomes an urgent need.

3 Materials and Methods

3.1 Study Areas and Data

According to the Plan of Sustainable Development for Resource-based Cities in China (2013–2020) issued by the State Council, there are 262 resource-based cities in the country, including 126 prefecture-level cities, 62 county-level cities, 58 counties, and 16 municipal districts. Given the availability of data, 114 prefecture-level cities are selected in this article in the second economic cycle. However, because of the adjustment of administrative districts, only 82 cities are selected in the first cycle. RBCs are divided into six types, including forestry-based, coal-based, oil & gas-based, nonferrous metal-based, ferrous metal-based cities and non-metal-based cities, based on the types of resources. They are then further distinguished by four categories, including growing, mature, recessionary, and regenerative cities, based on the Plan of Sustainable Development for Resource-based Cities in China (showing in Fig. 1). From resources types, nearly half of the cities (43.9%) are coal-based cities, followed by nonferrous metal-based (17.5%), ferrous metal-based cities (11.4%), non-metal based (11.4%) with oil & gas based (8.8%) and forestry-based cities (7.0%) comprising the smallest group. There are 62 mature cities accounting for 54.4% of cities, followed by the recessionary (20.2%), regenerative (13.2%) and growing (12.3%) cities, respectively.

All the original data were from the China City Statistical Yearbook from 1995 to 2017, and some missing data were supplemented by statistical yearbooks in each city. Basic urban vector data were obtained from the Institute of Earth System Science's data sharing platform (<https://www.geodata.cn>).

3.2 Methods

There is no single agreed approach to analyzing regional resilience to economic cycles, constructed as recessionary and subsequent recovery (Martin et al. 2016). Martin (2012) provides a useful and simple framework of analysis by defining resilience as a process with different phases, namely resistance, recovery, reorientation and renewal (Fig. 2). There are various factors that shape a region's reaction to a major recessionary shock. Such factors will include the regional economy's prior growth performance, innovation system, economic structure, governance, and so on. This study focuses on measuring two of the four dimensions of resilience, namely resistance and recoverability. The resistance means the degree of

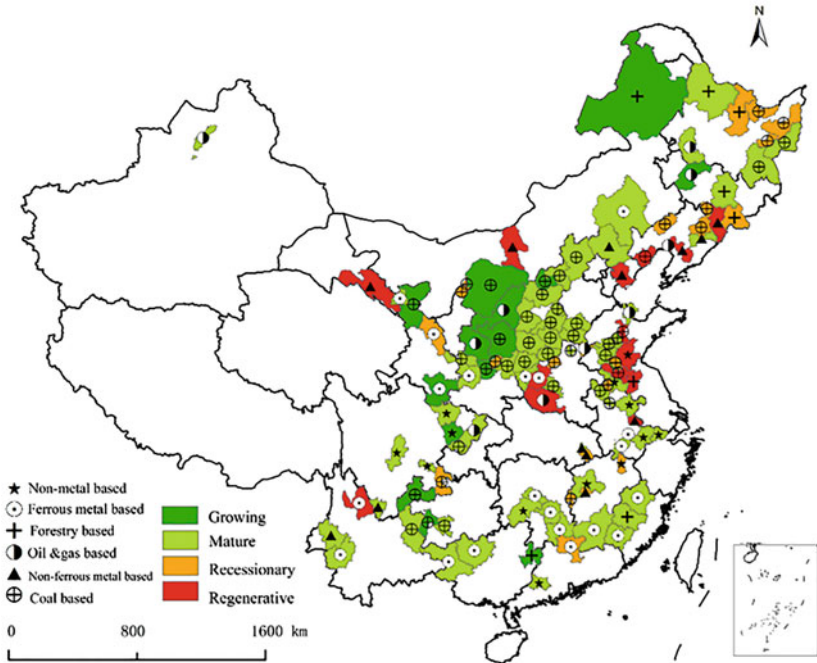


Fig. 1 The location of 114 resource-based cities in China



Fig. 2 Framework of regional economic resilience to a recessionary shock

sensitivity or depth of reaction to the crisis and the recoverability means the speed and extent of regional economy’s recovery from the crisis. Our research focuses on how regions react to recessions from peak to trough, as well as how they

recover from trough to peak, examining the factors that determine their economic resistance. Furthermore, we will not only measure the value of resistance and recoverability, but also consider the rate of recession and recovery.

Several different methods were used to measure economic resilience in term of economic resistance and recoverability. Martin (2012) used the sensitivity index to measure regional resistance and recoverability. The path of the national economy as a whole is taken as the expected change of regions. Then the expected change of GDP in region r during a recessionary period or recovery period, say of duration k periods, would be given as:

$$(\Delta E_r^{t+k})^{\text{expected}} = E_N^{t+k} - E_N^t \quad (1)$$

where $(\Delta E_r^{t+k})^{\text{expected}}$ is the expected recession or recovery value of national output, then E_N^t is the output growth rate of nationwide at starting time t , the base years, and E_N^{t+k} is the output growth rate of nationwide at time $t + k$ (the end of period analyzed). Then, the cities' economic resistance and recoverability can be expressed as follows:

$$\text{Resis}_r = \frac{(\Delta E_r^{\text{Recession}}) - (\Delta E_r^{\text{Recession}})^{\text{expected}}}{\left| (\Delta E_r^{\text{Recession}})^{\text{expected}} \right|} \quad (2)$$

$$\text{Recov}_r = \frac{(\Delta E_r^{\text{Recovery}}) - (\Delta E_r^{\text{Recovery}})^{\text{expected}}}{\left| (\Delta E_r^{\text{Recovery}})^{\text{expected}} \right|} \quad (3)$$

where $\Delta E_r^{\text{Recession}}$ is the recession value of region r from time t to $t + k$, and $\Delta E_r^{\text{Recovery}}$ is the recovery value of region r from time t to $t + k$. When the value of Resis_r is positive, it indicates that the city's economy declined more slowly than the national economy during recession period. Then we can conclude that this RBC was more resistant to recession. When the value of Recov_r is positive, it indicates that the region's economy grew faster than the national average during the recovery period demonstrating more recoverability than the national average. In this research, we will examine the economic resistance and recoverability in different years from peak to trough, then to peak, and examine not only the value but also the rate of economic resilience.

Due to the discontinuous spatial distribution of RBCs, this article does not consider spatial correlation characteristics. A multiple regression model was applied to identify and investigate the major determinants of economic resistance of RBCs during two economic cycles. The dependent variable is the economic resistance and recoverability, which is considered to be influenced by the explanatory variables of economic development, industrial structure, labor conditions, and so on. The multiple regression model is shown in Eq. (4).

$$Y = \beta_0 + \beta_1 * X_1 + \beta_2 * X_2 + \dots + \beta_n * X_n + e \quad (4)$$

where β_0 is a constant, which is the estimated value of the dependent variable when the respective variables are equal to 0. $\beta_1, \beta_2, \dots, \beta_n$ is the partial regression coefficient, and its detailed variable selection will be discussed in Sect. 4. When $\beta_n > 0$, it means the independent variable X_n has a positive effect on the economic resilience. e is a residual.

4 Results

4.1 Major Recessiary Shocks in China

This study focused on the two most recent recessions (the Asian financial crisis and the global financial crisis). Previous studies have used either employment or economic output (e.g. gross domestic product, GDP) data to measure economic resilience (Doran et al. 2015; Brakman et al. 2015). Employment has continuously grown in China and is less affected by economic recession because of the dominant position of state-owned enterprises who offer secure employment (Yu H 2014). Furthermore, in most cities, employment data is incomplete because only the urban employment data are available. Therefore, this study selects output data (GDP) to measure economic resilience. The GDP in RBCs experienced roughly the same development trend as China, which declined from 1997 to 1999; recovered in the following years; peaked in 2007; declined again in 2008, recovered briefly in 2010; and declined again; and after 2012 was stable. The brief recovery in 2010 was mainly caused by a 4 trillion CNY investment plan which was proposed in 2008 to cope with the economic crisis and prevent rapid economic recession by promoting investments in livelihood, infrastructure and ecological environment construction. As the RBCs were also affected by this plan and the economic trajectory experienced a similar trend to China, when the plan ended in 2010, we also consider this time a recessiary period. In short, we define the

period from 1996–1999 and 2007–2016 as recession period and 1999–2007 as recovery period.

4.2 The Resilience of RBCs to Financial Crisis

As a first step, we calculated economic resistance and recoverability for each RBC in two economic cycles. As we cannot present a table with the values for all RBCs from 1997 to 2016, we selected some maps of interest to present the economic resilience in two economic cycles. The green represents values higher than the national average, and the red represents values lower than the national average.

In the recessionary period of the first economic cycle (Fig. 3), we found that RBCs were quickly affected by the economic downturn, and economic resistance was generally low. In 1997, 57 RBCs had lower economic resistance than the national average, and the average value was -3.67 . By 1999, 68 cities had lower-than-average economic resistance, however, the average value rose slightly to -2.43 . From the spatial distribution aspect, cities with high resistance were randomly distributed, and the effect of spatial agglomeration was not significant. In short, the RBCs suffered quick economic recessions during the Asian financial crisis, and economic resistance was low.

During the recovery period of the first economic cycle, some interesting insights could be drawn from looking at the maps on Fig. 4. Firstly, in 2000, there were 37 cities whose economic recoverability was higher than the national

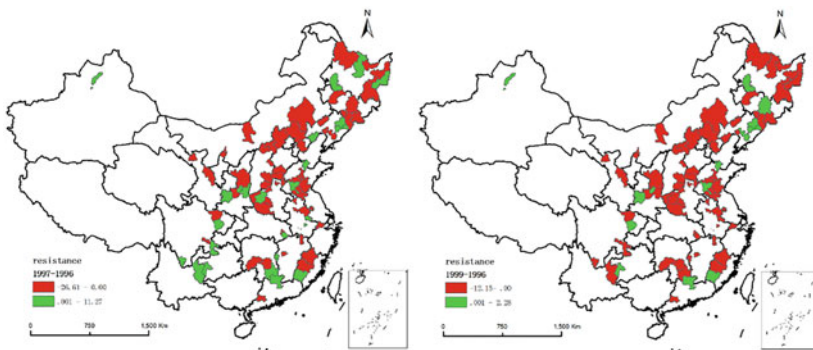


Fig. 3 The economic resistance of RBCs to the Asian financial crisis

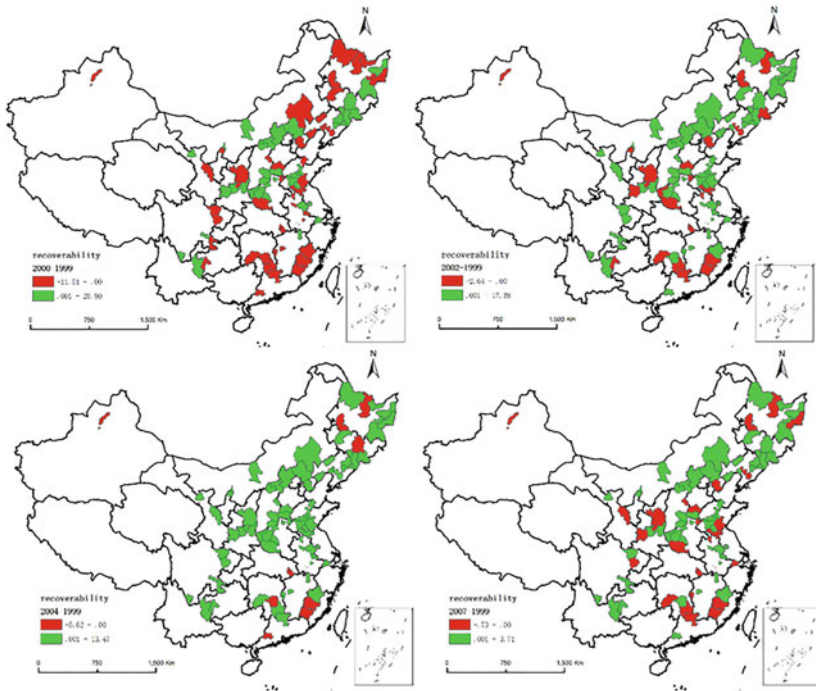


Fig. 4 The economic recoverability of RBCs to the Asian financial crisis

average, and more than half of the cities' economic recoverability was lower than the national average, which indicated the economic recovery rate of RBCs was slow, and they were deeply affected by the economic recession. Secondly, after 2002, the recoverability increased rapidly; only 24 cities showed lower recoverability than the national average, and the mean value reached 2.43. The mean value peaked at 2.64 in 2004, and only 10 cities had values lower than the national average. From here, economic recoverability began to slowly decline, reaching 1.02 in 2007. Thirdly, cities with high recoverability were also randomly distributed.

Drawing the scatter plot of economic resistance and recoverability in the first economic cycle (Fig. 5), we find that economic resistance and recoverability had a strong negative correlation, and the correlation coefficient was -0.673 , which was significant at a 99.9% confidence level, indicating that the cities with high resistance tended to demonstrate weak recoverability, whereas cities that suffered

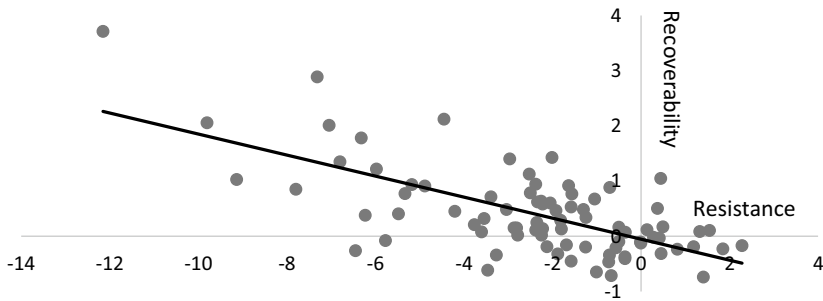


Fig. 5 The economic resistance and recoverability of RBCs to the Asian financial crisis

from deep recessions typically rebounded at a faster pace. This finding seems to be not compatible with the arguments of Martin et al. (2016) observing a positive relationship between resistance and recoverability in UK. In their research, however, some regions also tend to display weak or strong recoverability regardless of their resistance to recession. The reason for this phenomenon may be related to the method of economic resilience. In Fig. 5, only the values of resistance and recoverability were measured without considering the rate of recession and recovery. Therefore, the value of recoverability was calculated from 1999 to 2007, and most RBCs had recovered from the recession. Regions, which suffered deep recession from 1996 to 1999, usually had high economic recoverability. Based on the values of economic resistance and recoverability, 82 RBCs could be categorized according to four types: high resistance—high recoverability type, high resistance—low recoverability type, low resistance—high recoverability type and low resistance—low recoverability type. The majority of the cities, 58 RBCs, belonged to the low resistance—high recoverability type. In addition, 19 cities could be categorized as low resistance—low recoverability, and only six cities, including Huainan and Tongling, belonged to the high resistance—high recoverability type.

At the beginning of the global financial crisis, the economic resistance of RBCs was generally high, and most cities' resistance was higher than the national average from 2008 to 2012 (Fig. 6). There were only 18 cities whose economic resistance was lower than the national average, and the mean value of economic resistance from 2008 to 2012 was 0.69, 0.61, 0.93, 0.65, and 0.53, respectively. In terms of spatial distribution, cities with low resistance showed obvious spatial agglomeration at the beginning of the economic crisis. In 2008, the low-value areas were mainly concentrated in Shanxi Province, and since then, cities in Inner

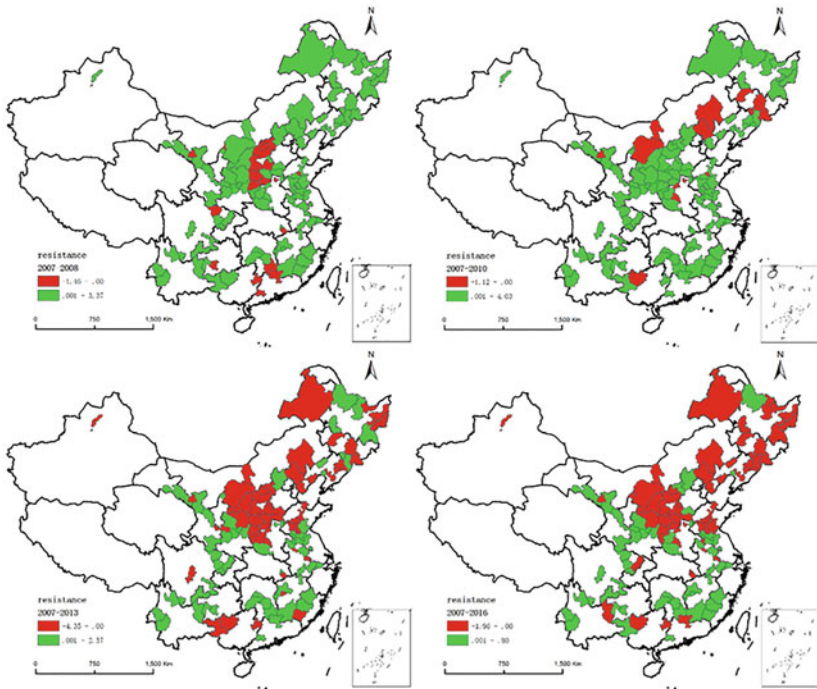


Fig. 6 The economic resistance of RBCs to the global financial crisis

Mongolia and Jilin Province have appeared to be deeply affected by the crisis. Overall, RBCs showed high economic resistance at the beginning of the global financial crisis.

This positive experience in RBCs was caused by their remote location leading to relatively small impacts of the external crisis compared with coastal cities. More importantly, the strongest direct impact of the 2008 economic crisis came from the decline in exports, which had a huge impact on China's manufacturing industry. In 2009, the exports value was 12.02 billion USD, which declined by 16% compared to 2008, and the manufactured goods accounted for nearly 95% of the exports. The manufacturing industry and export destinations were mainly concentrated in the Eastern coastal provinces and cities. Therefore, the effect of economic recession on RBCs remained small at the beginning of crisis. Another

important factor is that, since the end of 2008, the state has implemented a 4 trillion investment plan in response to the global financial crisis, mainly focusing on the livelihood projects and construction of major infrastructure including transportation infrastructure, railways, and highways. The investment of livelihood projects account for about 44%, and the construction of major infrastructure accounted for about 23%. All of these investments significantly strengthened the resilience of RBCs.

From 2012, the number of cities that were severely affected by the economic crisis increased rapidly. In 2013, 54 cities had lower-than-average economic resistance, which grew to 60 in 2016. The mean value of economic resistance from 2013 to 2016 was -0.014 , -0.083 , -0.198 and -0.119 , respectively, lower than the national average, indicating the impact of the economic crisis on RBCs was significantly delayed. The drop in economic resistance after 2012 can be attributed to the stop of national investment stimulus policy. In addition, China's manufacturing industry was strongly affected by the economic crisis, and RBCs were inevitably affected by the weakening demand for raw materials. After 2014, the economic resistance of RBCs dropped further, mainly due to the decline in exports. Furthermore, China proposed a structural supply-side reform and a de-capacity policy for steel, coal, coal and electricity industries, shutting down a large number of small and medium-sized enterprises, which had huge impact on the economy of RBCs. In terms of spatial distribution, cities with low resistance still showed obvious spatial agglomeration being mainly distributed in Shanxi, Inner Mongolia and Northeast China. This is closely related to the high proportion of RBCs in these regions and their high dependence on mineral resources.

4.3 The Resilience of RBCs by Type

We calculated the mean value and standard deviation of the economic resilience of RBCs in the Eastern, Central, Western and Northeastern regions, and the results are shown in Table 1. In the first economic cycle, RBCs in the Central and Eastern regions displayed low economic resistance, while cities in the Western region had the highest economic resistance, and the Western region had the smallest standard deviation, indicating that the fluctuation of economic resistance was minimal. In the recovery period, the difference in the mean values between the four regions was not large, and the Central region had the highest value, which is closely related to the deep economic recession that occurred in this region.

In the second economic cycle, the Eastern region had the lowest economic resistance, followed by the Northeast and Central regions, and the Western region

Table 1 Average values of resistance and recoverability for RBCs in different regions

	Recession (1996–1999)		Recovery (1999–2007)		Recession (2007–2016)	
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
Northeast China	−1.68	1.90	1.12	0.98	0.19	0.94
Eastern region	−2.78	1.83	1.28	0.86	0.18	0.22
Central region	−3.66	1.40	1.42	1.01	0.33	0.41
Western region	−1.12	0.39	1.56	0.96	0.48	0.38

Table 2 Average values of resistance and recoverability for RBCs by resource type

	Recession (1996–1999)		Recovery (1999–2007)		Recession (2007–2016)	
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
Coal-based	−3.31	2.13	2.32	1.23	0.27	0.50
Nonferrous metal-based	−1.74	0.78	1.59	1.15	0.21	0.49
Oil & gas-based	−0.85	0.34	0.10	1.74	0.36	0.51
Forestry-based	−2.48	2.50	0.10	0.32	0.21	0.48
Ferrous metal-based	−1.35	0.49	0.48	1.15	0.38	0.29
Non-metal based	−1.87	0.07	0.68	0.66	0.66	0.34

continued to have high economic resilience. The standard deviation of economic resistance in the Northeast region was highest, while the Eastern region was the lowest. This was mainly due to the high economic resistance at the beginning of the crisis in Northeast China, with an obvious decline due to a major recession of the regional economy since 2013.

Based on the types of resources, the RBCs were divided into six types, and the mean values of economic resistance and recoverability for each type are given in

Table. 2. In the first economic cycle, oil & gas-based cities had the highest mean value for economic resistance and the lowest mean value for recoverability, and coal-based cities had the lowest resistance and the highest recoverability. This was highly consistent with previous research results suggesting that economic resistance and recoverability had a strong negative correlation. Then, in the second economic cycle, economic resistance was generally high, and the gap between various types of cities was not particularly large, among which non-metal-based cities had slightly higher values, while nonferrous metal-based, forestry and coal cities had lower values. In general, coal-based and forestry-based cities displayed lower economic resistance, while oil & gas-based cities displayed high economic resistance in the two economic cycles.

The mean values of resistance and recoverability for growing, mature, recessionary, and regenerative cities were calculated and given in Table 3. In the first economic cycle, growing and regenerative cities had high economic resistance, and the standard deviation of the regenerative cities was the smallest, indicating that the regenerative cities had a better ability to cope with economic recession, and the volatility between each year was small. The mean value of recessionary cities was the lowest, which is mainly due to the gradual depletion of mineral resources, as well as the lack of alternative industries. Therefore, cultivating new economic growth points has become an urgent priority for recessionary cities. The characteristics of economic recoverability were generally opposite to resistance; growing and recessionary cities displayed high values, followed by mature and regenerative cities. In the second economic cycle, the resistance of different types of cities was generally high, and the gaps between the various types of cities were small, among which growing and mature cities were slightly higher, while recessionary regenerative cities were lower. In short, the economic resilience of recessionary cities was generally low during the two economic recessionary periods, highlighting the need for cities to urgently identify new areas of economic growth.

4.4 Influential Factors

Based on previous studies, this paper selected nine indicators to analyze the influential factors of economic resilience. We selected per capita GDP of base year as an indicator of economic development. Then we selected the proportion of employed persons in resource industries, industrial diversity, and the proportion of industrial output above designated size in GDP. These indicators can explain the effect of industrial structure to some extent. Industrial diversity was calculated

Table 3 Average values of resistance and recoverability for RBCs by development stages

	Recession(1996–1999)		Recovery(1999–2007)		Recession(2007–2016)	
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
Growing	-1.67	2.51	2.21	1.01	0.34	0.47
Mature	-2.91	1.15	1.39	0.74	0.37	0.37
Recessionary	-3.25	3.42	1.73	1.16	0.28	0.64
Regenerative	-1.94	0.98	0.90	1.66	0.24	0.44

by using an entropy index based on the regional sector employment data. Then we selected unemployment rate and the proportion of employees in the secondary and tertiary industries to represent the labor market structures. Furthermore, we analyzed the effect of the ratio of foreign direct investment to GDP and the ratio of local fiscal revenue to GDP, the ratio of foreign direct investment reflecting the impact of foreign investment and the ratio of local fiscal revenue reflecting the impact of state investment. Finally, the ratio of fixed asset investment to GDP was selected to express the ability of governance.

We analyzed the factors that influenced the economic resilience of RBCs utilizing a multiple linear regression modeling approach, and the regression results for economic resilience are shown in Table 4. In this article, the fits were tested by analysis of variance (F-test), and accuracy was assessed based on the coefficient of determination (R^2). We found that factors affecting economic resilience varied across the two economic cycles, and the reasons behind this shift may be two-fold. Firstly, the nature of the two financial crises is not the same. Asian financial crisis was a regional crisis, while the effect of the second recession was global, and then the main determinant may be various. Second, the responses of regions to economic shocks also vary according to the feature of recessions. During the second recession, the F-test indicated the model fitted well with the data ($F = 4.41$), although its explanatory power was low ($R^2 = 0.28$).

However, in the first economic cycle, the F-tests in the two regression models were not significant, which indicate the models did not fit well. In the second economic cycle, the results showed that X_2 was significant at a 99.9% confidence level, X_4 was significant at a 99% confidence level, and X_1 , X_3 , X_6 were significant at a 90% confidence level. In short, we could conclude that economic development, labor conditions, and, most of all, industrial structure had a significant effect on economic resilience.

During the second economic cycle, the proportion of employed persons in resource industries had the strongest negative impact on the economic resilience of RBCs. Cities with a high proportion of employed persons in resource industries like Qitaihe, Huaibei, Yangquan, Kelamayi and Jinchen all had low economic resilience. This was related to the fall in resource prices after 2008. Furthermore, the reason could relate to the policy of cut capacity, which caused large numbers of mines and enterprises to shut down. The proportion of industrial output above designated size in GDP also had a strong negative effect. This was primarily because enterprises in RCBs were usually state-owned, and economic vitality was relatively low. Per capita GDP also had a negative effect on economic resilience, which indicated that regions with high per capita GDP experienced stronger recessionary effects. The regions with high per capita GDP were mainly located in

Table 4 Multiple linear regression results of impacts on economic resilience

Indicators	Standardized Coefficients		
	Resistance (1996–1999)	Recoverability (1999–2007)	Resistance (2007–2016)
Per Capita GDP (10 ⁴ Yuan), X ₁	0.05	−0.33	−0.19*
Proportion of employed persons in resource industries (%), X ₂	−0.17	0.14*	−0.27***
Industrial diversity, X ₃	−0.27	0.08	−0.24*
Proportion of Industrial output above designated size in GDP (%), X ₄	0.27	0.13	−0.33**
Unemployment rate (%), X ₅	0.32*	−0.17	−0.03
Proportion of employees in the secondary and tertiary industries (%), X ₆	0.08	−0.19	0.21*
Ratio of foreign direct investment to GDP (%), X ₇	0.03	−0.01	0.06
Ratio of local fiscal revenue to GDP (%), X ₈	−0.15	0.23	−0.12
Ratio of fixed asset investment and GDP (%), X ₉	−0.07	−0.11	−0.08
Constant	−0.23	0.84	1.57*
R Square	0.15	0.17	0.28
F	1.35	1.63	4.41***

***p<0.001; ** p<0.01; *p<0.05

the South and East of China, while the low per capita GDP areas were located in the West and Northeast of China. Although the regression result show that industrial diversity had negative effect on economic resistance, the correlation between the two factors was not significant, so we draw the conclusion that the effect of industrial diversity on economic resilience was not significant. Finally, only the proportion of employees in the secondary and tertiary industries have a positive effect on economic resilience.

5 Conclusions and Discussion

The article analyzed the economic resilience of RBCs in China in terms of resistance and recoverability during the last two economic cycles, examining the main determinants of economic resilience. We drew four main conclusions: Firstly, RBCs were immediately affected by the Asian financial crisis and their economic resistance was generally low. In the recovery period, the economic recovery rate was slow at the beginning, but economic recoverability was generally high after 2002, while economic resistance and recoverability had a strong negative correlation. Secondly, at the beginning of the global financial crisis, the economic resistance of RBCs was generally high, and, after 2012, the number of cities being severely affected by the economic crisis increased rapidly. Thirdly, economic resistance varied across the different types of RBCs. Coal-based and forestry-based cities had lower economic resistance, while oil & gas-based displayed high economic resistance. RBCs in the Eastern region generally had low economic resistance, and the economic resilience of recessionary cities was also low. Finally, the factors affecting economic resilience varied across the two economic cycles. Economic development, labor conditions and especially the industrial structure had a significant effect on economic resilience, while most other factors had a negative effect.

The results showed that RBCs had low resistance during the two recessions from peak to trough, which was consistent with previous research on the economic resistance of RBCs in Northeast China (Tan et al. 2017) and is also consistent with other previous research by Li et al. (2009) and Su et al. (2008) who found that the economies of mining cities are vulnerable to external shocks, especially the resource-depleted mining cities. We found that coal-based and forestry-based cities had lower economic resistance, while oil & gas-based cities had high resistance. Furthermore, we gained new insights about the rate of recession and recovery. Our research found that RBCs were immediately affected by the Asian financial crisis and recovered slowly. However, at the beginning of the global financial crisis, the economic resistance of RBCs was generally high, with their resistance declining slowly. Previous research has usually focused on the values of economic decline from peak to trough, as well as the values of recovery from trough to peak, however, the rate of recession and recovery has been ignored. For example, Tan et al. (2017) concluded that the economic resistance of RBCs in Northeast China was generally poor, however, they did not examine the rate of economic decline and recovery.

We obtained similar results to previous research suggesting that the main influential factors affecting resilience varied across the two economic cycles. This

finding also supports the view that local responses to economic shocks vary according to the specific origins and characteristics of each recession (Martin 2015). In our research, per capita GDP had negative effects on economic resistance during the global financial crisis. This result is in accordance with Lee's (2014) findings that places with higher unemployment rates had a weaker impact from crisis than places with lower rates. Kitsos (2018) also found that regions in Great Britain with higher employment rates prior to the crisis exhibited the biggest employment losses in the subsequent period. Another interesting finding is that both the proportion of employed persons in resource industries and the proportion of industrial output above the designated size in GDP had a negative impact on the economic resilience of RBCs. This outcome could be viewed in terms of innovation. This innovation may be called regional innovation which is conceived broadly as embracing both the effective social, organizational and institutional capacities for innovation in a region, as well as its technological research and development. Cities with a high proportion of resource industries and enterprises above the designated size are usually viewed as being less innovative. The importance of innovation for long-term economic growth and regional development has been well established, and Bristow and Healy (2018) found that the stronger the innovation performance of a region, the more likely it is to be resilient to an economic crisis.

In our research, we found that the effect of governance in terms of fixed asset investment on economic resilience was not significant, however, national policies had a significant impact on the economic resilience of RBCs, especially in the second economic cycle. At the end of 2008, the state carried out a 4 trillion investment plan, which, to some extent, led to higher economic resilience at the beginning of the economic cycle. After 2014, the economic resistance of RBCs dropped quickly, mainly because of the proposed de-capacity policy, which further exacerbated the economic recession in RBCs. Policies should help to stabilize the economy in responding to financial crises by creating binding commitments. Wink (2014) classified political activities into three types (short-term reactions, mid-term measures and mid-term preventive activities) by their approach to strengthening regional economic resilience. Wang et al. (2009) claimed that the 4 trillion investment plan worked to stabilize the economy and society in the short term, however, it might hinder China's economic growth and market-oriented reform in the long term. Therefore, reforms should focus on increasing labor mobility and public investment to strengthen emerging technologies and new market infrastructure, support local civil engagement, diversify processes in leading economic sectors and bridge technological platforms (Wink

2014). In addition, affected by the de-capacity policy, resource-based cities, especially coal cities, have suffered direct and huge impacts, leading to the decline of leading industries that have subsequently suffered from deep recession. Taking Baishan, a coal-based city, as example, affected by the de-capacity policy: the coal industry suffered a direct and huge impact. The contribution of the industrial output value of the coal industry fell from 27.4% in 2014 to less than 3% in 2016, and tax revenue of coal industry dropped from 635 million yuan in 2014 to 97 million yuan in 2016, and then more than 9000 unemployed workers needed to be resettled (Data from the of Statistics Bureau of Baishan). Undoubtedly, the de-capacity policy should improve the industrial structure and economic quality of RBCs in the long run. However, ensuring the stability of cities' short-term economic growth is of utmost importance.

Overall, our research went some way to address the lack of empirical research in China on economic resilience, especially on the RBCs. What clearly emerges from our contributions, are the heterogeneity of economic resilience to different crises and its main determinant, and there are several theoretical implications of China's case study. Firstly, problem areas, especially with a single structure in China, are usually affected more severe by an economic downturn with strong regional differences. Therefore, more attention should be paid to the development of these areas. Second, the main factors affecting regional resilience changed in different regions and crises, but the proportion of resource industries always had negative effects on regional resilience. Therefore, industrial transformation is the key to the transformation of RBCs. Finally, under the market economy system in China, the state especially at the national level plays an important role in regional development, especially on how to deal with the economic recession, and this administrative force is often stronger than in the Western countries. Therefore, science-based policymaking is the key to improve regional economic resilience.

There are still several inadequacies in our research and possible extensions for the future. First, the paper mainly focused on the impacts of external crises and not about the response of RBCs to internal crises, such as resource exhaustion, policy shifts, and institutional problems, which is a complex and interesting question for further research. Second, this research measured the economic resilience based on the GDP data, and more complex data, such as employment data, financial data and more detailed industry data, should be used in future to verify our main conclusions. Finally, though many research questions were answered in this paper, more detailed research on economic resilience of RBCs in China is still needed. For example, the relationship between industrial structure, quality of government, relatedness, technological coherence and regional economic resilience of RBCs

in China could provide important insights for suitable economic policies, which address the specific challenges in Chinese RBCs.

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Investigating the Governance Mechanisms that Sustain Regional Economic Resilience and Inclusive Growth

Marianne Sensier and Elvira Uyarra

1 Introduction

The ability of regions to resist, adapt, respond, recover and/or renew from economic shocks has been a recurrent theme in the literature of economic geography. Resilience is a multifaceted phenomenon, influenced by structural and other context specific institutional and relational factors. The importance of institutions, policies and agency for shaping regional resilience has been stressed by recent literature (Bristow and Healy 2018a; Boschma 2015). There is a relationship between the system of governance and regional economic resilience, since local governments will use the policy levers at their disposal to try to mitigate the impact of economic downturns and address sub-national development priorities (Bentley et al 2017).

The system of governance in the UK is one of the most centralised among developed industrial nations. Attempts towards greater local decision making in some policy arenas have mainly taken the form of ‘conditional localism’ (Hildreth 2011), whereby decentralisation is conditional on local actors buying into national policy objectives. This implies that decision making is not necessarily tailored to local economic development needs. In addition, the organisation of Whitehall has often followed a functional logic with no holistic overview of how different

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problems and policies come together to affect specific places (Heseltine 2012). This has been compounded by a style of policy making characterised by short-termism; a lack of institutional memory and stability of policy initiatives, an undue influence of London in policy and resource allocation (Coyle and Sensier 2020), and a dominant economic framework underpinning national economic policy that is largely a-spatial (Bailey et al 2015; Hildreth 2011; Uyarra et al 2016). This framework assumes that investing in existing agglomerations is more efficient and that growth in core areas will trickle down to less developed areas. The UK has the greatest spatial inequality among European countries (see McCann 2019) to such an extent that the Conservative Government has made it a central mission to “level up” across UK regions (see Tomaney and Pike 2020). These regional disparities have widened since the financial crisis of 2008, with some regions demonstrating greater economic resilience while others have been slow to recover (see Sensier and Devine 2020a). The UK system of governance has proven to be ill-suited to respond to these interregional problems, and has arguably exacerbated them (McCann 2016).

The UK Labour Government’s policy response to the 2007–2008 Global Financial Crisis was to bail out the finance sector (nationalising some banks) and provide a fiscal stimulus to the economy. Following the general election in 2010 the Conservatives formed a Coalition Government with the Liberal Democrats and under the then Chancellor of the Exchequer, George Osborne, the focus turned to reducing the deficit (which had trebled in size due to the bank bailouts) and the introduction of austerity budget measures in order to stabilise the country’s financial ratings and bring down national debt. Funding cuts were particularly severe in metropolitan areas in the North of England. Harding (2020) notes that spending by Greater Manchester districts fell by 17% on average in real terms between 2009–2010 and 2017–2018, and that the City of Manchester experienced a 29% loss in spending power during that period.

In the ten years of austerity policy in the UK output growth has been subdued along with investment, employment, real wages and productivity. Beneath the national headline figures the regional picture is mixed with areas with the greatest shares of deprivation suffering the largest local authorities budget reductions (see Gray and Barford 2018) and some sub-regions yet to recover pre-crisis productivity levels (Sensier and Devine 2020b). The current crisis brought about by the coronavirus pandemic has seen immediate UK Government action in the form of support for businesses (Job Retention Scheme, business rate relief and business interruption loan schemes), the self-employed and the charitable sector with the lockdown announced on 23rd March 2020. Although too early to judge

these measures the response to this crisis has been led by the central state with some resources redistributed by local authorities.

In this chapter we look at two different styles of local governance that have evolved since the 2008 financial crisis in the UK cities of Greater Manchester and Preston. Greater Manchester and Preston have been chosen because they have performed differently in terms of various dimensions of resilience. While exhibiting a positive performance in some resilience aspects vis a vis the national and the regional level, their different trajectories are a product of the different structural, social, institutional and governance conditions in place. In order to do so we first review the academic and policy literature on regional economic resilience, governance mechanisms and inclusive growth. We document policy interventions that have been applied to help with the recovery from the 2008 recession to see if lessons can be learned to aid in the recovery from the 2020 coronavirus pandemic crisis. We compare Greater Manchester and Preston local indicators in terms of their recovery and resilience from the financial crisis along with indicators for inclusive growth and sustainability. Greater Manchester is part of the 100 Resilient Cities Project funded by the Rockefeller Foundation and has followed a devolution agenda. Preston has pursued local wealth building strategies and municipal socialism. We discuss what lessons have been learnt from the financial crisis and in particular the way local economies can adapt and recover, particularly when led by strong institutions. We explore if these policies could be applied for the recovery from the coronavirus pandemic and make recommendations for further policy measures. Does a crisis offer a chance of truly transformational change within a nation state to deal with the wicked societal problems of climate crisis and inequalities?

2 Governance and Resilience Review

Regional economic resilience is defined as the capacity of a regional economy to withstand, recover from and reorganise in the face of market, competitive and environmental shocks to its developmental growth path (Bristow and Healy 2014; Martin and Sunley 2015). While original interpretations of the concept of resilience were grounded in engineering and ecological traditions and understood as the ability to withstand or recover from a shock, recent understandings of resilience consider the possibility of renewal and the creation of new pathways, rather than simply returning to a pre-shock state paths (Boschma 2015). This is linked to the notions of adaptation and adaptability, understood respectively as the ability to maintain previous economic specialization through path extension or to transform

towards new development paths (Boschma, 2015). Martin (2012) in turn identifies four interrelated dimensions of economic resilience that are necessary for describing how a regional economy responds to a recessionary shock. The first is resistance which is the sensitivity of a region compared to the nation during the recession, second is the speed and extent of recovery from the recession, and third is if the region goes through structural re-orientation and what implications this has for the region's jobs, output and income. The fourth dimension is the degree of renewal a region will undergo following the shock and the extent to which it renews its growth path. The root cause of these shocks could be global (the 2008 financial crisis and the 2020 coronavirus pandemic), national (1990s house price crash) or local (closing of a factory) in nature.

Academic studies taking an evolutionary lens on regional resilience have focused on the nature and dynamics of resilience in local and regional economies, and tried to understand why some regions are more able than others to recover from economic shocks. Martin and Sunley (2015) identified three main sets of factors: compositional factors such as the sectoral/industrial structure of local and regional economies, collective factors related to relationships between local economic agents within each regional economy, and contextual factors related to policies and multi-scale institutions. Most studies have focused on compositional and collective factors, stressing aspects such as skills, the regional productive structure and the structure of knowledge networks and the innovation propensity of knowledge firms. Martin et al (2016) state that economic structure of places varies across the UK and the degree of foreign ownership, the geographical distribution of supply chains, export orientation and legacy of the inherited labour market all play a part in why some regions are more resilient than others, although they suggest that the importance of industrial structure has decreased since the 1970s. Davies (2011) reported that resilience was weaker in more manufacturing intensive regions across Europe in the immediate aftermath of the financial crisis. Webber et al (2018) uncovered mixed results on the effect of manufacturing and a positive impact of employment in services on economic resilience. Kitsos and Bishop (2018) found that past economic performance but also skills were important factors explaining differences in economic resilience outcomes to the 2008 recession in the UK. Lee (2014) discovered that UK cities with higher skill levels had the smallest increase in unemployment over the 2008–2009 recession.

Regions that have been most resilient have tended to be those specialised in dynamic and productive industries and those with more diversified economies (Cuadrado and Maroto 2016). Regions with a more diversified sectoral portfolio are assumed to be less sensitive to economic shocks as the risk of being hit by a shock is spread among those sectors (Frenken et al 2007) and they are better

placed to find new combinations that may lead to new growth paths (Boschma 2015). Xiao et al (2018) found in a study of European regions that related variety and unrelated variety of industry increased the probability of regions being resilient when comparing industry entry levels before and after the financial crisis. The most resilient regions had higher entry levels of knowledge-intensive industry after the crisis. Innovation was found to play a key role by Bristow and Healey (2018b), who observed that regions identified as innovation leaders were more likely to have either resisted the financial crisis or recovered quickly. Rocchetta and Mina (2019) reported that technological coherence, measured by the cognitive proximity of patenting activity in UK NUTS3 regions, had a positive impact on regional resilience performance. Other explanatory factors include the importance of networks, for instance the internal structure of a region's knowledge network, and the connectivity and openness of those networks to knowledge developed elsewhere (Balland et al 2015). Fratesi and Rodriguez-Pose (2016) found that regional economies which are more sheltered have lower levels of adaptability compared to those that are more open.

Recent studies highlight the importance of institutions (including policy) and agency in shaping resilience outcomes (Bristow and Healy 2018b; Dawley 2013; Wolfe 2010), including place-based (or 'place-renewal') leadership by firms and public authorities (Sotarauta and Beer 2017; Bailey et al 2010). For Boschma (2015) human agency, institutions and structural change are key to understanding the resilience and long-term economic evolution of regions. Institutional factors influence resilience but also key actors (either individually or collectively) can influence 'region-specific' institutional conditions (Martin and Sunley 2015; Boschma 2015; Cortinovis et al. 2017). Resilient regions are more likely to have dynamic and adaptable institutional structures that have learnt from previous crisis. Indeed, Kakderi and Tasopoulou (2017) argue that policies that promote social and institutional learning, flexibility and connectivity facilitate new path development and resilience (see also Balland et al 2015). Magro et al (2020) articulate the policy responses contributing to resilience, and use the case of the Basque Country in Spain to understand the role of policy measures and agency to foster not just short-term adaptation to crisis but also medium and long-term adaptability through enabling new regional growth paths. Ayres et al (2018) note that "crises open 'windows of opportunity' by potentially jolting institutions or constitutional configurations out of established pathways and thereby facilitating the introduction of new structures and relationships". Political elites may seek to control the crisis and return to the status quo. Conversely, reform agendas can be followed by committed individuals who seek to remove 'executive blockages' before the window of opportunity closes. The financial crisis may have provided such a window

of opportunity for some places to develop new arrangements supporting new path creation and diversification of regional economies (Neffke et al 2011).

Wink et al (2018) describe the vulnerabilities of Stuttgart region in Germany following the 2008 recession as the region's automotive industry was exposed to the global contraction of exports leading to a deep recession of 10% in regional GDP. The region had learned lessons from a severe recession in the early 1990s and had developed a strong institutional sector-based collaboration between public and private organizations and a strong social consensus between firms and trade unions in the manufacturing industry. There was an immediate country level response to the crisis with tax and social security payment reductions for firms and households, along with a short-term working allowance to enable workers to work part-time but still get 60% of their salary, thus preventing loss of workers with tacit knowledge. Germany also introduced a "future investment program" which was spent on education and research infrastructure and the modernization of energy systems. The state level response in Baden-Württemberg included the introduction of its own infrastructure program for public buildings and roads that was strengthened by a municipal fund for local infrastructure. Further measures introduced were "innovation vouchers" to boost SMEs R&D funding in 2008. This scheme awarded firms up to 5000€ for projects to develop new products and processes to strengthen innovation strategies through the crisis. Short-term liquidity loans and guarantees from the state development bank were also available to help struggling firms. Following the crisis, the region recovered quickly and transformed digitalization towards electric vehicles development along the same technological pathways and so achieved related variety diversification.

In the UK the 2004 Civil Contingencies Act required every local area to establish a Local Resilience Forum to be able to put in place emergency plans to deal with local/ national shocks. As an example of place-renewal leadership in the UK, Bailey and Berkeley (2014) discuss the operation of the West Midland's Regional Resilience Taskforce that dealt with business and employment issues during the 2008 downturn to ensure resilience over the short and longer term. They document a number of central and local government funds that were set up to help firms access credit and advice during the downturn. The retention of institutional memory and lessons from dealing with the 2005 closure of the Rover car plant were vital in helping to deal with recession. They suggest the resilience dimensions of resistance and recovery were important in the short-term but then the renewal and reorientation of the local automotive sector to diversify into low carbon and higher value activities were important for long-term planning. The West Midlands proved to be resilient following the 2008 recession as output, employment and productivity bounced back with higher rates of growth post crisis, see

Sensier and Devine (2020a). Tomlinson and Branston (2014) analysed how the North Staffordshire ceramics industrial district was able to reverse a phase of 'long decline' through purposive adaptation and joint action by local actors, thus showing that "there is nothing inevitable about the trajectory of old industrial districts" (p. 502). Sensier and Artis (2016) profile the resilience of the Welsh labour market following the 2007/08 financial crisis, and find that employment peaked earlier than the UK and subsequently had a larger loss than the UK recovering after 5 years. The Welsh Government introduced the ReAct (Redundancy Action Scheme) and ProAct schemes for firms to apply for training funding so as to retain jobs in the wake of the crisis with money from the European Social Fund.

Broadening the view of resilience to include sustainability and social considerations, the literature on urban resilience has also discussed governance structures and strategies to react and adapt to external shocks. Meerow and Newell (2016) define urban resilience as "the ability of an urban system-and all its constituent socio-ecological and socio-technical networks across temporal and spatial scales-to maintain or rapidly return to desired functions in the face of a disturbance, to adapt to change, and to quickly transform systems that limit current or future adaptive capacity" (p. 45). Urban resilience has gained momentum as a result of the influence of think tanks, NGOs and global initiatives such as the drive towards the United Nations Sustainability Development Goals (SDG) and the 100 Resilient Cities, set up by the Rockefeller Foundation to help world cities "become more resilient to the physical, social and economic challenges that are a growing part of the 21st Century". In the UK participating cities include Bristol, Glasgow, Belfast, London and Greater Manchester. The 100 Resilient cities strategy advocate a form of urban governance that is flexible, redundant (spare capacity to accommodate disruption), robust, resourceful, reflective, inclusive and integrated (Rockefeller Foundation 2015). Fastenrath et al (2019) discuss Melbourne's resilience strategy and conceptualise resilience actions as 'governance experiments' that aim to "re-construct established urban governance structures by disrupting institutional path dependencies through collective innovation, cooperation and coordination" (p. 7–8). They also discuss the need for more policy experimentation and combining solutions from "bottom-up" grass roots organisations (for example in the voluntary and social enterprise sector) with "top-down" established urban planning policy. A number of critical views have similarly argued against expert-driven, top-down and private sector led approaches to resilience and stressed the need to address questions of socio-spatial inequalities and social justice, including: who is included/excluded from the system? Who determines what is desirable? Resilience for what and for whom? Whose resilience is prioritized? (Meerow and Newell 2016; Leitner et al 2018).

The policy agenda around inclusive growth is similarly concerned with understanding the distributional consequences of economic growth (Lee 2019). The OECD (2018) describes inclusive growth as economic growth that creates opportunities for all segments of the population and distributes the dividends of increased prosperity, in both monetary and non-monetary terms, fairly across society. A number of UK local industrial strategies have focused on addressing challenges in terms of low wages, low skills and low rates of productivity. This involves stimulating demand for jobs that are more secure and better paid. In 2015 the Welsh Government introduced a “Wellbeing of Future Generations” Act. This placed a legal requirement on Welsh public bodies to think about the long-term social, cultural, environmental and economic impact of their investment decisions on well-being. In the Welsh Government Economic Action Plan of 2017 they launched an initiative to support the foundational economy (see Englen et al 2017, the includes the tourism, food, retail and care sectors), in particular to support key sectors with policies including skill development, new business models and infrastructure. In 2017 the Scottish government and North Ayrshire Council developed an ‘inclusive growth diagnostic approach’ to identify barriers to sustainable inclusive growth and recognise investment decisions with the potential to deliver long-term change. Lupton et al (2019) note that this “process identified drivers of inclusive growth across the external environment, local conditions, and social factors. These drivers included factors often identified in economic analysis such as infrastructure and skills but also the value and quality of jobs, and ‘social factors’ such as community empowerment, health, aspirations and childcare. Factors were then scored on a matrix of impact (on growth, inclusion and sustainability) and deliverability, in order to prioritise strategies and investment.” Lupton et al (2019) state that inclusive growth policy and practice has two spheres of activity: 1) working towards economic structures and activities which are more inclusive by design; 2) making sure local people are connected to economic opportunities in terms of having good physical local service provision (housing, digital connectivity and transport) and provision of good quality education, training, health and care services as a basic minimum.

These different agendas and considerations have implications in terms of how resilience, broadly understood, is measured, which indicators to use and at what units of analysis. Regional economic resilience has typically been operationalised in terms of standard economic measures such as gross value added (GVA) and labour market indicators. An array of resilience indicators have been reported by think tanks (CLES 2010; Greenham et al 2013; IPPR North 2014). To understand community resilience and inclusive growth a range of metrics are required that also measure citizen health and well-being, job quality, environmental assets and

cultural capital (Axinte et al. 2019). We will compare our resilience scorecard of Greater Manchester and Preston with two new approaches that advocate the use of indicators of societal well-being. The first is the Index from the Centre for Thriving Places (2020), which take account of local conditions, equity and sustainability measures. The Thriving Places Index builds on the approach of Raworth's (2017) Doughnut Economics which is derived from the UN's SDGs and argues that local economies should be regenerative and redistributive by design, instead of waiting for growth to level or clean things up. The second indicator is for inclusive growth from the Good Life Communities index from the Centre for Progressive Policy (2019).

3 Devolution in Greater Manchester

Greater Manchester's ten boroughs have a long history of working collaboratively from the creation of the Metropolitan county council in 1974 to its abolition in 1986, followed by the formation of the Association of Greater Manchester Authorities (AGMA), a voluntary body created as a forum for metropolitan collaboration and coordination (see Table 1 for a timeline of Governance events). This ensured coordination in important areas of public service delivery such as transport, policing, fire services and waste disposal. It also over time built up capacity for research intelligence and policy evidence (Harding 2020). In 2009 Greater Manchester reviewed the state of its local economy in the Manchester Independent Economic Review. This built up a strong evidence base on the economic and social progress over time for the city region in terms of location of economic activity, population, deprivation and worklessness (see Holden 2020). The building up of institutional and analytical capacity, based on a consensus between districts has strengthened over time, and formed the basis of the creation of the Greater Manchester Combined Authority (GMCA) in 2011. The formation of the GMCA required national legislation but it has forged its own path drawing from higher levels of government (Harding 2020).

Greater Manchester was in the first wave of City Deals in 2011 and the only place to secure the earn-back mechanism (to invest local funds into transport infrastructure, retain a share of the proceeds of subsequent tax yield derived from increased economic growth and then re-invest the revenues in further 'GVA enhancing' infrastructure, O'Brien and Pike 2015). The GMCA became in 2011 the first city-regional authority to receive statutory recognition, and its powers over economic development were extended to include transport and skills training

Table 1 Timeline of Governance Events in Greater Manchester

Date	Event/ Strategy
2009	Manchester Independent Economic Review published
2010	GM Local Enterprise Partnership created
2011	GMCA created. Each of 10 local authority district Leaders takes a GM policy portfolio
2012	GM City Deal agreed (£2.7 million)
2013	GM Strategy, Stronger Together brings together economic growth and public service reform priorities
2014	George Osborne makes two speeches about “Northern Powerhouse”. GM Devolution deal is signed in November
2015	Health and social care spending agreed £6bn
2016	Devolution deal for more criminal justice system powers
2017	GM Mayor Andy Burnham elected
2019	GM Independent Prosperity Review
2019	GM Green Summit, 5-year Environment Plan launched in March. GM aims to be carbon neutral by 2038
2019	Greater Manchester Housing Strategy committed to 50,000 additional truly affordable homes by 2037, launched in June (GM Spatial Framework)
2019	Transport for the North Strategic Economic Plan
2019	GM Local Industrial Strategy Launched in June

in 2015 (Harding 2020). Ward et al (2016; p. 420) argue that the Greater Manchester city-region played a “prototype role for central government’s wider programme of experimentation in devolved governance and enhanced fiscal autonomy”.

Devolution deals that took place in England between 2010 and 2016 are described by Ayres et al (2018) as partnership agreements bartered between the centre and local authorities. Holden (2020) describes the Greater Manchester settlement as “deal based” devolution which began in 2014 and is “grounded in a model, which has been developed over a period of more than 30 years, that is characterised by extensive public–private collaboration, strong civic leadership and robust governance with strong independent external review functions, an evidence based approach to policy development”. Haughton et al (2016) state that the Greater Manchester devolution model has favoured agglomeration policies that have increased economic activity in the city centre and public service reform has been crucial for Central Government to allow more local policy autonomy and greater fiscal powers. Greater Manchester’s devolution deal was initially negotiated

by Sir Howard Bernstein (Head of GMCA) with George Osborne (Chancellor of the Exchequer) and then by an elected Mayor since May 2017, Andy Burnham. Greater Manchester was also among the first group of city regions to produce a local industrial strategy, which identifies local strengths and challenges, future opportunities and action needed to boost productivity, earnings power and competitiveness.

Lupton et al (2019) discuss problems within Greater Manchester and its lack of inclusive growth in terms of low pay and insecure employment with around 620,000 households living in relative poverty. Peripheral areas continue to struggle and women, ethnic minorities and disabled people tend to fare much worse in terms of jobs and pay. Lupton et al (2019) discuss the Greater Manchester Good Employment charter¹ that has been established to encourage employers to offer more equitable employment practices including workplace engagement, in-work progression and paying at least the real living wage. In 2019 GM launched a Co-operative Commission which solicited ideas from the local population and businesses. Lupton et al (2019) note the challenges of financing inclusive growth strategies for city regions that have experienced piecemeal devolution and a long period of austerity which has meant the phasing out of the local government support revenue grant. They propose some solutions for filling the public sector funding gap including “establishing local financial institutions to enable local saving and lending; local investment of anchor institution assets and funds; municipal or social investment bonds; and municipal ownership or community ownership of local public assets”. Sensier (2017) discusses the role a community bank could play within Greater Manchester. Local networks and institutions strengthen community resilience, particularly those firms rooted in communities (Brett 2020) and community banks could work with local companies.

4 Community Wealth Building in Preston

Preston, Lancashire has aimed to rebuild itself post financial crisis after the loss of large inward investment from a shopping centre development in 2011. McInroy (2018) describes how Preston city council has been working on local wealth building initiatives with anchor institutions (university, housing associations and the hospital) to pay the real living wage and procure more goods and services locally. The driving force behind the “Preston model” is Councillor Matthew Brown who

¹ See <https://www.greatermanchester-ca.gov.uk/what-we-do/economy/greater-manchester-good-employment-charter/>.

Table 2 Timeline of Governance Events in Preston

Date	Event/ Strategy
2002	Won Golden City status in Queen’s Golden Jubilee.
2011	John Lewis retail development withdrawn; Cllr Matthew Brown investigates Community Wealth Building in Cleveland; US and starts to work with CLES.
2013	CLES estimates local spend for Preston & Lancashire.
2013	Preston, South Ribble and Lancashire City Deal was signed in September 2013. Investment of £1.47 million LEP says “expand transport infrastructure create 20k new jobs and generate more than 17k new homes over next 10yrs”.
2019	Selected for Government Stronger Towns and High Street Funds

was elected to Preston city council in 2002 and has been leader of since 2018 (Co-operative Councils Innovation Network 2020). Cllr Brown is a member of the Co-operative Labour party and has been following principles of municipal socialism learning lessons of community wealth building applied in Cleveland, Ohio in the US (Thompson 2020; for a timeline of events for Preston see Table 2). Preston also launched a Co-operative Development Network² linking procurement to expand local opportunity (Preston learned from the co-operatives in Mondragon, Spain, see Manley and Froggett 2016). Thompson et al (2019) state that Preston has developed place-based inclusive growth strategies which challenge the market dominance under urban entrepreneurialism in which cities look outwards to attract mobile capital and the creative class in a competitive zero-sum race to the bottom. They name this strategy “entrepreneurial municipalism”, developing the idea of the entrepreneurial state (Mazzucato 2013) for the municipal scale. This involves urban authorities using their political, legal and financial powers to harness endogenous assets such as land and labour to build a more socially just and self-sustaining pathway to local economic development—one which reflects the interacting processes of reciprocity, redistribution and market exchange of a socially embedded local economy.

CLES (2018), describe the inclusive economy model followed by Preston as one that is intentionally organised to produce social and economic justice, environmental sustainability and prosperity for all. This, according to CLES, “aims to reorganise and control the local economy so that wealth is not extracted but broadly held, generative and rooted locally” (p. 7). One of the pillars of this community wealth building has been to harness the spending power of anchor institutions through public procurement to retain mobile capital that would have

² See <https://www.councils.coop/case-studies/preston-co-operative-development-network/>.

otherwise leaked out of the region. This approach has been criticised for its protectionist stance towards local suppliers in procurement contracts which, if followed by other localities, could lead to a competitive race-to-the-bottom (Thompson 2020) and for its narrow view of value capture and anchoring (Uyerra et al 2017). While acknowledging that this approach is not risk free, CLES notes that it provides “the best options to enhance the opportunities of individuals and workers [...] as continued economic, social and territorial conflict continues to erode the economic, social and political foundations on which current and future well-being is based.” Preston has pursued these policies for nearly ten years in face of further local government austerity measures and is also planning to establish a co-operative community bank. It was named most improved city by the PWC/Demos (2018) Good Growth for Cities Index,³ due to a reduction in the unemployment rate and increases in the share of the workforce paid more than the real living wage, evidence that these policies are making a real difference.

5 Comparing Resilience in Greater Manchester and Preston

We compare the economic resilience of Greater Manchester and Preston by first dating the business cycle turning points (see Sensier and Devine 2020a) to determine if regions have experienced recession and then recovered their pre-recession peak level of output, employment and productivity. We assess how GM and Preston fared in the run up to the financial crisis, then during the recession and how they subsequently recovered. We examine time series data for real balanced GVA with Office for National Statistics (ONS) annual time series over the sample 2002–2018 (in 2016 pounds sterling which takes account of regional price differences, see ONS 2020). The employment series is the amount of productivity jobs from the ONS sub-regional productivity release. We calculate real productivity as:

$$\text{Real Productivity} = \text{Real GVA/} \text{Productivity Jobs} \quad (\text{F1})$$

When we have established the turning points of the business cycle we can calculate a range of indicators that will be utilised in the resilience scorecard. The duration of the recession is the difference in years between the trough and peak dates. We calculate the LOSS over the recession where we take the difference in

³ See <https://www.theguardian.com/politics/2018/nov/01/preston-named-as-most-most-improved-city-in-uk>.

the level of employment in a region (Emp_r) between the peak and trough dates and divide this by the level at the peak, multiplying by 100 to show a percentage loss:

$$LOSS = 100.[(Emp_{peak_r} - Emp_{trough_r})/Emp_{peak_r}] \quad (F2)$$

To compare the resistance of regions to the nation we compute a sensitivity index (β_r) from Martin (2012) which is the percentage change in the variable, here for employment lost in a region (Emp_r) compared to that lost at the national level (Emp_n), between peaks and trough turning points as follows:

$$\beta_r = \left[\frac{100.(Emp_{peak_r} - Emp_{trough_r})/Emp_{peak_r}}{100.(Emp_{peak_n} - Emp_{trough_n})/Emp_{peak_n}} \right] \quad (F3)$$

If the value of $\beta_r > 1$ then the region has lost a greater percentage of employment than the nation and is less resistant to the recession but if the $\beta_r < 1$ then the region has lost a smaller share of employment than the nation and is more resistant to the recession than the nation. We calculate the expansion average growth rate (EAGR) to measure the five-year average of the growth rate (first difference of the natural log) before the recession including the date of the peak year. We calculate the rate of growth for the series after the trough by taking the second expansion average of the growth rate (E2AGR) for five years following the recession. To rank the region's economic resilience we present a resilience scorecard that compares regional statistics before, during and after the recession to assess a region's growth path. The resistance of regions are compared to the nation as the benchmark along with how quickly they recovered from the crisis. The renewal measure compares the growth rates five years before the recession and then five years after the recession. A greater rate of increase after the recession indicates that the region has rebounded strongly and is accelerating to a higher growth path. The date of recovery is noted when the region has regained its pre-recession peak level or if by 2018 (last year available) it has not recovered (NR). We will analyse data at the NUTS 2 level (Greater Manchester and Lancashire) and then also NUTS 3 level within those areas (see the Appendix Table A.1 for list of NUTS 3 regions). The resilience scorecard compares 4 statistics for each region over the recession and up to 2018, including:

- 1) RESISTANCE: Has the fall in GVA/jobs/productivity been less than the national decrease ($\beta_r < 1$)?

- 2) DURATION: Has the duration of the recession been shorter or the same as the national recession?
- 3) RECOVERY: Has the region recovered faster or at the same time as the nation?
- 4) RENEWAL: Was the rate of growth after recession greater than before (E2AGR>EAGR)?

If the answer to the above questions is yes, then the region is classified as being more resilient than the national data series and is coded 1, if no, it is less resilient and coded 0. Based on this we sum up all regions over four categories for three variables the highest score if they are very resilient is 12.

The results for the UK national series are shown in the tables (UK charts are shown in Sensier and Devine 2020a) as we benchmark the regions against the

Table 3 Real GVA Business Cycle Turning Points and Resilience Measures

Region	Peak Year	Trough Year	Loss Peak to Trough	Beta—Resistance	Year Recover	EAGR	E2AGR
UK	2007	2009	-4.1	1	2011	2.99	2.2
NW	2007	2009	-3.61	0.88	2014	3.02	1.44
GM	2007	2009	-3.17	0.77	2012	2.97	1.3
UKD33	2008	2009	-1.64	0.4	2011	3.56	1.35
UKD34	2007	2009	-4.54	1.11	2012	2.9	2.79
UKD35*	2007	2011	-1.15	0.28	2012	1.88	0.49
UKD36	2007	2009	-6.87	1.68	2015	2.29	0.86
UKD37*	2007	2011	-4.99	1.22	2015	2.42	1.2
Lancs	2007	2009	-8.01	1.96	2014	3.11	1.87
UKD41	2007	2009	-5.13	1.25	2013	2.76	1.85
UKD42*	2006	2012	-16.44	4.01	2018	3.63	3.59
UKD44	2007	2009	-13.52	3.3	NR	2.96	1.45
UKD45	2008	2009	-4.97	1.21	2012	1.39	1.55
UKD46	2007	2009	-10.75	2.62	2013	3.97	3.08
UKD47	2007	2009	-4.66	1.14	2012	2.05	1.1

Note: bold font in Beta—Resistance column signifies the region is more resistant than the nation. Bold font in the second expansion average growth rate (E2AGR) column means that this is greater than the expansion average growth rate (EAGR) before the recession. *Double Dip recession

UK series. We present the turning points and resilience measures for real GVA in Table 3 which shows that the GVA loss over the recession for the North West was -3.6% and for GM was -3.2% both less than the national loss so they are more resistant (with beta-sensitivity index is less than 1 and is highlighted in bold font and shown in Fig. 1). Within GM GVA contracted the least in the Stockport and



Fig. 1 Greater Manchester and Lancashire Business Cycle Phases

Tameside NUTS 3 sub-region (UKD35) by -1.2% though it suffered a double dip recession lasting four years (a second deeper fall after an initial recovery) and Manchester (UKD33) GVA contracted by -1.6% . Bolton and Wigan (UKD36) had the deepest contraction of -6.9% along with Bury, Oldham and Rochdale (UKD37) which contracted by 5% over four years, both of these areas took the longest time to recover within GM of eight years. The Lancashire NUTS 2 region had a deeper recession loss of -8% , within this region the NUTS 3 region UKD42 (Blackpool) had the deepest contraction of -16.4% with a long recovery lasting 12 years. The area UKD44 (Lancaster and Wyre) suffered a deep recession of -13.5% loss over two years and is yet to recover its pre-recession peak (with data up to 2018). The Preston sub-region (Mid-Lancashire, UKD45) contracted -5% over one year and returned to its pre-recession peak in 2012 though suffered a small downturn the following year (see Fig. 2). In Table 3 the seventh column presents the pre-recession growth rate for five years up to and including the peak, the last column shows the growth rates after the trough of the recession for five years. In all cases apart from Preston the growth rate was lower following the recession.

Table 4 presents the results for the employment series for the UK and regions. Here we find generally greater loss than the national apart from for the North West (-0.8%) and for the Salford and Trafford sub-region (UKD34), loss of -0.6% . GM and Manchester were later to enter recession with the peak dated at 2010, and a recession lasting a year, this could coincide with the large number of local government job losses which began with austerity measures after 2010. The jobs level recovered by 2013 in Manchester (as shown in Fig. 2) with a rapid post-recession growth rate of 3.7% , more than double the five years before the recession.

All sub-regions within GM experienced higher growth rates after the recession though the sub-region of Stockport and Tameside (UKD35) experienced a deep double dip recession of -6.4% , only recovering the pre-recession level after 10 years by 2018. The jobs lost within Lancashire and its sub-regions were greater than the national rate with the deepest loss in the Lancaster sub-region (UKD44) which along with the Preston sub-region (UKD45) had not recovered its pre-recession peak levels, with lower growth rates after the recession (see Fig. 2).

Table 5 presents the results for real productivity and from here we can see that the loss within the North West, GM and Manchester was lower than the national, and the post-recession growth rate is much lower than before, apart from the sub-region of Stockport and Tameside (UKD35) which has a slightly higher growth rate than before. The productivity loss for Lancashire is deeper than the

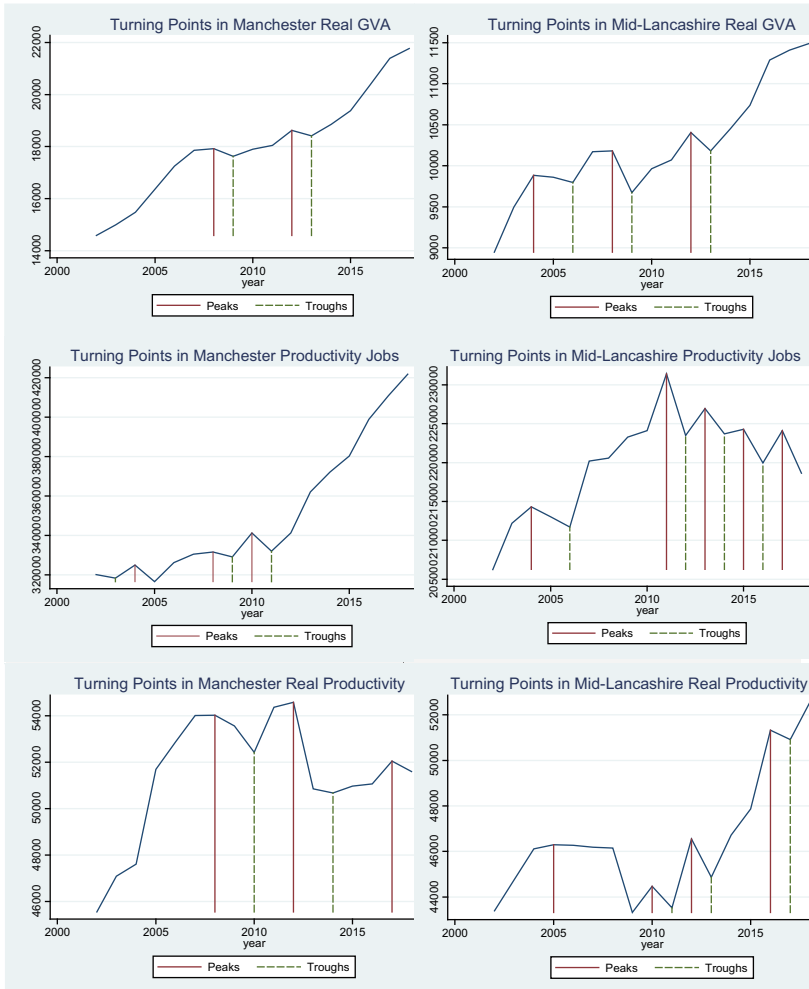


Fig. 2 Manchester and Preston Business Cycle Phases

national and most sub-regions take longer to recover with Lancaster (UKD44) not recovering its pre-recession level. The Preston sub-region (UKD45) does recover by 2014 and has a 1.5% growth rate after recession and in Fig. 2 we can see the productivity level continues to grow after recession, but mainly due to anaemic

Table 4 Productivity jobs business cycle turning points and resilience measures

Region	Peak Year	Trough Year	Loss Peak to Trough	Beta—Resistance	Year Recover	EAGR	E2AGR
UK	2008	2009	-1.49	1	2012	0.94	1.06
NW	2008	2011	-0.76	0.51	2013	0.62	1.15
GM	2010	2011	-1.8	1.21	2013	0.16	1.64
UKD33	2010	2011	-2.73	1.84	2013	1.5	3.67
UKD34	2007	2008	-0.6	0.41	2010	0.59	0.86
UKD35*	2008	2013	-6.4	4.31	2018	1.23	1.65
UKD36*	2008	2012	-3.3	2.22	2014	-0.0005	1.62
UKD37*	2007	2011	-6.35	4.28	2016	1.16	1.46
Lancs.*	2008	2012	-2.59	1.74	2016	1.07	0.41
UKD41	2008	2011	-10.92	7.35	2014	1.33	2.52
UKD42*	2006	2013	-7.84	5.28	2018	-0.34	2.06
UKD44*	2008	2012	-11.06	7.44	NR	1.77	1.18
UKD45	2011	2012	-3.43	2.31	NR	1.78	0.05
UKD46	2008	2010	-7.94	5.35	2016	0.61	1.46
UKD47	2007	2009	-5.49	3.69	2014	1.73	1.19

*Double dip recession

job growth. The sub-region of Chorley and West Lancashire (UKD47) has a three year recession but the loss of productivity is more resistant than the national, it has a negative rate of productivity growth before the recession but a greater rate of 2% after the recession.

In Table 6 we present the total scores for the resilience scorecard in the final column. Based on these measures Greater Manchester (UKD3) scores more points on the resilience scorecard with 7/12 than Lancashire (UKD4) with 2/12. Within GM, Manchester scores highest in the resilience scorecard with 9/12 points in total, giving support to Haughton et al (2016) that the dense city centre has been the most successful with the greater focus of the devolution deal. Points lost for Manchester were due to the growth rates of output and productivity being lower following the recession and employment experiencing a greater percentage loss than the nation. The least resilient region within GM is Bolton and Wigan (UKD36) sub-region which scores 3/12 points for higher employment growth

Table 5 Real Productivity Business Cycle Turning Points and Resilience Measures

Region	Peak Year	Trough Year	Loss Peak to Trough	Beta—Resistance	Year Recover	EAGR	E2AGR
UK	2007	2009	-3.51	1	2011	2.06	1.13
NW	2007	2009	-3.31	0.94	2013	2.27	0.66
GM	2007	2010	-2.51	0.72	2012	2.23	0.74
UKD33	2008	2010	-2.96	0.84	2011	2.75	-0.56
UKD34	2008	2010	-5.83	1.66	2013	2.11	1.83
UKD35	2006	2008	-2.59	0.74	2010	1.5111	1.5113
UKD36	2007	2009	-6.59	1.88	2017	1.76	0.33
UKD37	2008	2009	-1.97	0.56	2011	1.95	0.16
Lancs	2007	2009	-7.82	2.22	2014	2.36	1.65
UKD41	2006	2008	-5.32	1.51	2011	3.09	0.71
UKD42	2007	2009	-16.77	4.77	2017	2.78	1.09
UKD44	2006	2009	-17.01	4.84	NR	2.27	2.12
UKD45	2005	2009	-6.41	1.82	2014	2.16	1.51
UKD46	2007	2009	-9.93	2.83	2013	4.69	2.66
UKD47	2008	2011	-1.31	0.37	2012	-0.98	2.03

after the recession and for a two-year-recession duration in output and productivity, the same as the nation. Preston (UKD45) scores 4/12 with output the most resilient indicator. Lancaster (UKD44) is the least resilient area within Lancashire with 1/12 points and Chorley (UKD47) is the most resilient with 5/12 points.

In Table 7 we compare a range of alternative indicators that consider quality of life and rank these for our sub-set of areas, in the second column we include the ranking of areas from the resilience scorecard (where 12/12 points is the 1st rank and 1/12 ranks 12th). In the third column we list the Inclusive Growth (IG) score from the Centre for Progressive Policy (CPP 2019) using a range of 2016 data on five key outcomes including consumption, healthy life expectancy, leisure, inequality and unemployment. Higher scores in this indicator point to local economies that provide all round good quality of life. The Centre for Thriving Places (2020) Index (TPI) show the latest measures for a range of factors that affect individual and societal well-being within the three categories of equality (health, income, gender, ethnicity and social), sustainability (energy use, waste and green infrastructure rated) and local conditions (covering many indicators for

Table 6 Resilience Scorecard for NUTS 2 & 3 regions

RS	GVA				Jobs				Productivity				Sc
	1	2	3	4	1	2	3	4	1	2	3	4	
UKD3	1	1	1	0	0	1	1	1	1	0	0	0	7
UKD4	0	1	0	0	0	0	0	0	0	1	0	0	2
UKD33	1	1	1	0	0	1	1	1	1	1	1	0	9
UKD34	0	1	1	0	1	1	1	1	0	1	0	0	7
UKD35	1	0	1	0	0	0	0	1	1	1	1	1	7
UKD36	0	1	0	0	0	0	0	1	0	1	0	0	3
UKD37	0	0	0	0	0	0	0	1	1	1	1	0	4
UKD41	0	1	0	0	0	0	0	1	0	1	0	0	3
UKD42	0	0	0	0	0	0	0	1	0	1	0	0	2
UKD44	0	1	0	0	0	0	0	0	0	0	0	0	1
UKD45	0	1	1	1	0	1	0	0	0	0	0	0	4
UKD46	0	1	0	0	0	0	0	1	0	1	0	0	3
UKD47	0	1	1	0	0	0	0	0	1	0	1	1	5

example: transport, housing and social cohesion). Both these sources have been produced using data from after the financial crisis and no comparable measures are available from before the crisis.

We find that Manchester has scored highly in the resilience scorecard but ranks the lowest of all the GM districts for inclusive growth and local conditions, with the lower rates of healthy life expectancy pulling down this measure as also discussed in Lupton et al (2019). Here we find that Preston has a higher outcome for the equality ranking, this is helped by having lower health inequalities, but scores lower on sustainability with a lower score for green infrastructure. The sustainability measures put Salford ahead and this is helped with a higher scores for waste recycling and green open spaces. We rank the scores for each indicator in the column next to the index and in the last column of Table 7 we sum all the ranks to give a more balanced measure of societal well-being. From this summation we find that Trafford ranks the highest out of the GM districts and this is driven by the best local conditions and inclusive growth, other districts that perform well include Stockport and Bury with Preston ranking in third place of the total scores adding resilience to well-being.

Table 7 Resilience with CPP Inclusive Growth and Thriving Places Indices

Region	Res. Rank	IG CPP	R	TPI Equality	R	TPI Local Conditions	R	TPI Sustainability	R	T
Manchester (UKD33)	4	0.52	11	5.45	6	3.72	11	6.28	2	34
Salford (UKD34)	6	0.6	9	5.36	8	3.99	8	6.9	1	32
Trafford (UKD34)	6	1.25	1	5.41	7	5.75	1	5.11	10	25
Stockport (UKD35)	6	1.04	2	4.17	11	5.49	2	5.55	5	26
Tameside (UKD35)	6	0.59	10	5.95	3	4.04	7	5.82	3	29
Bolton (UKD36)	10	0.8	6	5.3	9	4.18	6	5.51	6	37
Wigan (UKD36)	10	0.82	5	5.28	10	4.62	5	5.43	9	39
Bury (UKD37)	9	0.92	4	5.99	2	5.03	3	5.49	8	26
Oldham (UKD37)	9	0.67	7	5.73	5	3.97	9	5.5	7	37
Rochdale (UKD37)	9	0.66	8	5.82	4	3.86	10	5.59	4	35
Preston (UKD45)	9	0.94	3	6.1	1	4.93	4	4.81	11	28

Note: Ranks (R) in columns 2, 4, 6, 10 and 11, higher ranks signify better outcomes. Indices in columns 3, 5, 7 and 9, higher numbers signify better outcomes. Total (T) rank in last column

6 Conclusions

In this chapter we have reviewed the literature on regional economic resilience and discuss how it interrelates with systems of governance, local sustainability and inclusive growth. Resilience is a complex and multifaceted phenomenon shaped by pre-existing structural conditions, networks as well as institutional and governance configurations. We compared the economic resilience and recovery of Greater Manchester and Preston from the global financial crisis and compared the devolution deal making and municipal socialism styles of governances that have evolved over the ten years since the crisis. Our key empirical finding from our economic resilience scorecard is that Manchester has been the most resilient sub-region, particularly in the recovery of jobs since the crisis. Peripheral areas, like Bolton and Wigan, have continued to suffer and probably will continue to until austerity measures are reversed and they received targeted investment and support. Tentatively, we conclude that policies targeted at dense agglomerations (like city deals and the Northern Powerhouse devolution settlements) have not spread benefits to surrounding areas. When we widen our analysis to examine indicators for societal well-being Manchester ranks poorly for inclusive growth, particularly with poor health and life expectancy outcomes, so even within Manchester the proceeds of growth are not being shared equitably to improve the life chances of its poorest citizens. Peripheral areas that score well include Trafford and Stockport which were already prosperous and they have shown average resilience in recovery from recession and good well-being scores. Preston has enjoyed increasing output and a recovery in productivity but at the expense of falling levels of employment. It has scored better on good growth measures in that it has reduced unemployment and the number of people earning less than the real living wage as a direct result of the community wealth building policies. It ranks highly for measures of health and income equality and local conditions which contribute to inclusive growth.

In recovery from the current crisis local and national policy should be directed at regenerating sustainable and equitable regional economies and to continue with a meaningful levelling up agenda. Rather than a return to measures of austerity economics to balance the budget (which has left communities further behind and possibly sewn the seeds for rising nationalism and populism which could have led to the Brexit vote) the country should aim to improve international collaboration and look towards Europe for more redistributive policies. After reunification in Germany all citizens paid a solidarity tax as part of their income tax to help with redistribution of funding towards East German region's infrastructure to help them level up. Raising higher income tax on all workers who earn more than the

median salary should be considered in the UK and should be put to the working population as a “recovery tax” that will go towards paying down Government debt and also lifting the wages of the lower paid workers to the real living wage who in times of crisis have become the indispensable “key workers” (these include health and social care workers, local and national government workers, teachers and child care providers, food processing, retail and delivery drivers, policy and utility workers⁴). These workers in the foundational economy are less able to work from home and have therefore put themselves on the frontline in times of crisis and have been more exposed to coronavirus contagion. Local councils need to see a reversal of austerity cuts so they have greater capacity and revenue funding to plan and react faster during a crisis as they are on the front line of emergency response with local resilience forums.

Future local economic development strategies should include measures to enhance firm capacity, particularly those rooted within communities. More collaborative and co-operative approaches are needed, as followed in Preston, which share the proceeds of growth more equitably and the structures for community finance need to be enhanced by increasing the capacity of credit unions or introducing community banks. Innovation vouchers could be offered to firms during the crisis similar to those distributed in Germany during the financial crisis which helped companies in the automotive sector in Stuttgart continue to innovate during the downturn to allow them to bounce back in the recovery (Wink et al 2018). These will enhance the capacity of related and unrelated variety firms to pivot so they can respond during a crisis, these could also be directed towards green infrastructure investments to respond to the climate crisis.

Appendix

See Table A.1

⁴ See UK Government advice at <https://www.gov.uk/government/publications/coronavirus-covid-19-maintaining-educational-provision/guidance-for-schools-colleges-and-local-authorities-on-maintaining-educational-provision>.

Table A.1 Region codes and names

Code	Region Name
UKD	North West
UKD3	Greater Manchester
UKD4	Lancashire
UKD33	Manchester
UKD34	Greater Manchester South West (Salford & Trafford)
UKD35	Greater Manchester South East (Stockport & Tameside)
UKD36	Greater Manchester North West (Bolton & Wigan)
UKD37	Greater Manchester North East (Bury, Oldham & Rochdale)
UKD41	Blackburn with Darwen
UKD42	Blackpool
UKD44	Lancaster and Wyre
UKD45	Mid Lancashire (Fylde, Preston, Ribble Valley & South Ribble)
UKD46	East Lancashire (Burnley, Hyndburn, Pendle & Rossendale)
UKD47	Chorley and West Lancashire

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Resilience in the Periphery: What an Agency Perspective Can Bring to the Table

Heli Kurikka and Markus Grillitsch

1 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 et al. 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

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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 and Sunley 2015, p. 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, p. 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, p. 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 and Sunley 2015, p. 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 and Bishop 2018). Notwithstanding some exceptions (Bristow and 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 and Sotarauta 2020). Grillitsch and Sotarauta (2020) 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 Sect. 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 Sect. 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 Sect. 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.

2 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 and 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 and Sunley 2015).

Third, ‘adaptive resilience’ or ‘evolutionary resilience’ emphasizes structural and operational adaptations to shocks (Martin and 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, p. 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 and Sunley 2007).

The usefulness of the concept of resilience within economic geography has also been challenged. Hassink (2010, p. 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 whose resilience to what is investigated (Carpenter et al. 2001; Martin and 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 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 and 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.¹

A slightly different kind of categorization is presented by Martin and 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, p. 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

¹ 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 et al. 2018) and therefore better matches Martin's concept of re-orientation.

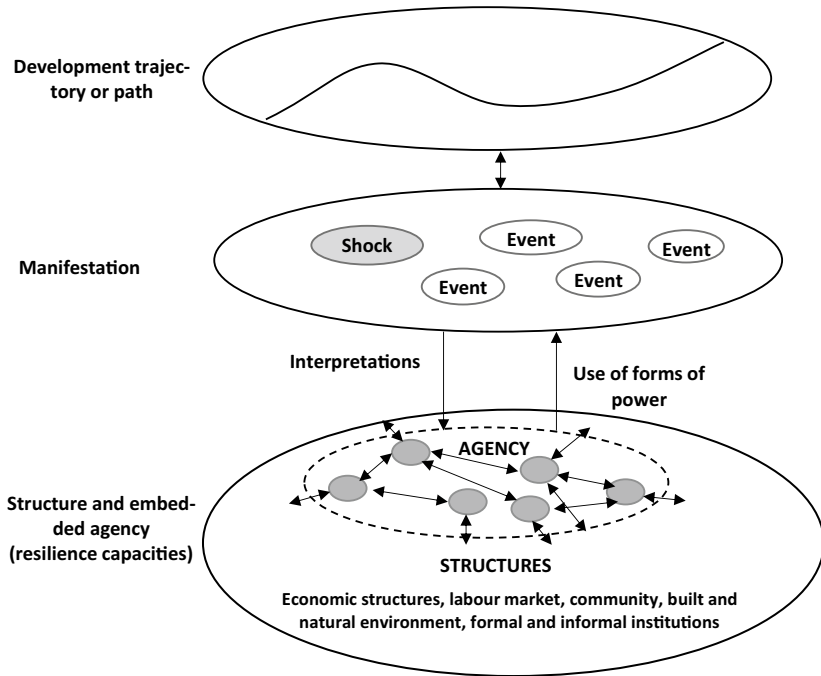


Fig. 1 Analytical layers of regional economic resilience (see e.g. Grillitsch and Sotara 2020; Bristow and Healy 2014b; Martin and Sunley 2015; Sensier 2018; Giddens 1984)

behind adaptation are rooted in close and tight bonds (Pike et al. 2010; Granovetter 1983). 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.

3 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 2020, 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 et al. 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 2020; Jolly et al. 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 et al. 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 et al. 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 et al. 2015; Sotarauta et al. 2017). The focus does not lie 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 (2020) introduce the notion of opportunity spaces. The authors (p. 713) 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 are examples 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 et al. 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 Trippel 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

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

Conceptualization of Resilience		Conceptualization of Agency	
Adaptation	<ul style="list-style-type: none"> Resistance Recovery Renewal 	Maintenance Agency	
Adaptability	<ul style="list-style-type: none"> Re-orientation 	Change Agency	
Key Sources: Grabher & Stark 1997; Hassink 2010; Pike et al. 2010; Martin 2012; Boschma 2014		Key Sources: Grillitsch & Sotarauta 2020; MacKinnon et al. 2019; Jolly et al. 2020	

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. Martin's approach to these phenomena is mainly based on structural conditions. For example, in some cases peripheral regions may avoid a shock because of lack of integration to global markets. As our approach to these phenomena is agency-related we do not focus on this 'structural resilience' here but refer to cases where an actual adversity has encountered a region and resisting its effect requires active efforts. We aim to explain processes of adaptation and adaptability by underlying agency patterns where adaptation results from maintenance agency and adaptability from change agency.

4 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 referring to 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 or groups of them 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 or group 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.

The research design included the following steps (Grillitsch et al. 2020). 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. 2020). 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.

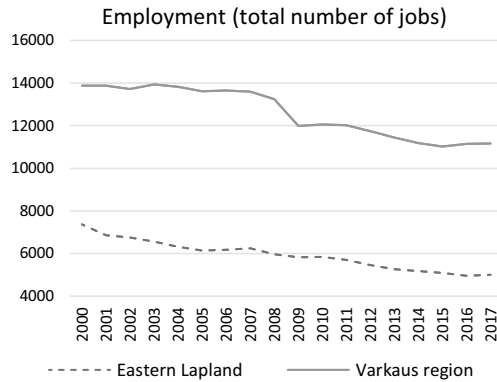
15 interviews were conducted for Eastern Lapland (13 local/regional, 2 national level actors) from March 2019 to January 2020 and 17 interviews for Varkaus region (17 regional/local, 2 national level actors) between June 2019 and February 2020. Informants were key people representing local, regional,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

5 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. Also, mechanical engineering industry struggled. However, 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 different outcomes. Relatively minor differences in structural preconditions allow comparisons of agency patterns and changing opportunity spaces.

The study of amount of jobs in the region (Fig. 2) indicates that the employment loss in Varkaus in 2008–2009 was severe. After a short recovery phase downhill continued but since 2015 the employment has been growing again. In Eastern Lapland the immediate reaction was not quite that severe but labour market has been deteriorating rather steadily ever since. Therefore, it can be argued

Fig. 2 Number of jobs in the region in 2000–2017 period (data source StatFin 2020)



that Varkaus region seems to have taken its first steps of returning back to a growth track i.e. having long-term adaptability.

Finland's geography with long distances and a sparse population (18.2 per km²) 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 subregions were growing while in 2018 only 12 were growing. Until 2030 predictions suggest that only 10 subregions, 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 with 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 forms 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. 24% of the people over 25 years old had a higher-level education in 2005 and 27% in 2015, which is in the average class among regions in Finland (StatFin 2020). 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 begun 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 gained 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 focused on diversification into new products or markets and on 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 focused 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 was raised from the ashes and it became one agent for change itself. 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 subregion 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, which were mostly a result of the state industrialisation policy. 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 does not provide higher than secondary level education, for example only 17% of the people over 25 years old had a higher-level education in 2005 and 19% in 2015, which is a lot lower than in Finland on average (StatFin 2020). Region 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 off 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 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 above-mentioned 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 global competition. Recovery has been a slow process. However, the crisis resulted

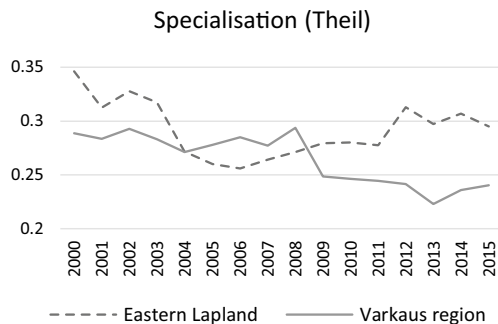
in some changes of local agency patterns. Local actors did take the lead in getting new investments to the region and reached out to China, hoping to attract a company that would be a good partner in developing newest technological and organisational innovations.

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 had 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 and also improved more its 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 made two years earlier than in Varkaus 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 national policy responses in both situations were rather similar. Regions were stated as regions of ‘abrupt structural change’ that received special state funding. However, the local actions were different.

The Theil index describes relative regional specialisation of the employment (Fig. 3) (see Grillitsch et al. 2019, p. 34). It indicates that Eastern Lapland region has become more specialised (or lost its diversity). Varkaus region has become less specialised which may signal that crisis actually led to more versatile and therefore less vulnerable employment structures.

Fig. 3 Specialisation (Theil index) of the regional employment (Data 2018 source: Employment statistics)



The patterns of agency in these two regions are not that similar either. This also has historical roots. Eastern Lapland had been for a long time an object of regional development policies conducted by the public sector. For example, forest industry was imported to the region by the state in the 1960s. The roots of the Varkaus industrial history were more endogenous, based on engineering skills and dated back over 100 years. Varkaus had also already experienced a period of change and survived before when they encountered the chopping and selling of the local conglomerate in the 1990s. 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.

6 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.

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Regional Resilience: Lessons from a Region Affected by Multiple Shocks

Patrizio Bianchi and Sandrine Labory

1 Introduction

The concept of resilience is intimately linked to the conceptualisation of regions (territories of various sizes and at various levels) as systems, more precisely socio-economic and ecological systems. In biology, resilience means the capacity of a natural system to face and adapt to shocks, in the sense that the whole system coherently transforms to be able to live in the new environment. The concept of regional resilience has gained momentum around the 2008 financial crisis, which raised awareness among citizens and politicians that the world was increasingly exposed to shocks: the number and frequency of shocks has been rising, including natural disasters linked to climate change and other environmental disasters, but also global financial crises and recently pandemics (Gong et al. 2020); globalisation making the different world countries more likely to be affected by shock arising even in distant territories.

Disasters induce great stress and damages to the population in the affected area. Climate change implies that in many places in the world populations will increasingly be confronted to extreme weather conditions and natural disasters such as floods, hurricanes, and so on. In this context the literature on recovery from disasters, as well as preparation to potential disasters, particularly those caused by climate change, has substantially developed. Geographers have addressed

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numerous issues, including the probability of disasters and their socio-economic impact. Sociologists have studied the role of social actors in emergency and recovery. Management studies have focused on mitigation, preparedness, response and recovery programmes (see Cho 2014, for a review). Political scientists and economists have highlighted the role of leadership, institutional networks, empowerment, as well as multi-level governance (MLG) and enhancing the institutional capacity at all government levels (Durant et al. 2004; Dryzek 2005; Amundsen et al. 2010; Meijerink and Stiller 2013; Osberghaus et al. 2010).

The literature has pointed to the importance of governance in the success of both adaptation and emergency and recovery policies (Alexander 2010; Özerdem and Jacoby 2006). Governance means the process of policy decision-making, the manner in which it unfolds and is realised and how the different stakeholders interact in the governing process. Good governance has been highlighted as a key factor for the success of policymaking in general (for instance, OECD 2006, 2012). The UN departments specialised in disaster resilience have also pointed to the importance of good governance for the success of recovery (UNDP 2010, 2015). Participative and democratic processes are particularly underlined, whereby the affected population directly takes part in the policy process in various ways, especially through the involvement of civil society organisations.

Regarding climate adaptation (for instance, Amundsen et al. 2010; Hovik et al. 2015) and disaster recovery (Boettke et al. 2007; Alexander 2010; Cho 2014), the discussion of multi-level governance seems to have focused on two levels: the national and the local one, where local generally means communities or municipalities. In particular top-down versus bottom-up approaches have been compared, demonstrating the advantages of decentralisation and empowerment to local communities. The national state can provide resources but is generally far away from the populations in the affected areas and may lack adequate information and knowledge to define appropriate priorities for emergency relief and reconstruction. In centralised systems this led in many cases to an important role of communities or civil society organisations: for instance after the earthquakes in Kobe, Japan of 1995 and Marmara region, Turkey, in 1999 (Özerdem and Jacoby 2006); also in the case of Hurricane Katrina in 2005 (Boettke et al. 2007) and L'Aquila earthquake in Italy in 2009 (Alexander 2010).

However, there are intermediate levels of government that might have a role in emergency and recovery governance as well as climate adaptation, such as the regional one. In contrast to more local levels, they may have higher capacity to raise financial and material resources; they may also have broader perspectives and be able to propose solutions beyond localism. More importantly, they may act as coordinator of local communities involved, understanding the different interests

and needs and being able to provide a synthesis and decide on collective actions that take the different interests and needs as well as social norms into account (Ostrom 2000). They are closer to local knowledge than national levels and may be more able to mobilise local actors.

This chapter analyses the policy-decision process of emergency and recovery in the Emilia-Romagna (ER) Region in Italy after an earthquake arising in May 2012. The methodology is based on interviews with policymakers and stakeholders involved in the policy process, as well as desk information obtained from various sources. It shows two main points. First, there is a role for intermediate levels of government between the national and the local ones in defining priorities and mobilising resources, so that the multi-level governance framework of policymaking has to be considered in its whole complexity, especially in bigger countries. Second, learning is key in building a capacity for adaptation.

The chapter is structured as follows. The first section defines multilevel governance and its main characteristics. The second section shows how it has been taken into account in the literature on reaction to and recovery from disasters. The third section discusses the institutional framework in Italy and the previous experiences with earthquakes. The fourth section examines the case of the 2012 earthquake in the ER region and is followed by the conclusions.

2 Multilevel Governance and Government

Governance defines the characteristics of the policymaking process: information gathering, diagnosis and decision, implementation and monitoring. While government means the institution that has the formal authority to make decision, governance also includes other stakeholders that may be involved in the decision-making process, such as private institutions and civil society organisations. Governance appears to be more about the process of decision-making, the analysis of how it unfolds and is realised and how the different actors interact in the governing process. This is the definition adopted by international organisations dealing with resilience from disasters and climate adaptation (UNDP 2015, 2010). Multi-level governance is therefore about the complex system of interactions between stakeholders at all levels of government, engaged in the exercise of authority. It is a process by which different interests are accommodated and collective action is decided.

The concept of multi-level governance has been defined in political science studies first by Marks (1993) in the context of the European Union decision-making framework. The concept assumes that decision-making competencies and power

are not exclusively held by national states, but also by subnational and supranational levels. Multi-level governance has been praised as bringing a number of advantages. First, the dispersion of governance across multiple jurisdictions has been shown to be more efficient than central state monopoly in a number of cases (Hooghe and Marks 2001). For instance, it has been shown that in order to internalize externalities, governance must operate at different scales: global warming for instance implies that externalities arise at world level and public goods should be defined at that level. Second, more decentralised jurisdictions can better reflect the heterogeneity of preferences and needs of citizens. Third, multi-level governance may facilitate credible policy commitments (Majone 1998). Fourth, it allows for competition between jurisdictions and may facilitate innovation and experimentation. Authority and resources normally flow from the national government while the local level obtains more knowledge about the situation, the available local resources, the requirements and needs.

Hooghe and Marks (1996) defined two types of multi-level governance, namely state-centric meaning hierarchical decision-making process generally top-down and multi-level governance where decision-making is made in networks rather than hierarchies. MLG is therefore characterised by democratic processes, where non-state actors are involved. This increases the democratic accountability and the importance of the coordination and steering functions in MLG, where the relationships between actors appear more as networks than as hierarchies. In addition, the culture, the political system and the socio-economic conditions differ at different scales of government and determine the form that the multi-level governance framework can take.

Multi-level governance is a useful concept in the analysis of climate adaptation policies and resilience from disasters. Both generally involve very localised problems, such as a territory prone to disasters related to climate change (hurricanes, floods) or a territory affected by disasters. In these cases, knowledge is better available at the local level than the national one. The national level may obtain that knowledge, but this takes time and urgency cases such as disaster emergency and recovery make it necessary to directly involve the local level. In addition, it has been shown that the more complex and uncertain the policy problem is, the more local authorities should be involved and empowered (Amundsen et al 2010; Bailey and Pill 2015).

The discussion of multi-level governance in climate adaptation and disaster recovery may also be related to the general trend that has been observed toward decentralisation and empowerment. Yetano et al. (2010) observe an international trend towards more involvement of citizens in policymaking in order to make the policy process more legitimate. Bailey and Pill (2015) analyse the concept

of empowerment in the context of two local case studies in the UK. They argue that this empowerment may make policy more effective since involved local communities may mobilise to a greater extent towards the achievement of the policy goal. In addition, the public goods or services provided by the policy are likely to be more responsive to local needs.

However, empowerment may also be a mean to reduce spending on policy. In addition, local empowerment and involvement of local communities may induce a lack of broad perspectives on problems, allowing to temporarily solve the problem but not to address the deep (and broader) root of the problem. Complex policy issues such as climate adaptation and disaster recovery require the coordination of different actors at different levels of government, because knowledge and resources are distributed in networks of actors (Amundsen et al. 2010). Meijerink and Stiller (2013) stress the role of leadership in climate adaptation, especially in MLG. Leaders have the capacity to gather people, collect information, listen to different stakeholders and make synthesis and decisions. They also have the ability to create consensus and mobilise people and institutions towards the decided actions and goals. Therefore, it is important to consider multi-level governance in complex and uncertain policy cases such as climate adaptation and disaster resilience. The latter is particularly interesting to study because disasters create stress on governments to make rapid decisions and show capacity for adaptation. Another reason for preferring the study of a case of disaster rather than climate adaptation is that the latter policy has only recently started to be implemented in Italy with a national strategy for climate adaptation adopted in 2013. The next section therefore focuses attention on multi-level governance and resilience (emergency and recovery) from disaster.

3 Disaster Recovery and Multi-Level Governance

Many countries have national governance of disaster with a central organisation created to react in case of disaster. For instance, the US has a system with the Department of Homeland Security (DHS) at the top (created after the 9/11 disaster). The DHS has 22 federal agencies and 170,000 employees. The Federal Emergency Management Agency (FEMA) is part of the DHS and has 10 regional sub-offices across the country. Each state has an emergency management agency that should manage the disaster, i.e. evaluate damages, define an emergency plan and reconstruction plan and deliver community emergency services.

The system in the USA is therefore very hierarchical and complex. The problem is that this leads to very time-consuming decision-making processes which

do not work in emergency where rapid response is required. In case of disaster, each state evaluates the damages, defines an emergency and recovery plan, and submits it to FEMA. FEMA then evaluates the proposal, makes a report to the President who makes the final decision. In the case of recovery after Hurricane Katrina, this system created delays and inefficiencies due to corruption and the lack of reliance on local communities (Boettke et al. 2007). Some local communities mobilised to reconstruct after the disaster, but the support provided by FEMA even created obstacles to their activities. For instance, local businesses had difficulties in finding employees because the activities financed by FEMA paid much higher wages. Therefore, local communities were left isolated, and no coordination of their efforts occurred.

In Japan, since 1945, the tendency has been for a centralisation of the political system at national level with little power for regions. According to Matanle (2011), this has led to a reduction of the socio-economic vitality of Japanese regions. A number of reforms have been implemented to revive the role of regions since 2000, but the aim of this decentralisation seems to have been more reduction of national budget deficit than more autonomy of the Japanese regions (Cho 2014). Cho (2014) argues that this centralised system impeded an efficient recovery after the disaster on the East coast of Tohoku in Japan in March 2011. In particular, the national government made decisions without the involvement of local communities which were thought to only look after own interest, so that decisions and actions were delayed.

Hence, the literature on emergency and recovery from disasters has increasingly stressed the role of local levels of government and communities in favouring resilience. Armitage (2005) argues that community-based natural resource management (CBNRM) has diffused in recent years and has become a commonly used practice in climate change preparation: forest management, wildlife preservation, fisheries, water resources etc. According to Armitage (2005), CBNRM has three main characteristics. First, it allows to address both environmental and socio-economic goals and balance exploitation and conservation of ecosystems. Second, it implies the empowerment of communities, and third, it is assumed to be efficient by involving stakeholders who are directly affected by the resource management problem at hand.

Fois and Forino (2014) show that the role of local communities can indeed be strong in the example of a self-built ecovillage in L'Aquila, an Italian town affected by an earthquake in 2009. Whereas the national government decided a centralised action consisting in re-housing the local population in prefabricated houses in nearby areas as well as new towns made of earthquake-proof, sustainable and eco-compatible housing complexes (the CASE project), the community of

the Pescomaggiore village decided to take the initiative to rebuild the village next to the old one as an ecovillage where all the local community could be re-housed. This was successful and avoided the loss of identity and social cohesion induced by the relocation of the CASE project.

However, although these community actions can be effective, they remain very localised and do not include all the population and the area affected by the disaster. Community initiative may therefore be useful and encouraged by higher government levels, but they have to be coordinated. Coordination of the communities at national level could be ineffective because of its distance from local knowledge and information. Therefore, intermediate levels such as regions may be more adequate, and, as shown below, the case of the Emilia-Romagna region provides evidence of this point.

The role of communities in emergency and recovery governance processes in fact expresses the importance of social capital in development processes. The social capital has been emphasised as important factor favouring resilience (Aldrich 2012; Murphy 2007; Kelly and Agder 2000). Social capital is made of social networks, reciprocity and interpersonal trust, which allow individuals and groups to achieve greater things than they would on their own. This means that the civil society is very important in emergency management and recovery: communities or other social organisations. Kelly and Agder (2000) talk about the “architecture of entitlements” that determines resilience. The case of the ER region is interesting in this sense because the region has been shown to have high social capital with high participation rates in civil society as well as in voting processes (Bianchi and Labory 2019, 2011; Putnam et al. 1993; Pyke and Sendenberger 1992).

The involvement of communities however has both positive and negative effects. On the positive side, well-functioning communities have the trust of their members and the moral authority to urge cooperative behaviour and teamwork which the government may lack. In addition, the community can better assess needs, being close to individuals affected by the disaster, and distribute services and goods efficiently and equitably. On the negative side, a government funding of the community’s activities may undermine the independence and autonomy of the community. In addition, community leaders may make wrong decisions due to more direct emotional involvement such as staying in a damaged house. Lastly, the involvement of the community may lead to the exclusion of non-community-members. The involvement of communities can therefore be positive but not all action should be left to the community because they can have a narrow perspective and a lack of access to government funds for reconstruction. There might be corruption (as in Katrina case, Boettke et al. 2007) and criminal organisations creating obstacles to the recovery process.

Hence intermediate levels of government, between the local and the national ones, might be useful. The next sections aim at showing this point through the analysis of emergency and recovery policy after the 2012 earthquake in the ER region. The next section discusses the institutional framework for disaster response in Italy as well as previous cases of similar disasters, and Sect. 5 focuses on the case of the ER region.

4 The Institutional Framework in Italy and Previous Earthquakes

The Italian institutional framework has experienced important changes in the last decades with an increasing decentralisation. In 1999 the Constitutional law was reformed, allowing more statutory autonomy to regions, which can decide on both their form of government and their relationships with local governments. The Constitutional law of 2001 (n. 3) completes the reform of Title V of the Constitution by extending the competencies of the region in terms of legislation, particularly in the field of development policies.

Italy is regularly affected by earthquakes, although generally of a low magnitude. The last previously important earthquake which affected Italy—not in terms of magnitude but in terms of dramatic effects—before 2012 arose in L’Aquila (capital of the Abruzzi region in Italy) in 2009. It was the seventh earthquake affecting the country since 1968.¹ This earthquake was not sudden, since it followed a long sequence of minor earthquakes starting in October 2008 and ending in the summer of 2009. The strongest tremor was felt in April 2009 with a magnitude of 6.3, with epicentre very near to the town. The town is characterised by a historic centre with very old buildings which did not resist the seisms. 380 people were killed, 1500 injured. 60,000 buildings were seriously damaged, and 67,500 people left homeless. After the earthquake the historic centre was cordoned off and access restricted. People were immediately sheltered in tent camps, in hotels on the Adriatic coast or in alternative solutions found by the people themselves. The earthquake was of medium intensity but occurred in a vulnerable city.

¹ Earthquakes arose in Bellice (1968), Friuli Venezia Giulia (1976), Irpinia (1980), Umbria and Marche (1998) and Molise (2002).

In L'Aquila, like after most earthquakes arising in Italy before,² the emergency was managed by a commissioner nominated by the national government. The latter released important funds for reconstruction. Priorities for emergency and reconstruction were set at central level, without sufficient attention to the need and desires of the local communities. Priority was given to the provision of houses. The government rapidly decided to implement the so-called CASE (Complessi Antisismici Sostenibili ed Ecocompatibili—anti-seismic, sustainable and eco-compatible complexes) project, aiming at building new temporary buildings a few kilometres away from the centre of the L'Aquila city. The new complex was rapidly built, but the main problem was that such relocation disorientated local communities which lost the reference to their neighbours and friends and experienced social distress. Besides this, the new complex lacked connection to waste and water treatment, creating further inconvenience (Alexander 2010). The result was that 15 months after the disaster 90% of the population was rehoused, but no action had been taken to favour the restart of economic activities and to help people return to their jobs or find new ones (hence the effects on the labour market highlighted by Di Pietro and Mora 2015). The historical city centre was left full of rubbles for years. As highlighted by Alexander (2010, p. 336), *“the missing element in the Italian government’s recovery policy is local participation”*; *“Moreover, the neglect of the economy and infrastructure failed to kick-start any indigenous form of recovery”*.

As already mentioned in the previous section, Fois and Forino (2014) analyse an example of what could have been a participative process, namely the self-built eco-village of Pescomaggiore near L'Aquila where inhabitants refused to be rehoused away from their former village and decided to rebuild houses near the village. Inhabitants mobilised funds and resources for the construction of the new village and managed to realise the project. In this way the coherence of the local community was preserved, and people were more satisfied by the reconstruction process.

Italy had disaster response structure in place since the Irpinia earthquake of 1980 based on the Civil Protection Act (Protezione Civile). The structure was

² For instance, the Friuli earthquake of 1976, arising in the North of Italy, caused 989 deaths. The reconstruction was successful once the regional authorities took the lead in priority-setting and decision-making. Another important earthquake was the earthquake in Irpinia in 1980, in the Basilicata region, with a magnitude of 6.9, which had a huge impact with 3000 deaths and 8800 injured. In Irpinia emergency rescue arrived late, worsening the number of victims. The national government provided huge funds, but these were lost in corruption and criminal organisations' infiltrations. Funds were even diverted to towns which were not hit by the earthquake.

then characterised by centralisation on the State, unclear control of the civil protection between the Prime Minister (Presidente del Consiglio), the Minister of Internal Affairs (Ministro dell'Interno) and the Minister of Civil Protection. In addition, no coordination between the public and the private organisations and services was scheduled. The national structure for civil protection was completed in 1992 with law n. 225, which decentralised the structure and organised it as a network of many different organisations, including the fire department, the police, the military forces, the State forest body, the national health system, the Italian Red Cross and voluntary organisations. As a consequence, it appears fragmented. With the reform of the Constitution mentioned above civil protection is a concurrent competence of the state and the regions, but the state has primary role in case of very high emergency. The structure is quite decentralised and make mayors of municipalities the executive heads of civil protection. Therefore, in L'Aquila as in the ER region the structure was the same. However, reaction by regional authorities widely differed. The ER regional government immediately took leadership by asking that the President of the Region be nominated as the Head of the Emergency Committee, so as to be able to set up priorities and relevant actions. The Abruzzi authorities did not seem to have taken such a lead, leaving the national government making decisions, with the above-mentioned results. It was only nine months after the earthquake that the President of the Abruzzi Region took the lead of the Committee for reconstruction instead of the external delegate appointed by the government.

In fact, the ER region learnt from the experiences of the previous earthquakes in Italy, although the 2012 earthquake differs from the other Italian experiences by the big damage to industrial production. The earthquake affected an area which produces 2% of national GDP. The ER region learnt from previous experiences and it appears (from the field study carried out for this study) that four main lessons were drawn regarding emergency and recovery policy, in terms of elements to take into account in the process:

1. dialogue and involvement of stakeholders at all levels of decision-making in contrast to the high centralisation of decisions as in the case of the L'Aquila earthquake;
2. the need to address the risk of depopulation of the affected areas and avoid the move towards peripheral zones where social identity is lost (as in L'Aquila);
3. reconstruction as an occasion to adapt buildings not only to anti-seismic features but also to climate change, adopting new available technologies;

4. strike a balance between conservation and innovation, taking advantage of the need for reconstruction to resolve previous problems in land and urban planning.

In the ER case neither the national level nor the very local one took the lead in governing recovery. Rather, it was the intermediate—regional—level taking the lead. Local communities are very close to the problems and can highlight the needs and desires of the local communities; however, they may also be too emotionally affected to be able to rapidly set priorities and decide on actions to take. In addition, they are far from national levels of governments and may not be so effective in negotiating resources and necessary funds for reconstruction. The national level on the other hand is too far from the local realities to get appropriate information and make decisions that fulfil the needs and desires of the local populations. Many cases show this, such as the L'Aquila earthquake where priority was given to housing provision but without any regard to the social cohesion of the local communities. An intermediate level between the local and the national—here: regional—may therefore be more appropriate. Not too far and neither too close to the affected population and space. This is clear in the ER case, but the confrontation with other cases also point to conditions under which the actions of that government level may be effective: democratic governance, self-government and attention to the coherence and cohesion of the local communities, but also to the restarting of economic activities.

5 The ER Region

The earthquake consisted in a long series of seisms with two particularly strong seisms arising in May 2012, one on the 20th with magnitude 5.9 on the Richter scale and one on 29th of May with 5.8 magnitude. The earthquakes affected an area between the cities of Reggio Emilia, Modena, Bologna and Ferrara, the core of the industrial system of the region with 48,000 firms and about 190,000 employees. 55 municipalities were affected by the seisms. The industries concentrated in this area are food industry and biomedical in particular. The area comprises the world-wide excellence biomedical cluster in Mirandola employing about a third of all employees in this sector in Italy. In this cluster, characterised by the presence of foreign multinationals leaders in the sector, about 90% of firms were damaged by the earthquake. The affected areas concerned a population of about 550,000 people. 27 people died because of the seisms, while damages were

estimated at about 12 billion euro in the ER region. The governance of emergency was made difficult by the fact that the seisms continued in the following months, although of a much lower magnitude.

These earthquakes were sudden and totally unexpected: the region had been considered as very low seismic risk, even a non-seismic area. The regional government immediately ordered a review of damages which was carried out in June 2012. The schools appeared to be particularly affected, since 570 from 1041 buildings were declared damaged to different degrees (some declared completely unusable while others having only to be consolidated). The ER regional leaders learnt from the previous experiences with disasters in Italy and decided rapid action, no involvement of the national level to avoid both delays in decision-making and inadequate priority-setting, and put the society as a priority: reconstruction was focused on schools and jobs, which are two important elements of communities and social cohesion. The region took advantage of its reputation for high-quality governance and made rapid decisions to signal its determination in avoiding becoming another recovery failure as the L'Aquila case of 2009. Anti-corruption measures were also taken to signal its reliability and 'professionalism', and also as a symbol against infiltration by criminal organisations in reconstruction projects. This was important with regard to industry. Managers of damaged factories decided to stay in the region and reconstruct their factories there also because of the reliability of the institutional framework of the region.

The region provides an intermediate level of governance between the local and the national ones. The local levels tend to be emotionally involved and may set priorities according to very local interests without any regard for wider impact. The regional level is close enough to local communities to be also emotionally involved but it has more critical mass for action, in particular in terms of capacity to attract and mobilise resources for emergency and reconstruction. It also has wider views and access to knowledge about new technologies which might be useful for reconstruction. The regional level also has the capacity to define objectives which can be locally shared.

Regarding gathering of financial and material resources for reconstruction, the region took advantage of the multi-level governance framework. It immediately appealed to the national government as well as to European institutions. Various financing channels and instruments at various government levels have been used to realise the recovery programme. In addition to some funds from the national government, the European structural funds allocated to the region were partly re-programmed to be used for reconstruction. In addition, European structural funds allocated to other Italian regions were partly re-allocated and Centre-North Italian

regions provided 4% of their European resources to the recovery process of the ER region.

Measures were immediately taken to preserve one of the main priorities of reconstruction, namely the industrial centre. Funds were allocated to support the reconstruction of damaged factories and business activities. In the biomedical sector, calls were made to the public health system to complete delayed payments to the suppliers located in the cluster; and support to R&D activities was enhanced. The regional government indeed feared that foreign multinationals would leave the region which had become insecure. Financial support to business was therefore granted on the condition that the business would commit not to delocalise.

In addition, disasters create the risk of dismantling of the local social cohesion: communities may be too affected to be able to effectively react. Hence in ER the regional government decided to put school reconstruction as a priority (besides industry) because schooling can be considered as one of the pillars of social cohesion as well as a signal to local population that the regional government was committed to rapid return to normal life. Participation in the labour force is easier for workers when their children can normally go to school.

The ER region activated a network of institutions, consisting of mayors, civil protection, local education institutions and other stakeholders. The President of the region acted as coordinator of the network through the committee specifically created. As result, knowledge was rapidly gathered and shared so that priorities could be defined in a consensual manner and the sense of community was preserved. Three main characteristics emerged from this governance framework: clear objectives were defined, actions were decided and implemented with transparency, and mobilisation to face the disaster was pushed.

In the case of the ER earthquake, effective institutional leadership appears to have been essential to the successful resilience of the region. The regional authorities immediately mobilised to react to the natural disaster. A committee for emergency governance was immediately created, consisting not of outside experts but of local and regional government authorities: the President of the region was nominated as head of the committee (rather than nominating an external Commissioner as in the L'Aquila case) and mayors of the cities affected by the earthquakes (54 towns were affected) together with presidents of the counties (provinces) were designated as members of the committee. The committee was able to immediately design a plan for reconstruction, putting the coherence and the involvement of the local communities at the heart of the plan. Thus, the completion of the schooling year was ensured, although the earthquake took place in May and the normal end of schooling year is in June. Pupils and students were able to end their schooling year and pass necessary exams, and the aim was also to restart the schooling year

in September as usual. Pike et al. (2010, p. 68) stress that “*literally making sense of the moment with credibility and authority should not be underestimated in what can be confusing, uncertain and fearsome circumstances for people and places*”. In addition, nominating local and regional authorities and experts in the committee was key to ensure that the committee would have the appropriate knowledge of the effect of the event and the possible strategies to overcome it.

The school programme was already adopted on 5 July 2012. This programme had three important features. First, a clear objective: to re-open all schools in the region by 17th September 2012; second, involvement and consensus with the local authorities and population; third, clear and transparent rules for the reconstruction activities. Reconstruction was realised through two tenders allocating funds for reconstruction. Some important special rules were decided to ensure transparency and effectiveness. First, a firm could not apply to more than one call and only apply to rebuild not more than two schools. This was adopted as a rule in order to allow the participation of SMEs in reconstruction as well as avoiding infiltration by criminal organisations. In addition, this rule increased competition so that the best available technologies would be proposed. This led to minimising costs and allowing to rebuild with anti-seismic features as well as energy efficiency. The region became a laboratory for the most recent technologies for reconstruction and anti-seismic systems.

The Operative School Programme adopted on 5 July 2012 had € 224 million, of which € 25 million were dedicated to the immediate reconstruction of the most damaged buildings and € 35 million for the repair of buildings introducing anti-seismic features for other school buildings. In addition, € 3.5 million were spent for the repair of schools already built with prefabricated buildings, € 67 million for the construction of temporary schools and € 25 million for the renting, assembly and removal of prefabricated buildings. € 33 million were used to construct temporary gyms, € 24 million for necessary infrastructural adjustments linked to the new schools, € 1.5 million for the renting of structure and furniture, and € 10 million for the creation of new school directions following the re-organisation of the school network.

Regional resources were also dedicated to the schooling authorities in the affected areas: € 1.6 million of which € 800.000 in co-financing with the Ministry of Education to finance innovative education methods. In addition, private funding was also mobilised, allowing for instance the reconstruction of schools in two particularly affected towns, namely Sant’Agostino and Cavezzo. Private fundraising was transparently managed by the region with open and easy access to the amounts received and their use in reconstruction, so that each citizen or

organisation which would have sent funds, could easily reckon where the funds had been used.

During the summer of 2012 a large part of the population of the affected area was living in big tents. Specific recreation activities were organised for the children living in such precarious conditions, so as both to make families more hopeful and better-off to maintain the cohesion of the community. It is worth noting that the affected area is also the area with highest proportion of immigrants in the region. Re-starting school on time was also seen as an essential instrument to the successful social integration of these populations. The dramatic events of the earthquake were also used as an opportunity to improve the social inclusion of immigrants, allowing the local population to more easily accept diversity and realise the advantages of multi-cultural backgrounds.

After the earthquakes, 45,000 people saw their houses damaged and 16,000 had to be accommodated in 36 big tents or other structures prepared by the Civil Protection. On 19 July the number of assisted people declined to 7000. On 20 September they were 4100, and the camps closed down on 30 November. In contrast to previous earthquakes in Italy, such as in Foligno in 1997 and L'Aquila in 2009, the ER region chose to use tents for emergency and no prefab, but the aim was to move from tents to definitive houses. Some prefabricated houses were used in the ER region but the contract with the builders of such prefab houses stipulated that they would have to re-buy the structures within two to six years. The reason for these restrictions was that generally it is the poorest and most vulnerable population moving to such temporary houses, and leaving them for long would risk creating ghettos and social fracture.

The region could count on strong communities. The strength of the local communities in the region has been outlined since the work of Putnam on social capital in 1993 (Putnam et al. 1993), showing the high level of social capital in this region. Industrial districts are based on strong social capital, which is an essential ingredient of their functioning. The transformation of the region from an industrial system largely based on industrial districts in traditional sectors into an innovative system was performed in a long time period (10 to 15 years) using this social capital (Bianchi and Labory 2011). All this was possible thanks to the loyalty between central and regional institutions, the political will shared with the mayors of the affected areas and an extraordinary collective participation. The objective of starting schools on September 17th, as usual and as non-affected areas, was achieved, although some pupils had to start lessons in gyms, pavilions or other spaces while waiting to enter the new buildings. The last rebuilt school was inaugurated on November 10th, only six months after the earthquake.

While undoubtedly the magnitude of the natural disaster, the amount of resources, tangible and intangible capital and endowments, determine the success of emergency and recovery policies after natural disasters or other shocks, the political leadership and governance of the emergency also influence the outcome. In particular, the case of the ER region shows that the capacity of learning and adaptation of the policymakers, taking lessons from past experiences in their choices, has been important. In addition, the regional government took a strong leadership in order to coordinate local efforts and mobilise resources for reconstruction. Such a governance system was so successful that many firms, in particular multinational firms in the biomedical sector in the Mirandola cluster, which laid at the epicentre of the earthquakes, decided to take advantage of the need for reconstruction to increase productive capacity and ended year 2012 with increased revenue relative to previous years, despite the crisis and the earthquake.

6 Conclusions: Regional Resilience beyond Natural Disasters

This paper analysed the emergency and recovery process of the Emilia-Romagna region in Italy after an earthquake arising in May 2012. The emphasis has been on the multi-level governance framework, and two major results emerge from this study. First, an important feature of the process has been learning and adaptation: the region took the lessons from previous experiences in Italy and avoid errors of the past. This induced the regional government to take the leadership of the emergency and recovery process, the President of the Region being immediately nominated as the Head of the emergency committee. However, the governance was also democratic and participatory, involving local stakeholders and particularly mayors of the affected municipalities. This allowed to be close to local information and local needs without too close emotional involvement, which could have negatively influence choices. The regional government coordinated all local actions and was able to mobilise resources from the national government but also collaborating with neighbouring regions in the Centre-North area of the country using European funds. This leads to the second result of this study: there is a role for intermediate levels of government besides the national and the local ones. The overwhelming priority was to maintain and ensure the rapid restart of industrial activities by preserving the cohesion of the local communities. For this purpose, actions were primarily orientated towards schools and industry (namely work, allowing families to send their children to school and ensuring the restart of economic activities so that people could continue their normal working life),

besides providing shelters to homeless people. Housing repair and reconstruction were also carried out with the objective of avoiding relocation of communities to different place, so as to avoid social fragmentation, which had been a problem in previous cases in Italy, particularly in L'Aquila after the earthquake of 2009. This is another lesson that was taken from past experiences.

As a result, the region recovered. Figures 1 to 3 show the recovery after the double shock of global financial crisis and earthquake. The figures also reveal the long-term resilience of the region. Figure 1 shows that industrial value grew at higher rates in the ER region relative to Italy's major industrial regions. ER was also the only Italian region to have surpassed pre-crisis level by 2019.

Figure 2 shows that ER's resilience also emerge in terms of employment performance. ER had the lowest unemployment rate amongst Italy's major industrial regions for most of the past thirty years. The 2008 financial crisis induced an increase in the unemployment rate from 3% in 2007 to nearly 9% in 2013, one year after the earthquake, but in the following six years it dropped to 5.5% and was again lower than in all the other major Italian regions.

In addition, export performance is also impressive, since regional exports grew by 40% (in current prices) in the period 2008 to 2019, which is more than in Italy as a whole and in the other major industrial regions of the North, with only Tuscany performing better (Fig. 3).

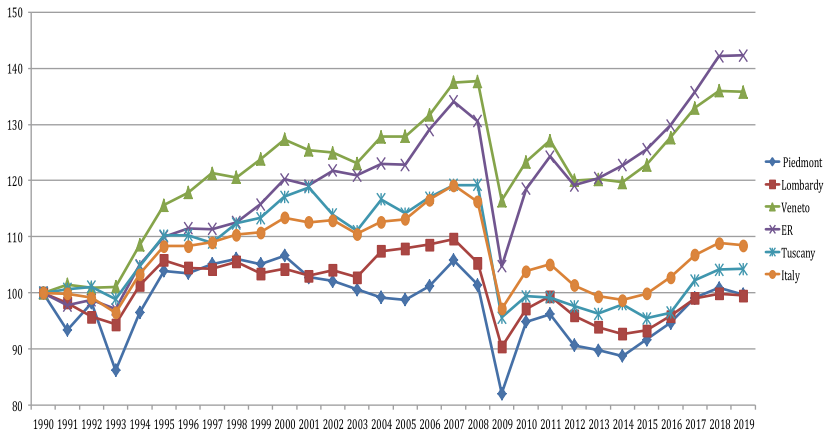


Fig. 1 Industrial value added in ER and some selected regions, 1990–2019 (constant prices, 2010 = 100). (Source: Own elaboration on data provided by Istat (1990–2015) and Prometeia (2016–2019))

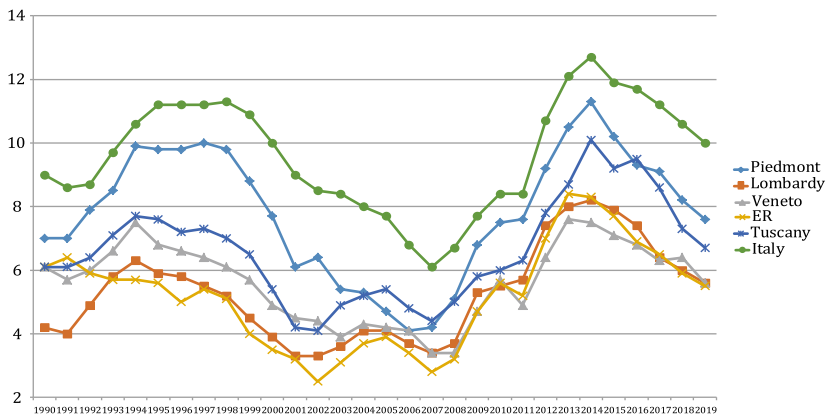


Fig. 2 Unemployment rate in ER and some selected regions, 1990–2019. (Source: Istat)

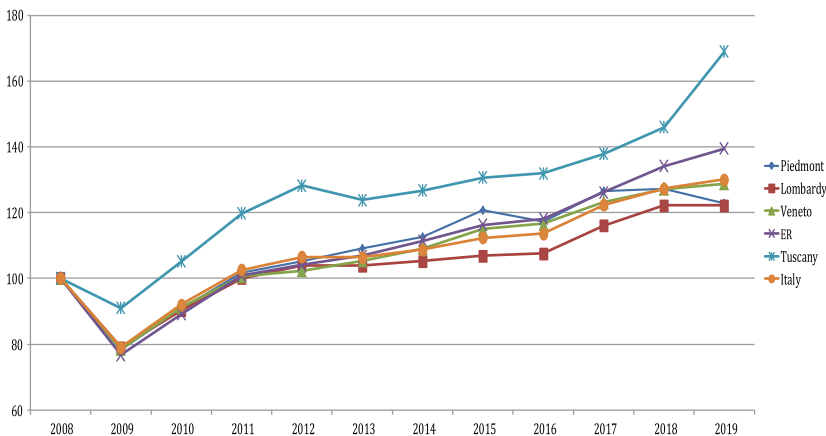


Fig. 3 Index of exports in ER and some selected regions, countries, 2008–2019—current prices. (Source: Istat)

In fact, it is likely that the very factors that facilitated long-term resilience of the region (adaptability to changing context) also facilitated the short-term resilience (adaptation to sudden shocks). Bianchi and Labory (2011, 2018, 2019) show that the regional government has implemented industrial policy since the 1980s

aimed at promoting the adaptation of the regional industrial system to the changing competitive context to ensure jobs in the region. A distinctive feature of this policy has been to comprise elements of social and educational policy, to facilitate the participation of people in the labour market and help firms finding appropriate skills, which is essential for development. Social cohesion has been high in the region, but also cultivated by the regional government, which has implemented policies to up-skill the labour supply (such as training and education policies) as well as to favour the participation in the labour market (supporting childcare, healthcare, transportation and housing) since the 1980s. The ER region is the region with third lowest poverty rate in Italy, and this rate has actually decreased after the crisis.³ Recent literature on regional resilience has indeed shown that inequalities are a structural vulnerability that reduce regional resilience to shocks (Lewin et al. 2018). The case discussed in this paper shows that resilience depends on a social capacity, depending on both a participative governance process and social cohesion built over long time periods.

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³ Data from the Italian National Statistical Office: <https://www.istat.it/it/archivio/disuguaglianza>.

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Developing Resilience Understanding as a Tool for Regional and Tourism Development in Bavaria

Daniel Zacher and Elina Gavriljuk

1 Introduction

The spatial perception of risks and crises fluctuates between global challenges and the attitude towards local and regional strategies for action (Troeger-Weiß 2018). Reference systems are different and sometimes contradictory: While pandemics such as the coronavirus and its worldwide spread in 2020 lead to resolute response measures by politicians and decision-makers, climate change measures, for example, are criticised from many sides for the hesitant behaviour of responsible actors (Elkerbout et al. 2020). Local and regional governance structures have limited decision-making powers within the political systems of their communities (Kuhlmann and Bouckaert 2016). At the same time, bottom-up approaches are required when it comes to finding joint solutions to social issues (Sabel and Victor 2017). In times of dynamic processes of transformation and change, the resilience approach finds its way into questions of spatial science and political theory (Christopherson et al. 2010; Boschma 2015). These mostly analytical approaches sketch ex-post an understanding of the course of crises and try to develop strategies for the future to learn from the lessons of the past. It becomes clear that psychological and sociological concepts of motivation, self efficacy, and willingness to change can deliver an explanatory framework and make a difference in the question of whether challenges are actively managed or passively neglected (Cinderby et al. 2016; Paton 2008; Wink 2014).

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Conferences and events that explicitly address the resilience approach have developed in different local and regional contexts in recent years, also and especially where it is not a question of coping with crisis events in the short term, but rather of maintaining long-term resilience for the future (Hartz-Karp and Meister 2011). The aim of this article is to examine methods and formats that are used in the course of dealing with the resilience approach. The focus is put on particular studies and related experiences in the study area of Bavaria. Specifically addressed questions are:

- At which interfaces can an effective start be made in actively building resilience in a region?
- What prerequisites and factors does a region need in order to actively promote the transformation of the transport economy towards more resilience?
- What is the role of destination managers in Bavarian tourism destinations regarding resilience development?
- How should destination resilience be organised on a regional level?

The presented findings (Chapter 5) are part of ongoing studies. They are interim results and, at this point, serve as an explorative discussion of introducing the resilience approach on a regional level (Chapter 6).

2 Resilience in Regional Development and Tourism

2.1 Changes in Resilience Understanding

The resilience approach has found its way into various research disciplines. For a long time, engineering, psychological, and socio-ecological approaches were the home of the concept (Dawley et al. 2010; Pendall et al. 2010). Since the beginning of the 2000s, organisational and spatial science disciplines have considerably expanded the scientific discourse. The latter are responsible for placing social systems at the centre of a stakeholder-oriented consideration of the resilience approach (Adger 2000; Frommer 2013; Walker and Salt 2012). In addition to the description of resilient systems, this development has increased the importance of a participatory discussion of resilient societies (Al-Khudhairy et al. 2012; Ryan 2012), whereby these address not so much a status quo but a process that has to be implemented in the long run (Hassink 2010; Hughes et al. 2005; Newman and Dale 2005). This process depends on the systemic framework conditions

and the participation of relevant actors. It can usually only be described in context and be understood as a collaborative development of competencies between science, politics, business, and civil society (Walker et al. 2002). Furthermore, joint knowledge acquisition and awareness raising from a cooperative spectrum of actors is necessary, because abstract challenges are also addressed in addition to concrete threat scenarios (Tschakert and Dietrich 2010). With regard to specific crisis events, a transfer of knowledge between places and regions can take place by means of disaster control plans, best practice cases, and crisis management tools (Cutter 2016; Cimellaro et al. 2010). Rather incremental threats and change processes require a comprehensive set of methods that have hardly been researched (Robinson and Carson 2016) and which have rarely allowed quantitative measurements to date (Hoffman and Hancock 2017).

2.2 Resilience in Regional Development

Regional resilience has become a “buzzword” in regional and economic studies in recent years (Martin and Sunley 2015). Cities and regions are facing social, ecological and technological transformation processes that require adaptation. The resilience approach thus provides regions and regional development with a new perspective on change processes and challenges (Gruber 2011). In recent years, the resilience approach has developed into a multidisciplinary and cross-sectoral approach within the framework of a multi-level system, which increasingly deals with regional units in a manifold interaction process at an individual, organisational, and overall spatial level (Wink 2016). Resilient regions are characterised above all by their ability to adapt to trends and circumstances that cannot be influenced (Lukesch et al. 2010). With regard to adaptive systems, the terms “adaption” and “adaptability” are frequently discussed issues in regional resilience studies (Pike et al. 2010). While adaption concerns changes within existing structures, adaptability is more about the long-term ability to overcome a negative lock-in. Nevertheless there is a dynamic tension between the two (Boschma 2015). A closer look at regional resilience in the literature shows that adaptation processes often occur in the course of crises related to climate change (Plöger and Lang 2016). Further analyses are particularly concerned with the issue of why certain regions recover more quickly from crises and various stressors than others, which are unable to achieve their original growth rates even after a longer period of time (Jakubowski et al. 2013; Bürkner 2010). According to this approach, resilience describes “the ability of societies/ecosystems to respond to disturbances

or shocks and to maintain essential system functions” (Gerstengarbe and Welzer 2013, p. 49, translated).

Shocks may appear as sudden and discrete incidents, or they may develop more slowly and be unforeseeable (Boschma 2015). In times of permanent change and with the presence of different stressors, one characteristic is of particular importance to regions: the ability to cope with changes. This means for regions to be able to transform in a way that important structures and functions are further developed in new context conditions (Weig 2016). Here, the core question is how regions can position themselves in a crisis-resistant and future-oriented manner. Foster defines “regional resilience as the ability of a region to anticipate, prepare for, respond to, and recover from a disturbance “ (2007, p. 14). Thus, regional resilience means to deal with future issues in an early and timely stage, to become aware of different options for action and development paths and to keep a clear view on important future-related questions. Among other things, this also implements reflexive behaviour and precautionary measures (Jakubowski et al. 2013). Early detection and being prepared for change therefore have a significant impact (Lukesch 2016). To be a resilient region does not only mean to be economically successful or to just examine values such as economic growth, standard of living, or employment rates. It is also about the question which factors are helpful to adjust and adapt over time (Christopherson et al. 2010). Economic, social and ecological subsystems need to be taken into account in an appropriate manner (Foster 2007). It is also noticeable that applied research on regional resilience tends to relate to rural areas and especially to structurally weak regions. Moreover, the focus lies on regions that were historically dominated by industry. The emphasis has been placed particularly on the question of how cities and regions have dealt with far-reaching economic changes, and how these have been able to overcome the transformation of economic structures. Particular challenges were high unemployment, the loss of previous traditional industries and, consequently, a long-lasting reorientation process towards alternative economic sectors in the service industry (Wink et al. 2016). However, less research is devoted to regions that are economically very strong, but nevertheless have to worry about their future (Kujath 2010).

2.3 Resilience in Tourism

Tourism-related resilience literature has gained importance in the shadow of the regional resilience discussion. Pioneering contributions by Farrell and Twinning-Ward (2004), Cochrane (2010), or Becken (2013) describe tourism as a good

example of complex adaptive systems. The tourism-related resilience discussion has its predecessors: a systemic understanding of destinations with different development phases has been prominently discussed in the 'Destination Area Lifecycle' by Richard Butler (1980). The necessity of transforming supply and demand structures in the face of ecological and social challenges of intensive tourism development at the regional level provides additional fuel for the introduction of the resilience approach to tourism research (Cheer et al. 2019). In the course of an emerging evolutionary understanding of resilience, however, it is less the resilience of a tourism system than of a regional system with special consideration of tourism which has been scientifically investigated (Bellini et al. 2017).

Especially in structurally weak rural areas, tourism seems to be a relatively easy-to-establish economic pillar that can contribute to the mitigation of regional disparities (Lv 2019; Stoffelen et al. 2017). The development of tourist destinations is thereby also a matter of regional and location development for the economy (Pechlaner et al. 2009). In this context, destination management is to be understood as strategic regional management (Lew 2014). Due to the recent overtourism debate, destination resilience is pursued by organising management structures in a more decentralised way or by supporting primarily businesses with a high regional identity (Tervo-Kankare 2019). The local population as guarantors of tourism value creation (Cheer et al. 2019) has an active participatory role in strategic tourism development issues. Potential crises can be identified at an earlier stage by using the decentralised knowledge of the community (Mair et al. 2016). The competence-oriented participation in the definition of local and regional resilience strategies is part of a more or less formalised organisational process, which will be discussed in the next section.

3 Levels and Initiatives to Develop Resilience Understanding

Regional resilience is beginning to become an explicit topic of regional policy (Raith et al. 2017). Using comparative case studies, Wink et al. (2016) were able to show that policymakers at various levels of governance have implemented a wide range of measures to increase regional economic resilience even without the use of the term resilience. In this contribution, we examine the explicit use of the resilience approach in the form of practical initiatives. Resilience initiatives can be started and promoted by central governmental agencies, whereas local ownership and bottom-up processes are crucial for long-term success (Juncos 2016; Sharifi

2016). National resilience strategies are one possibility to provide an administrative framework for the specific development of resilience initiatives. To date, national resilience strategies have been developed particularly in countries whose national identity is significantly shaped by the threat of natural disasters (e.g. New Zealand) (Brown et al. 2017; McGowan 2012). These strategies provide a framework that is clearly linked to disaster risk reduction. External effects and state policy guidelines have an impact on the resilience of a city or region, but above all they set a framework that must be completed by concrete local initiatives (Shaw and Maythorne 2013). Local initiatives can be organised in networks that go beyond federal and national administrative units, for example the 100 Resilient Cities network of the Rockefeller Foundation (Spaans and Waterhout 2017).

Meanwhile, communities as networks of everyday forms of interaction have become a main research subject to describe local and regional resources for resilience development (Norris et al. 2008; Paton 2008). In Germany, there are scattered initiatives that explicitly include the term “resilience” in their title. Regionale Resilienz Aachen e.V. was founded by scientists, citizens, and students. The association is an interdisciplinary discussion and participation platform for the resilient design of urban space and the region, with the aim of developing a transformation concept for the regional economy and society. Current projects focus in particular on perspectives for sustainable and resilient urban planning and development as well as on the role of city partnership networks for municipal sustainability (Resilienz Aachen 2020).

In various German cities, the initiative “Zukunftsstadt” (City of the Future) deals with impulses for sustainable urban and regional development. This project, which is funded by the Federal Ministry for Education and Research (BMBF), is designed to be highly participatory and aims to provide good examples of resilient cities and regions. A number of local sub-projects from this initiative bear the term “resilience” in their names.¹ These temporary projects are of an exemplary research nature and mostly relate to specific topics in the context of climate change adaptation (Zukunftsstadt 2020). All in all, the intention is to promote the proactive dimension of the resilience approach by means of funded projects and explicit mention of the resilience concept. This is intended to release it from the civil protection authorities and bring it into the minds of citizens. Apart from this, in Germany, disaster control issues are supported by a remarkable volunteer culture (Voss and Dittmer 2016). For example, without using the term “resilience”,

¹ e.g. BREsilient (Bremen): <https://bresilient.de/>; HeatResilientCity (Dresden): <https://heatresilientcity.de/>; RESI-extrem (Stuttgart): <https://www.project.uni-stuttgart.de/resi-extrem/>.

about 1.3 million people were involved in a volunteer fire brigade in 2016 (Feuerwehrverband 2020). In the light of the coronavirus crisis in 2020, the discussion of destination resilience, which had previously only been regarded scientifically in a European context, was translated into spontaneous practical initiatives and exchange formats.²

4 Bavaria and the Region of Ingolstadt

4.1 Geographical Context

Bavaria is the largest federal state in Germany with regard to its geographical extension and, in economic terms, it occupies a leading position within German and European regions (Glückler et al. 2008). For a long term, Bavaria was mainly known as an agricultural region. The effects of industrialisation and the trend towards tertiarisation were observed in Bavaria comparatively late (Deutinger 2001). Nevertheless, in recent decades, Bavaria has quickly developed into a successful industrial region known for its internationally networked and competitive companies (Glückler et al. 2008). The mechanical engineering and automotive industries are particular focal points of the Bavarian economy (Pfäfflin and Ruppert 2011).

At the same time, Bavaria has developed into a globally known tourist brand (Pillmayer and Scherle 2013). From 2010 to 2019, the annual tourism volume increased steadily; therefore, this industry was far away from a crisis. The strength of the Bavarian economy and its success in tourism go hand in hand, and business trips play an important role in the demand for tourism, which is particularly reflected in city tourism (Arlt 2016). At the same time, Bavarian tourism has built onto its natural resources and developed structures over decades in the small-scale private rental business. This product, which is exposed to global competition in many respects, still represents a significant pillar of Bavarian tourism, which is the reason why destination management has a special role to play in coordinating the fragmented components of offers on a regional scale (Pechlaner and Döpfer 2009).

The research on regional resilience in this study specifically refers to the Ingolstadt region. The Ingolstadt region is located in the heart of Bavaria and represents the interface between two metropolitan regions, Munich and Nuremberg. The region, which includes the districts of Eichstaett, Neuburg-Schrobenhausen, and

² e.g. resilient destinations: <https://www.resilientdestinations.com/>;

Pfaffenhofen a.d. Ilm as well as the city of Ingolstadt, can regularly secure the top places in economic rankings, even if there has been a tendency for a light slow-down recently (Focus Money 2020). The Ingolstadt region is also predominantly a rural area. As a central municipality with an urban and rural environment in the agglomeration area, the city of Ingolstadt has a supra-regionally important supply function (Bachinger 2012). Results of expert interviews in the study show that the strengths of the region lie particularly in its outstanding location. The city and the respective districts are characterised by very good accessibility. Good transport connections are ensured by the central location near the autobahn, the short distance to Munich Airport, and the respective federal highways within the region (Regionaler Planungsverband 2020). Another special feature of this area is its location in Altmuehl Valley Nature Park. Therefore, tourism represents an important economic factor for the region. Not only the hospitality industry, but also the retail sector and service providers in the region benefit from it (Engels 2008).

4.2 Methodological Approaches and Formats to Discuss Resilience

While many resilience studies refer to quantitative comparisons in a retrospective view, the qualitative approach in the studies considered here takes into account the constructivist claim of regional resilience research (Wink et al. 2016, p. 13). Subjective attitudes as well as processes of perception and interaction provide at least one additional explanatory framework for regional and tourism resilience (Christmann et al. 2014; Luthe and Wyss 2014). In the following section, different methodological approaches and formats that have been used are discussed.

Expert Interviews

The main emphasis of the studies discussed in this chapter focuses on qualitative research. As a specific instrument of the qualitative approach, both represented studies in the framework of this contribution make use of guideline-based interviews with experts, which were conducted using principles of empirical social research. Guideline-based interviews are particularly suitable due to their relatively open design, so that the views of the interviewees are displayed more clearly than in standardised interviews (Flick 2017). This is of great importance, especially with regard to the topic of resilience, because the opinions of the various stakeholders are highly differentiated and allow the topic to be considered from

different perspectives. Within the scope of the research, it was important to involve actors from different fields.

Focus Group

While interviews deal with the individuals, their knowledge, and attitudes, a focus group discussion puts the characteristics of a dialogue and participation process into the foreground and particularly uses the group constellation (Schulz et al. 2012). The focus group is suitable for developing a common understanding of a relevant issue. The resilience approach, which has so far hardly been operationalised in questions of urban and regional development, can be regarded as a subject area in which such advantages come into play. In the resilience study on destination development in Bavaria, 12 destination managers were acquired as participants. The moderation provided expert input by presenting conceptual perspectives of the resilience term and used previously conducted interview material for illustration purposes. The following goals were achieved:

- Bavarian destination managers received general information on the theoretical background and practical applications of the resilience approach.
- Mutual reactions were immediately available to the entire participant field of destination managers. Divergent opinions could be discussed.
- The researcher received content-related feedback on the organisational and political application possibilities of the resilience approach in the context of Bavarian destination management.
- The participants were brought to a common level of understanding of the resilience approach which enabled them to be competent discussion partners in a subsequent series of interviews.

Workshops

In the scope of the resilience study for the Ingolstadt region, two workshops were conducted to discuss common positions with regional stakeholders. Due to a transparent participation of various actors, challenges and interrelationships in the context of regional resilience were revealed and explored. Thematically and methodologically, the first workshop focused on the development of indicators to make resilience in the region more comprehensible. The second workshop concentrated on the development of measures to increase resilience in the Ingolstadt region. Transparent participation of the key stakeholders made challenges and interrelationships easier to understand. The half-day workshops were formed by a small group of 15 to 20 people from different fields. During the workshop,

the participants were split into different working groups dealing with similar topics but with different personal backgrounds. It was important to involve not only representatives of the city of Ingolstadt but also actors from the surrounding districts.

Real-Time-Delphi

As a further methodology, Real-Time-Delphi (RTD) was used within the scope of the study for Ingolstadt to clarify the subject matter. The RTD represents a methodical extension of the classical Delphi approach; the classical “round logic” is resolved here. After each question, all participants received a real-time overview of the average answers of the other respondents so that an immediate re-evaluation of their own conclusions was possible (Gerhold 2019). The emergence of this dynamic method can be traced back to Gordon and Pease (2006). Another special feature was the possibility of collecting qualitative data via a comment function for each question. These comments were particularly popular and enabled the respondents to communicate with each other. It served as an argumentation for their choice of answers (Cech and Tellioglu 2019). The Real-Time-Delphi covered a period of five weeks and was carried out using a collaboration platform “SurveyLet” offered by Calibrum³

The aim of the survey was to determine future trends and developments in the Ingolstadt region, create a consensus on these developments, and explore ambivalent attitudes more closely. A regional panel of experts from various fields of expertise and competence received selected statements on possible future developments in the Ingolstadt region. These statements related to possible scenarios occurring up to the year 2030. During the formulation, attention was paid to a deliberate exaggeration of the theses in order to stimulate more discussion between the participants. Based on previously defined criteria, 50 experts were selected to be contacted for the study. In the end, the resulting panel consisted of 33 experts, who answered the questionnaire several times within the given time frame and who used the comment function to discuss their points of view.

Population Survey

Resilience also means to identify and discuss problems in a participatory process. In this respect, the population was regarded as the driver and integrating part in the question of resilience development. Thus, a population survey was conducted for the Ingolstadt region as part of the resilience study. The instrument chosen was an online participation opportunity, which covered a survey period of two months.

³ see: <https://calibrum.com/>.

An online survey offers various advantages such as low costs, independence of location, time savings and a high degree of anonymity (Blasius and Brandt 2009). The aim was to develop awareness of this topic among the population and to sensitise them to the issue of resilience. The results are therefore complementary and serve as a basis for further research. Articles in the newspaper as well as in social media drew attention to the survey, so that approximately 250 people participated in the end.

Analysis of the Qualitative Research Findings

The analysis of the qualitative interviews is based on GABEK® (GANzheitliche BEwältigung von Komplexität—Holistic Coping with Complexity) using WinRelan®, a software tool specially developed by GABEK®, to structure and evaluate unstructured interviews. With this approach, the guideline-based interviews can be systematically organised and described as accurately as possible (Abfalter 2010). The method was developed by Josef Zelger and is generally based on the phenomenological Gestalt theory by Carl Stumpf (Zelger 2019). Within the framework of the research presented here, this method of analysis has been used to take into account the open and sometimes very extensive qualitative interviews to an even greater extent and provide a deeper understanding of different aspects in terms of resilience.

5 Selected Findings

5.1 The Region of Ingolstadt

Compared to other regions, the Ingolstadt region is seen as a region of high economic performance not only from structural indicators but also in the perceived feeling of the respondents. This is also comparable to other regions in Germany, which in the recent past have already had to implement fundamental structural development and transformation processes. The results of the interviews reveal that the region offers reputable educational institutions, a good social infrastructure, and a high quality of life for employees and their families. In general, it can be stated that study participants saw the necessity to think about the future, even if the region is economically strong compared to others. The dynamic development of the entire city, which also strongly influences the success of the overall regional environment, is based on a competitive automotive industry. Yet, this is also seen as a main factor of vulnerability. The economic success of the region currently stands and falls with this industry and its expertise. Due to a strong

specialisation in the automotive industry, the region is also characterised by a high vulnerability in the face of exogenous shocks. Especially in times when the economic environment seems to be changing, the question arises how strongly a region can be prepared to react to such a change. The Ingolstadt region is thus facing great challenges and is considering whether it is well positioned for the future with its current economic structure.

Against this background, the aim of the resilience study for the region was not only to identify factors that favour or promote the resilience of a region, but also to determine how long-term stable development can be generated in the region. Association graphs were created with GABEK® to illustrate some insights of the interviews. They show the connections between mentioned keywords according to factors to be more resilient in the future and keywords according to the question how to generate a stable development in the region. The thickness of the connecting line indicates how often the individual terms are linked to each other, i.e. how often they were mentioned in connection with each other.

Figure 1 shows that in order to reduce the vulnerability of regions and to be prepared for external shocks, a clear transformation strategy is crucial. It requires professional communication so that possible negative crisis scenarios are properly understood and translated into constructive projects and measures. This requires

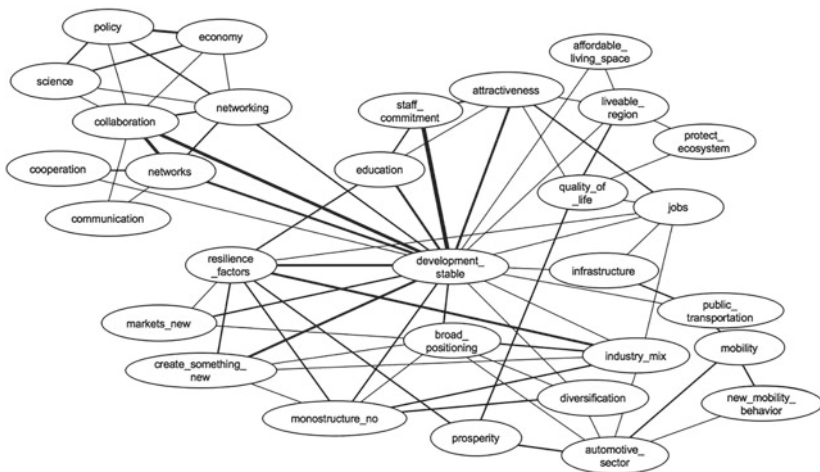


Fig. 1 Factors that Encourage Resilience and Promote Stable Development in the Region of Ingolstadt. (Source: Extraction from WinRelan®, own elaboration)

clear communication responsibilities, both internally and externally. The association graph shows the relevance and need for regional networks in the context of global and regional challenges. Not only well-established networks that also deal with issues of resilience have been regarded in this respect. New networks also have to be created and, above all, have to be made usable. The results of the interviews also show that it is particularly effective to link large players with young companies, because young companies in particular foster transformative capacity. This way, competencies of different industries can be bundled with new networks. Networks require cooperation, which must occur at different regional levels: science, economy and policy. Furthermore, the results of the interviews show that if the Ingolstadt region is able to act in a resilient manner, diversification strategies are required. This means a broader positioning, instead of appearing as monoculture, and thus enabling new things to emerge. Interviewees saw a balanced branch mix as crucial to reduce the vulnerability to economic shocks. Several pillars in different sectors and the striving for balance between sector specialisation and diversification are favourable factors for the region of Ingolstadt, as not all sectors are affected by different crises to the same extent. There are even differences within the region and within the various districts. In addition, there are assumptions that small and medium-sized enterprises (SMEs) promote resilience in the region. This is supported by the fact that SMEs are considered as hidden champions in the Ingolstadt region, as the following quote illustrates:

“Of course, as a region, we are very strongly affected by the automotive industry, but there are also other focal points. I am talking about our medium-sized companies. These are the hidden champions of the region and an important pillar for the entire regional economy.” (A84, translated).⁴

Fundamental changes in the Ingolstadt region are seen in the light of digitalisation, automatisisation and the appearance of new forms of supply. These are all developments that mutually inspire each other, for which the region already forms an important platform as an automotive location. Thus, the interview partners see the opportunity for the region to think about mobility in a different and new way within the framework of integrated concepts that bring together creative minds and ideas.

In addition, educational institutions play an essential role in the context of regional resilience. Crisis-resistant regions strongly focus their investments on education, innovation, and competences (Gruber 2011). A properly functioning

⁴ The abbreviation following the quotation refers to the individual sense units contained in the analysis of the interviews with GABEK®.

education system helps to build up the adaptive capacity and is less dependent on cyclical fluctuations (Pestel-Institut 2010). In this respect, diversification also plays an important role for the interviewees:

“It is important that we set up the educational landscape in the region in such a way that it is future-oriented, i.e. on the one hand strengthening the competences we have of course, but also bringing in others on board.” (B16, translated).

To a certain extent, this refers to the diversification of higher education, which not only focusses on business and technology, but also on developing new visions in research and teaching. This means not only to educate skilled workers, but also to keep them in the region by providing an attractive freetime and cultural offer, for example. Employment, in turn, means ensuring job flexibility in the future. The more efficiently and flexibly the labour market is organised (e.g. through the shaping of working hours), the more attractive the region is, which in turn also promotes resilience.

All those factors such as workplaces, the attractiveness of the region, affordable housing, and a protected ecosystem contribute to a region worth living in and thus also increase the quality of life in the region of Ingolstadt.

5.2 Tourism in Bavaria

The following explanations are based on the results of a focus group with Bavarian destination managers and qualitative interviews conducted with the same persons some time later. Destination managers play a central role in the development of tourism destinations. They coordinate a network of legally independent tourism service providers with their destination management organisation (DMO) by initiating joint marketing activities and encouraging the service providers to act in a cooperative manner. Destination management is the first point of contact for questions of operational development, especially for small-scale private rental businesses, which are still frequently found in rural areas.

This is regarded as a task against the background of a far-reaching transformation process in the industry. For many of the Bavarian destination managers interviewed, climate change represents a manageable task, and corresponding adjustments to supply will at best only affect seasonal shifts in demand. However, the challenges of digitalisation and the perceived lack of skilled workers, particularly in tourism, are causing greater concern:

“For example digitalisation, artificial intelligence, for example lack of skilled workers and other ways of approaching and searching. The awareness of the tourism industry in this location is still quite rudimentary.” (H17, translated)

Destination managers see themselves as the central people responsible for building destination resilience. Due to the predominantly public financing of DMOs, a political mandate to promote resilient tourism structures would, in the view of the interviewees, directly be a task within their position’s responsibility.

A destination manager who promotes resilience combines two basic competencies: As a central contact person for the concerns and needs of all tourism service providers in the destination, he or she takes a *leadership role* and usually finds out very quickly when operational challenges or local political circumstances threaten the economic development of tourism. This day-to-day business, however, requires a lot of time, which destination managers do not have for their second essential task in promoting resilience: the development and implementation of a destination-wide tourism strategy.

“So we have to find a way to get involved strategically without overburdening ourselves so much in terms of work that we no longer have any time for operational activities. This is a dilemma that I have to consider in the strategic repositioning.” (E9, translated)

In the field of tension between operational and strategic aspects, destination managers make a significant contribution to the development of a resilient destination (see Fig. 2).

For destination managers, destination resilience must be viewed in isolation from quantitative growth and *numbers* in tourism volume. Only in regions with low tourism intensity, an increase in the share of tourism value added in the regional economy is considered to promote resilience. Here, tourism can contribute to a diversification of the regional economic structure. This is especially true in regions that are strongly influenced by a particular industry and that are therefore more vulnerable to crises. For some Bavarian destinations, however, tourism does not represent a solution, but a challenge for regional resilience. Due to the fact that the carrying capacity limit of an acceptable tourist number has been reached, quantitative growth is not an option. *Indicators* of destination resilience shift here in particular to qualitative factors and the design of a sustainable social space for guests and locals, which also takes into account the ecological resources of the respective region. Against this background, destination managers face the challenge of having to justify the success of their work in ways other than quantitative growth. Only if they succeed in doing so, destination managers can ensure

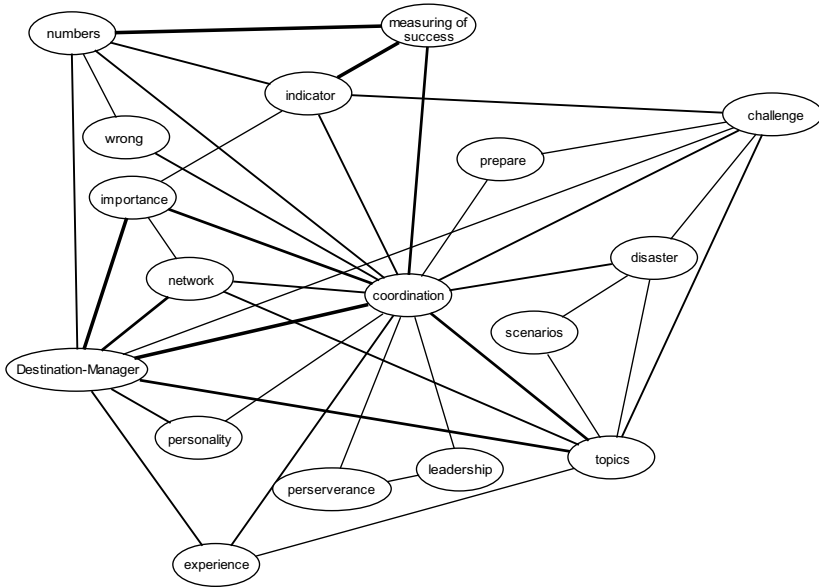


Fig. 2 Coordinating Resilience Development from a Destination Manager's Perspective. (Source: Extraction from WinRelan®, own elaboration)

the future financing of their tasks. In this respect, it is above all a matter of convincing local politicians, who often still recognise the increase in the number of overnight stays as the main criterion for successful regional tourism.

However, the destination managers interviewed are generally confident that a rethinking process will begin here as well, whereby *different scenarios* of tourism destination management will operate more at the interfaces of regional and location development. These considerations include questions of organisational integration of different destination and regional development agencies, which on the other hand is seen as a highly political topic.

Based on the qualitative studies with the Bavarian destination managers, it becomes clear that questions of resilience must be considered in the regional context and cannot be solved in a sector-specific way. At the supra-regional level, however, federal, national, and even international *networks* of destination management can certainly make a contribution to destination resilience. This tourism-specific exchange on a professional level is considered to be crucial when

it comes to the early recognition of crises and the appropriate assessment of developments and trends. The implementation of resilience initiatives at the regional level is considered an interesting approach to develop and establish suitable resilience indicators for the region, which can also be used to *redefine and measure the success* of destination management, which is itself looking for suitable criteria to assess its success in a phase of stagnation or shrinkage of the tourism offer.

6 Discussion: Perspectives on Future Development of Resilience Initiatives

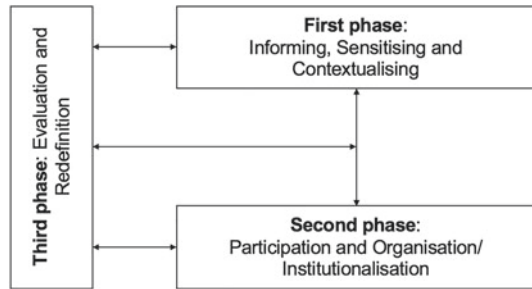
Regional resilience has so far been investigated mainly quantitatively and retrospectively. This contribution, however, refers to combining individual, organisational and regional perspectives of perception, taking a constructive approach to the formation of an understanding of resilience from the practice of implementation. The research presented in this paper aims to develop a participatory understanding of resilience from a practical perspective at a specific spatial or functional level to provide a contribution to the theoretical development of the resilience approach. In consequence, we can learn from practice how resilience is seen in a particular context, and how the concept can help to overcome difficult situations. In German-speaking countries, people have a rather indefinite understanding of the concept of resilience. It can be stated that resilience is still in a phase of conceptual consolidation despite its current widespread popularity. This is transferable to a regional as well as a tourism-related research context. There are only a few initiatives in Germany that focus on the resilience approach.

With regard to the introduction and implementation of the resilience approach in a German-speaking context, different methods were considered in these discussed research projects. Some of these methods were already in use, while others were implicitly and explicitly requested by the research subjects for further steps of implementation. These experiences can be summarised in an overview, which divides the strategic development of resilience into three phases (see Fig. 3).

First phase: Informing, Sensitising and Contextualising

In a first phase, the focus lies on information, sensitisation and contextualisation of the resilience approach. Participants in the research projects were consciously confronted with the resilience approach. Basic definitions from the various disciplines of resilience research were presented in interviews and focus groups, whereby the study participants were asked to contextualise the information they

Fig. 3 The Strategic Planning Process for Resilience Initiatives.
(Source: own elaboration)



received in a regional or functional context. One major challenge is to raise awareness of issues of resilient development, since in both of the study contexts there was a positive economic development that made a discussion of challenges and crises seem inappropriate, at least to some of the study participants. The results discussed in this paper show that even successful economic regions can deal with the issue of resilience. Indications of a rethinking by broad stakeholder groups are visible; however, this reflection preferentially takes place within certain positions in the administration. Thus, the resilience approach is a catalyst for thinking in different future scenarios, at least for a group of participants with expertise in the field of regional and destination development. It was therefore possible to start a professional discussion. This discussion even developed its own type of dynamic: a wide variety of branches and disciplines in the public and private sectors wanted to take part in the discussion, or to have the views of their stakeholders represented, who were not originally intended to participate in the studies. However, it was evident that top political leadership has not entirely discovered the topic for itself. Local politicians seem to be reluctant to discuss challenges and crises, and there are presumably great concerns about being politically associated with the communication of negative development dynamics. A branch- and target group-specific discussion of the resilience approach could be considered useful using tourism as an example. The overall definition of regional resilience also results from a resilience definition of its sub-systems, whereby in tourism, regional and supra-regional networks should be considered together. The inclusion of heterogeneous stakeholder groups at the beginning of a resilience discussion represents a methodological challenge that was faced with a mix of different qualitative and quantitative methods. Expert interviews are suitable to contextualise the resilience approach on a regional level, whereby a sufficiently diverse group of participants consisting of representatives from business, politics, and civil society

should express their positions. Looking at a specific industry such as tourism destinations, it seems to make sense to ask as many comparable positions as possible about their impressions and experiences.

Second Phase: Participation and Organisation/Institutionalisation

At the beginning of a research project, it is hardly possible to have a comprehensive view of the relevant participants in a participation process. In this context, it is important to involve different actors at different levels in participation processes for resilient development step by step. A broadening of the participation basis is an important next step to create acceptance for the implementation of a resilience approach. In the study of the overarching discussion of regional resilience, the necessity of participation of the population was undisputed, and a request to fill in a questionnaire via the regional media led to widespread participation. In a sector-specific perspective such as tourism, there are certainly controversial views on the necessity of participation of broad sections of the population. Destination managers, who advocated broad participation of the population, require innovative discussion and participation formats that allow direct interaction between tourism stakeholders and the population. The high effort in organising such processes is justified when a general increase in tourism acceptance can be expected through the participatory design of future tourism development. This, in turn, requires a basic transparency and a common understanding of resilience, which can be ensured by carefully handled communication. Participation formats should also have a decision-making character. In particular, measures that combine the expertise of different sectors with new networks and enable unusual constellations of actors are particularly promising. The required effort and permanence that go hand in hand with the implementation of a resilience strategy brings with them the question of how resilience can be organised in specific terms and which actors should be involved. It makes a difference whether the necessary competencies can be provided by existing constellations of actors, or, if there should be resilience managers who lead a lasting participation and design process, no matter if sector-specific or across sectors.

Third Phase: Evaluation and Redefinition

The evaluation of the projects and measures within the framework of resilience development requires a continuous improvement process to verify the effects of the measures. It is necessary to take into account social, cultural, and ecological aspects. A systematic success control should be based on a defined strategy, which already classifies the numerous feedback loops of a resilience system on a regional level. For example, if the defined objectives are not achieved, it is

necessary to verify them to identify the causes and, with this in mind, generate adjustments and correction measures in the previously defined phases. The crucial factor here is a combination of aspects and measures to promote resilience that can be demonstrated in the short term and those that will take effect in the long term. Short-term evaluation objectives are important to demonstrate progress in building resilience to the stakeholders of the resilience initiative and to encourage them to continue to support it financially or with human resources. Long-term evaluation goals form the core of strategic thinking in the context of building resilience and should be implemented consistently. Since these are sometimes difficult to measure and quantify, they are often not yet sufficiently taken into account. Against this background, further conceptual work is necessary to develop reliable criteria of resilience that create awareness and acceptance. The identified phases of the systematic introduction of the resilience approach on a regional level are based on the results and experiences of the studies presented in this paper. They can initially be considered as a linear process, which comes to bear in the successive development of competencies and participation. However, in the further course of the process, these phases presumably interact with each other in different ways, reacting accordingly to evaluation results. Hence, the process can start all over again by a new sensitisation process in the light of changing conditions. However, it can also begin directly with phase 2, in that the evaluation results indicate organisational structures of resilience that require modification.

The results and references presented are of an exploratory nature. A longer-term monitoring of existing and new resilience initiatives in different regional and functional contexts could contribute to a validation of the results. In the authors' view, the explicit mention of the concept of resilience has great potential to involve different target groups, which have rarely been considered together, in the discussion of sustainable regional development. In its proactive understanding, it can be a useful addition to formalised processes of regional planning.

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Crisis, Coping and Resilience as a Multi-Layered Process – Haniel, Thyssen, and Krupp Between the 1950s and the 1970s

Thomas Urban

1 Introduction

Even after the end of active coal mining in 2018, the Ruhr area still is considered economically backward and vulnerable in comparison with other German economic centres. Although optimistic (scientific) views see the Ruhr area in an already far-advanced transformation process from an industry to a knowledge region, in particular the northern parts still suffer from the historically shaped, mono-structural coal and steel heritage (Bogumil and Heinze 2019). Throughout most of the “long” nineteenth century, which took until the beginning of World War I, it was precisely this specific orientation that made the Ruhr area a highly dynamic economic region and, along with Saxony and Upper Silesia, a major driving force of the Industrial Revolution in Germany.

An upheaval of a very different kind has taken place in international research since the 2000s. The term and concept of “resilience” has become widespread in a variety of disciplines, resulting in a veritable “resilience revolution” (Höhler 2014). Despite the large number of uses and interpretations, and a blurring of the concept in result, research has agreed on certain key elements. This includes in particular the idea that resilience unfolds in processes, through the interaction of different systems. During these processes, systems at least adaptively and reactively, if not proactively, face adversities and stressors of different origin, duration, and severity by the exploit of existing or by developing new, idiosyncratic resources. Additionally, resilience is understood as an outcome of such

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processes. In fact, recent research has seen resilience primarily as a processual and time-bound phenomenon (Wink 2016). Economic history research has further deepened and differentiated this finding by using the term of *resiliencing* to stress the processual character of resilience management (Denzel 2018). Therefore the “beauty of a developmental perspective” has prevailed over a view that implies “continual perfection” or “constant invulnerability” and is based on an understanding of resilience in the sense of an extraordinary trait or characteristic (Sutcliffe and Vogus 2003). In regard to the dominance of the systemic approach and the increasing differentiation, the pronounced multidimensionality of the phenomenon is also unmistakable. In accordance with the economists Williams et al., resilience can be described as a process “by which an actor (i.e., individual, organization, or community) builds and uses its capability endowment to interact with the environment in a way that positively adjusts and maintains functioning prior to, during, and following adversity” (Williams et al. 2017).

This article focusses on the resilience of three traditional family businesses in the Ruhr area—Haniel, Thyssen, and Krupp—and their key actors between the 1950s and the 1970s. In doing so, it observes three different (social) systems interacting in family businesses—family, business, and the group of shareholders (Schlippe et al. 2017)—and their interaction with other environmental contexts, especially with governments and non-family experts. As a result, the article involves three dimensions of resilience: individual/entrepreneurial, family, and organizational. *Individual/entrepreneurial resilience* comprises the personal dispositions and experiences that individual actors bring to organizations (Williams et al. 2017; Bullough and Renko 2013). Based on findings of developmental psychology, *family resilience* can be understood as variable paths of adaptation, perseverance, and growth that families follow over time and during their life cycles while facing specific adversities. In the event of success, this growth can be reflected in greater cohesion and higher resourcefulness, and these paths strengthen the family as a functional unit (Hawley and De Haan 1996). Froma Walsh distinguishes several key processes that can support family resilience (Walsh 2016). These include the forming and maintaining of homogeneous belief systems (e.g. positive outlook, transcendence and spirituality, principles and values, identity), organizational processes (e.g. flexibility, provision of financial and social resources), and communication/problem-solving processes (e.g. clarity of information and collaborative problem-solving inclusive preparedness, planning and prevention—on the importance of preparedness in resiliencing see from a business historical perspective Köhler and Schulze 2016). Walsh’s framework has recently

been further developed and, using family meetings as an example, explicitly concerned owner families and their routines and rituals (Henry et al. 2015; Harrist et al. 2019).

Organizational resilience can be considered as a repetitive, three-step process of absorbing, renewing, and learning (Bauweraerts 2016). Transformative activities and achievements have also been highlighted. This dimension of resilience mainly differs from family resilience in terms of the influence exerted by non-family individuals and structural units that help the company “to achieve desirable outcomes amidst adversity, strain, and significant barriers to adaptation or development” (Vogus and Sutcliffe 2007). At the same time, in family businesses some interdependencies and even overlappings can be identified. These may result from an interconnection of resources, which in turn stems from the mutual influence of the family on the enterprise (the so-called familiness of the enterprise) and vice versa (the so-called enterpriseness of the family) (Frank et al. 2010). An example of such overlapping between the above-mentioned organizational processes of family resilience and organizational resilience is the implementation of family-influenced bodies. Thus, family business research postulates that owner families can foster not only family resilience but also organizational resilience, if they are able to set up their governance structures in a way that the enterprise’s complexity and level of development can be met. This is crucial in times of crisis, when fast decision-making is under a particular obligation (Wimmer 2013). All in all, in contrast to other forms of business, family companies are distinguished by the fact that they bundle these three dimensions of resilience in an idiosyncratic way (Urban 2018).

Research is broadly in concurrence that resilience can only develop in the face of a (looming) crisis, regardless of whether the latter evolves in an event or in a process. It should be noted that crisis phenomena as “social constructs” are always closely related to contemporary or retrospective judgements, perceptions, and attributions (Denzel 2018). As Table 1 shows, Haniel, Thyssen, and Krupp, which were all engaged in the hard coal and steel business, faced a combination of crisis phenomena at different levels. At the macro level, which in this paper refers to the overall economic system, the consequences of the Allied dismantling process (*Entflechtung*), which was mainly aimed at the heavy-industrial assets, the recession in 1966/67 as well as the economic crisis of the West German economy in the 1970s, which was further fuelled by sky-rocketing oil prices on the world market in 1973/74, were the most influential examples. The Allied dismantling law (*Entflechtungsgesetz*) of 1950 should lead to a de-concentration of the West German economy in order to eliminate an excessive concentration of economic power and prevent the reconfiguration of a war potential.

Table 1 Looming and Actual Crisis Phenomena, 1950s to 1970s

Level	Haniel	Thyssen	Krupp
Macro	Consequences of the Allied dismantling process, 1950s–1960s Recession in the West German economy, 1966/67 Crisis of the West German economy, 1973ff		
Meso	Structural crisis in the coal and steel industry/ structural change in the Ruhr area, since the end of the 1950s Crisis of family capitalism, 1960s–1970s		
Micro	Alienation crisis, at least until the 1950s Governance crisis, since the mid-1960s (GHH group)	Alienation crisis, until the mid-1950s	Strategy crisis, 1960s Credit/Liquidity crisis, 1966/67

At the meso level, which includes development processes and dynamics in regional or sectoral subsystems of the overall economic system, the structural change in the Ruhr area is the outstanding crisis phenomenon. This process reached its first peak with the mass closures of hard coal mines in the 1960s and steel mills in the 1970s. However, it should be noted that there was already a structural crisis in the Ruhr economy in the 1920s with frequent mine closures. The downfall of the mining industry was only interrupted by the temporary booms during the Nazi period and the reconstruction years after the end of World War II (Tenfelde and Urban 2010).

The concept of structural change is increasingly understood as a broad socio-economic change. In this respect, not only regions and their populations, but also family-owned enterprises were confronted with severe adjustment constraints that went beyond the purely economic and also concerned their identities, perceptions, logics of action, and expectations of the future at the micro level. Along with this constellation, many forms of coping processes and strategies were conceivable. These ranged from anticipation and various forms of adaptation to processes that displaced or even denied the disruptions or that were oriented towards the restoration of the *status quo ante* (Goch 2002). Furthermore, in West Germany as well as in other Western European countries, a crisis of family capitalism developed since the 1960s, which initially was only partly visible and then became a much more perceptible phenomenon in the 1970s. The main driving force of this development was an increased capital requirement in order to successfully take on the growing global competition (James 2012).

Often closely intertwined with these scenarios, several looming or already existing crisis phenomena can be identified at the micro level, i.e. in individual businesses and business families. With regard to the course of crisis, business history research more currently has begun to break away from the classic three-step categorization (strategy, earnings and liquidity crisis) in economics and to look on a larger scale at other, especially psychologically influenced types such as a crisis of confidence (Triebel and Grunert 2006). As Table 1 indicates, Haniel, Thyssen, and Krupp provide excellent examples to identify looming or actual crises of alienation, governance, credit/liquidity, and strategy. These adversities neither came into play in all three cases nor over the whole period of investigation and in the entire family business. Yet these adversities resulted, especially in relation to the owner family, from historical “pre-embossings” that had the potential of at least obstructive, if not even resilience weakening, (strategic) path dependencies (Treiber 2018).

On the basis of the initial reflections, the article focuses in particular on the following questions: what can be said about the focus, intensity and quality of coping processes and the resiliencing in the businesses studied, and how did the key actors get involved? What did their “initiators” expect in terms of duration, scope and impact of the resilience factors and strategies that were launched? And in which (idiosyncratic) way and to what extent did the dimensions of resilience presented at the beginning come into play?

2 Facing the “Double” Structural Change—Haniel

Since the end of World War II, the Haniel family company, founded in 1756, had to come to terms with several external and internal stressful events and simultaneous processes that were in danger to develop into a real crisis. Due to the Allied “reconnection” of hard coal and steel assets from companies to family shareholders, the non-family management and the family’s representatives had to find ways to renew Haniel’s organizational structure. Along these ways, the influence on the companies should be enhanced as well as the growth of the family, family cohesion, and the security of their property be satisfied.

The owner family had a traditional, yet tense, relationship with the Gutehoffnungshütte Aktienverein (GHH). The forerunners of this company, founded in 1873, date back to the earliest entrepreneurial activities of Franz Haniel at the beginning of the nineteenth century. Over decades, GHH had developed into a vertical group of steel mills, coal mines, and processing plants. Its non-family

leadership, first represented by Paul Reusch and later by his son Hermann, appeared on strategic issues both with loyalty and self-confidence towards the owner family. This was basically a mutual phenomenon. Nevertheless, some of the Haniel family's eight branches (*Erbstämme*) did not see their interests sufficiently represented, although their positions did not always appear to be capable of winning a majority even within the family (Obermüller 2009). In 1945 a total of 125 members held shares in the GHH. In this respect, the group of shareholders was more of a "fictitious majority owner". The splinter shares accounted for a sizeable majority of 74%, however (Bähr 2008; James 2006).

Hermann Reusch, who together with his father was forced out of the management by the Nazi regime in 1942, returned to the GHH in 1945 and officially chaired the executive board since 1947. This operation, in the midst of the dismantling of GHH, was an alarm signal for some shareholders who saw the owner family in a looming governance crisis. Among these family members was Wolfgang Curtius, descendant of the *Erbstamm* of Friedrich Wilhelm Haniel. In 1951 the chief executive of the associated mining company Rheinpreußen AG addressed to Hans Böninger, a descendant of the oldest *Erbstamm* of Hugo Haniel. Böninger at the same time was a member of the GHH group's supervisory board. Curtius spoke of a systematic restriction of family influence in the GHH, which had been in place for decades, and he therefore appealed to the owner family's future robustness. He also believed that the Allied dismantling policy was the last chance for the family to take control of their fortunes again. This was not a return to the operative business but a stronger articulation, sharpening, and representation of their interests in relation to the entire group of companies (James 2006).

Curtius alluded to the creeping alienation of the family from their businesses. In 1917 Franz Haniel & Cie. GmbH was founded not by the family shareholders but by the companies in their possession (mining companies and the GHH). Representatives of these companies used to attend the meetings for decades. In addition, the sale of the Zeche Zollverein to the Vereinigte Stahlwerke AG in the 1920s, which was controversial in the family, had since made it difficult to reach an understanding between the *Erbstämme* (James 2006). The conclusion of the Allied dismantling process was a setback for Curtius and his supporters. Since the dismantling of GHH effected on the owner family as capital increase, some shareholders separated from their shares for material and tax reasons. In 1952/53 the family acquired only about 45% of the shares and was only able to maintain the majority with the help of amicable shareholders. The Allies had decided on an involuntary crisis-preventive measure: ironically, it was the Oberhausen hard coal and steel companies, which had been separated from the GHH

group, that would plunge into the turbulences of structural crisis since the end of the 1950s. The remaining works in machine, plant and automotive engineering were comparatively well positioned. Of course, some years before, the leaders of the GHH, especially Hermann Reusch, did not perceive this as a welcome relief (Bähr 2008).

While the GHH group therefore successfully restructured and expanded, especially after the change of management from Hermann Reusch to Dietrich Wilhelm von Menges in the mid-1960s, the governance crisis of the owner family, which Curtius had already perceived in the early 1950s, threatened to become real. In contrast to Reusch, von Menges preferred the wellbeing of the company over that of the Haniel family on all central and contentious issues. In addition, the governance structures in the GHH Group were strongly aligned with the person of Reusch (Obermüller 2009). The owners, for their part, faced a priority problem, which, in relation to the GHH, nevertheless shook the foundations of its existence: should the family clear the way for capital increases in order to enhance the competitiveness of the group? Or should it be continued to control the fortunes of GHH through a majority shareholding, so that the GHH remained a family group within the Haniel family group? This question overshadowed the negotiation processes with the non-family management (Flemming 2008).

By the traditional renouncement of substantial leverage from banks and the entry into a financial partnership with the Allianz Versicherung instead in 1969/70, the owner family under the lead of the chairman of GHH's advisory board, Klaus Haniel, tried to find a compromise. Nevertheless, as Thomas Flemming noticed, this decision was the "entry into the exit of the Haniels at GHH". Due to further capital increases in the 1970s, the stake was gradually reduced. In the mid-1980s, the family finally gave up its last shares. Especially Klaus Haniel, who wanted to preserve the influence of the owner's family for at least another generation, was disappointed by this decision (Flemming 2008; James 2006). Since the mid-1960s at the latest, the Haniel family was in a real governance crisis in relation to the GHH group, and neither individual/entrepreneurial nor family resilience could come into play. Since at least GHH's chief executive von Menges considered the owner family's long "rearguard action" as very time-consuming and stressful, even the organizational resilience of the GHH could hardly be promoted.

Within the Franz Haniel & Cie. GmbH (FHC), two new family-influenced bodies, the *Beratender Ausschuss* (1953) and the *Haniel'scher Interessen-Verein* (1957), were set up during the 1950s. Although the FHC only later exercised the function of a holding for the whole Haniel family company, it gained considerable importance as a result of these measures. Both bodies, together with the reactivated advisory board, enabled the possibility to push opinion forming

and decision-making. These steps were necessary because the family was quite dispersed. On a larger scale, it met in 1956, the year of the 200th Haniel anniversary, for the first time since many decades. In September 1958, Alfred Haniel as chair of the supervisory board appointed the first general meeting since 1916, in which the shareholders directly took part. Regarding this long period of relative family absence in the general meetings, Haniel and the non-family chairman Werner D. Ahlers grasped the opportunity and revived historical “flashbacks” to the company’s development during the last decades. These retrospections had three functions: firstly, they should strengthen the identification, especially of the younger shareholders, with the company. Secondly, these memories should give some insights in certain adversities such as the consequences of the Allied dismantling process. Thirdly and lastly, they should help to increase the shareholder’s awareness of present and future challenges (Urban 2018).

Ahlers emphasized that the former golden years in the hard coal and steel business were about to be replaced by a structural crisis that would not only affect the coal mines but also sales in cargo shipping and coal trade. This rather pessimistic in-house outlook was not new. As early as 1956, Curtius had obviously startled many family members by emphasizing that the hard coal business, in which the family still was heavily involved, would be the “most uncertain investment” in the future. He recommended to take a new, mediate path between rigid adherence to these traditional shareholdings and a radical change through liquidation because the latter would create a negative public image. In this context he assessed the Rheinpreußen mining company, whose chief executive he was, as most valuable hard coal asset in potential sales negotiations.

After the first Ruhr mines were forced to cancel shifts in 1958, because they could not sell their extracted hard coal, intense discussions about the adequate strategic decisions responding to this upcoming external crisis took place in the supervisory board between members of the family and the management. This dispute was initially overloaded by a personal conflict between the non-family chairman Ahlers and Alfred Haniel. Its escalation followed in February 1959, when Haniel drew comparisons to the company’s history to criticize Ahlers’s board activities. In Haniel’s view, Ahlers and the FHC have had the same starting position as all other industries and trading companies after the end of World War II. The shareholder therefore argued that it would not have been the chairman’s task to mourn the past or repetitive structural changes, but to search and find new fields of activity. Since Haniel finally blamed him of having an inconsistent reconstruction strategy and a light-headed financial policy, Ahlers withdrew from the company (James 2006).

After Ahlers's resignation, the discussions mainly dealt with the question in which direction and sector the company should extend and invest. In December 1960, in a meeting of the *Beratende Ausschuss* with the shareholders, the management and the advisory members in Rotterdam, Alfred Haniel reminded of the leading entrepreneurs in Haniel's history and demanded to create something new: "what next? As a founder, Franz Haniel combined hard coal with iron, [Paul] Reusch switched from hard coal and iron to refinery and [Johann W.] Welker summarized emerging opportunities. At this very moment, we are facing a turning point—whether we like it or not" (Urban 2014). Haniel voted for a radical exit from the hard coal mining, coal trade, and cargo shipping and suggested to engage in the banking business because the FHC in former times had played this role for the family. In contrast, Curtius recommended to strengthen the coal trade because regional competitors such as Stinnes would invest heavily in these businesses, and the core business had to remain stable and profitable. In January 1962, as no agreement about the future strategy found consent, the 78-year-old Haniel repeated his demand in the presence of the same circle of participants in Munich. After he had assessed that all business fields except the grain trade would stagnate, he emphasized that, especially for the elderly family members like himself, the great name of Franz Haniel & Cie. included not the obligation to maintain the name's reputation and tradition by mourning the past, but the ambition to enter new ways with "constructive fantasy" instead of backward-looking "romantic thinking". In his view, new approaches had to be found, if Goethe's much-quoted advice "what you have inherited from your forefathers, acquire it to make it your own" was still valid for the owners (Urban 2018; James 2006).

The Haniel family made some ground-breaking decisions. In 1964, Alfred Haniel's year of death, the sale of Rheinpreußen to the Deutsche Erdöl AG was finalized, which had been initiated by Curtius and Alfred Haniel already at the beginning of the coal crisis in the Ruhr area in 1959. This was the first step to gradually cut the family company's cord from its traditional core businesses. In 1962 the family and the management really tried to create something new by entering the pharmaceutical trading. Second and last, in 1966 Haniel entered the consumer products industry and supported the founder of the Metro cash-and-carry markets, Otto Beisheim. This very successful coup, which turned out to be Haniel's cash cow for many years and helped to get Haniel comparatively unharmed by the recession in the West German economy in 1966/67, was arranged by the non-family chairman Friedrich Wilhelm Lenz. Alfred Haniel's son-in-law, Thuisko von Metzsch, as chair of the supervisory board of the FHC and Curtius as board member provided the financial "munition for this jackpot" from the Rheinpreußen sale (James 2006).

As the Haniel family began to get more organizationally and visibly linked with business affairs since the late 1950s, it was mainly Curtius's and Alfred Haniel's ambition to give them orientation concerning the past and upcoming challenges. Based on their decade-long experience in the mining business, they were able to anticipate the forthcoming structural change in the Ruhr area and the adversity in the hard coal industry by initiating an exit strategy at a very early stage. This benefited both Haniel's family and organizational resilience. Traditional competitors such as Thyssen or Krupp only followed a few years later, and Stinnes even went bankrupt with its hard coal trade business in the 1960s because they had invested too much financial means in this dying sector.

Curtius revealed a high degree of entrepreneurial resilience, which was strongly based on pragmatism and flexibility. As Klaus Haniel, the great-great-grandson of Franz Haniel and together with Curtius and von Metzsch one of three influential family representatives (the so-called *Ober-Onkels*), put it, Curtius had dug his own grave by selling Rheinpreußen in favour of the family. Due to these capacities, Curtius ultimately transferred his resilience to the family system and to the organization. With some limitations, this finding also applies to Alfred Haniel. His individual resilience was primarily of cognitive nature and mainly expressed in partly radical demands on the occasion of board meetings. As grey eminence, he asked uncomfortable questions and gave important thought-provoking impulses to both the non-family management and the family shareholders. In this perspective, he was rather progressive instead of caught up in the lure of the past, as Harold James has suggested. However, James is right in describing him as a "transitional figure" between the past and the present (see James 2006). Positively interpreted, Alfred Haniel was an important interface to familiarize the shareholders with the spirit and history of the company. His retrospections were highly identity-shaping. Yet his old age and this character hindered him from being the unifying figure for the family. This role was assumed by the mentioned triumvirate, before it became more and more replaced in the 1970s by a new group of shareholders, the so-called *Jungen Wilden*, led by Jan von Haefthen. It can be assumed, that Alfred Haniel's often short-tempered appearances in board meetings and his dispute with the non-family chairman Ahlers in 1958/59 might have more unsettled and paralyzed the family shareholders than it was useful.

Haniel's letter to the management from October 1963 might have triggered unrest. In this document he assessed the Stinnes breakdown as part of a "long chain of precisely such first-class and well-known companies that bear the label of family companies" such as Borsig, Maffei or Borgward, and he referred to the liquidity of the FHC, which, in his view, was also fragile. This analysis was a bit of surprising because only five years before, when Alfred Haniel resigned from

the supervisory board, he was convinced to leave a “very stable” company with a “healthy body” (James 2006). All in all, his almost excessive individual resilience, which was based on optimism and positive outlooks, alternated with pessimism and negative outlooks and may therefore have led to ambivalent implications on the family and organizational level. Through the triumvirate (Klaus Haniel, Curtius, von Metzsch) and a self-developed “family policy” at the beginning of the 1970s, the Haniel family could eventually proceed a path that rebalanced their relation to the companies in the FHC and could thus overcome the “double” structural change in business and family as well as the connected, looming alienation crisis (Urban 2018).

3 Two Heiresses, a Four-Men Committee and a Plan—The Reviving of a Thyssen Family Group

In contrast to Haniel, Thyssen, whose historical roots go back to the year 1871, was no longer a family business at the end of World War II. This status was lost already in 1926, when Fritz Thyssen had brought in the steel mills, hard coal mines and processing plants in the western Ruhr area, which he had inherited from the late father and founder August Thyssen, as a stake into a newly founded group, the Vereinigte Stahlwerke AG. The so-called *Stahlverein*, to which several companies transferred their previously independent business assets, was the child of an industry crisis. In view of an overcapacity in steel production and the resulting lack of sales and price decline, the newly formed joint venture took advantage of its vertical structure and economies of scale (Reckendrees 2000; to the acting of the *Stahlverein* during the Nazi period see Donges 2014). Nonetheless, prominent competitors, including Haniel’s Gutehoffnungshütte as well as the Fried. Krupp AG in Essen, remained independent. Besides, financial reasons caused Fritz Thyssen to join, and, in his last years of life, even August Thyssen advocated the project for pragmatic reasons (Rasch 2010). In 1927, Fritz Thyssen’s younger brother Heinrich Thyssen-Bornemisza combined his part of the company’s heritage, including two Northern German shipyards, into an independent multinational group of companies (Wixforth 2019).

Fritz Thyssen, an early financial supporter of Hitler, had broken with the Nazi regime at the beginning of the war. He fled with his wife Amélie; both were persecuted, arrested and interned in concentration camps until the end of the war. His participation in the *Stahlverein* was expropriated. In 1948/49 Fritz Thyssen was tried in court for his early Nazi involvement. After his denazification, he died in Argentina in February 1951; a few days before his death, he was able to make

a settlement with German authorities regarding the reimbursement of his business assets (Schleusener 2018).

For the two heiresses, Amélie Thyssen and her daughter Anita Gräfin Zichy-Thyssen, the situation in 1951 was as follows: on the one part, the company's ownership was fragmented by the dismantling of the Vereinigte Stahlwerke into its individual units (steel mills and coal mines), and for this reason the distance between these individual units and the owner family was substantial. On the other part, political support had already succeeded in averting the threat of complete breakup of the traditional August Thyssen-Hütte in 1948/49. The Allied dismantling legacy took into account the property rights of shareholders, which gave hope for a return to family capitalism (Bähr 2015).

In relation to the family, the widow Amélie Thyssen must have perceived the situation as a possible turning point in a long-running alienation crisis. This decline had already begun in the lifetime of her father-in-law, August Thyssen, and was reflected in his distrust of both sons. Specifically, he considered them unsuitable for acting as successful family entrepreneurs (Lesczenski 2008). In this respect, a temporal overlap of several process-based crisis phenomena on the meso and micro level can already be observed in the 1920s. Economic downturns (regarding the steel industry and the liquidity of the Thyssen group) were closely related to non-economic crises (trust and loyalty of the owner family). The years 1926 to 1939, in which Fritz Thyssen represented the integrated Thyssen participation within the Vereinigte Stahlwerke only by a seat in the supervisory board, also did not help to intensify the (emotional) attachment between the owner family and the companies. The events described since the beginning of the war, as well as the emigration of Anita Gräfin Zichy-Thyssen and her nuclear family to Argentina, promoted a further weakening.

After the death of Fritz Thyssen and the restitution of assets, 73-year-old Amélie Thyssen saw it as her husband's legacy and mission to form a new family-influenced Thyssen group. Her daughter Anita, however, was not primarily interested in reactivating the family factor, but in long-term lucrative returns for herself and her sons. As heiresses, both women were sole shareholders in separate asset management companies. The decisive impetus for the implementation of the project came from its chairmen Robert Ellscheid and Kurt Birrenbach. In addition to Robert Pferdenges, who had good connections to the German Chancellor Konrad Adenauer and other politicians, and Hans-Günther Sohl they belonged to a group of confidants of four people, the so-called *Thyssen-Komitee*. The body represented the interests of both heiresses within this branch of the Thyssen family, and their members functioned as agents, consultants, and asset managers. Indeed, the de-concentration plan drawn up by Ellscheid and approved

by the Allies in 1953 was ground-breaking. Yet the plan was not intended (as blueprint) to reconstruct the former Thyssen part of the Vereinigte Stahlwerke. The aim was to create a new, more powerful, and stable Thyssen group. Consequently, for example, the Phoenix-Rheinrohr AG Vereinigte Hütten- und Röhrenwerke, two formerly independent companies, were integrated (Bähr 2015).

The inclusion of the newly established August Thyssen-Hütte AG (ATH) quickly became the core of the expanded *Thyssen-Plan*. In addition to its psychological value, the importance of the company had tangible economic reasons. Both motive strands can also be identified in the merger between the ATH and Phoenix Rheinrohr, which was promoted by Hans-Günther Sohl. The chairman of the ATH was sure of Amélie Thyssen's approval, as the merger promised a symbolic conclusion to successfully deal with the alienation crisis. Accordingly, Fritz Thyssen's widow was overwhelmed when Sohl informed her in March 1963 that "your long-standing desire to put your family's works together in the August Thyssen-Hütte [...] is about to be fulfilled" (Bähr 2015). That month, the High Authority of the European Coal and Steel Community in Luxembourg gave the green light to Sohl's application after six years of political struggle. Amélie Thyssen's share exchange sealed the merger in 1964. A year later, the *Alte Dame*, as the members of the *Thyssen-Komitee* called her among themselves, died. With the merger, Fritz Thyssen's widow—in the run-up to the 75th anniversary of the company in 1966—could indeed consider her late mission to be fulfilled.

For Sohl, the merger was primarily about forging a "pure steel company" under his leadership. Due to stable ownership, this should ensure the necessary scope of action and planning security and thus strengthen his standing at Thyssen. The company had to take advantage of economies of scale and scope. In fact, the new Thyssen group was able to cope better with the first part of the steel crisis (since 1964) than many of its competitors. This included a flexible and rapid adaptation to disruptions: Sohl had advocated a separate coal base for Thyssen as recently as 1957, and the group subsequently acquired a majority stake in the modern, and therefore highly valued, Erin Bergbau AG in Castrop-Rauxel, the so-called *Schwarze Diamant* ("black diamond") of Ruhr mining. Less than two years later, the majority shareholding was relinquished under the impression of the rising coal crisis. In 1968 the entire Thyssen mining holdings were at last transferred to the newly founded Ruhrkohle AG. The company instead increased its steel capacity at the end of the 1960s by purchasing companies that were no longer viable, such as Haniel's Hüttenwerke Oberhausen AG. The HOAG had earlier been dismantled from the GHH group by the Allies (Bähr 2015).

From the early 1950s to the mid-1960s, Thyssen can thus see a complex, predominantly profitable interaction of different dimensions of resilience. The

non-family agents overcame the family's alienation crisis with the help of the strategy pursued in the *Thyssen-Plan*. With the *Thyssen-Komitee*, an unofficial body was created, whose members were in boundless loyalty to their principals and complemented the competences well (Bähr 2015). Thus, it was itself a proactive resilience instrument at the organizational level. In doing so, they transferred their individual resilience to the family of owners represented by Amélie Thyssen and Anita Gräfin Zichy-Thyssen. Such a transfer was necessary because cohesion in this branch of the Thyssen family was not very pronounced. This led to conflicts between the two heiresses and to divergent strategies and objectives. These divergences had to be reconciled by the committee members also with a view to preserving the newly created organization.

Furthermore, such mediation services did not constitute a new phenomenon. Instead, the high need for advice was an early and significant feature of the owner family (Derix 2016). In this respect, in relation to Thyssen, the variable paths that were described at the beginning to promote family resilience posed a cross-generational threat, especially for organizational resilience. Mother and daughter stressed different accents in their understanding of family. While Amélie Thyssen had in mind the historically shaped owner family; for Anita Gräfin Zichy-Thyssen this was her own nuclear family. These two were latently competing manifestations of family resilience.

Hans-Günther Sohl played a decisive role in the resilience management of the non-family fraction since the end of the 1950s. In addition to a high level of assertiveness, his entrepreneurial resilience resulted from his experience as a former board member at the Vereinigte Stahlwerke. This, in turn, benefited the organizational resilience of the newly formed Thyssen family group to a particular extent. Yet it should be pointed out that despite the volatility in the steel industry until the mid-1960s, there was no question of an economic threat to the Thyssen companies. On the contrary, they recorded an order boom, which sometimes grew at double-digit rates. The measures completed by Sohl can therefore be regarded as strategies that proactively promoted organizational resilience by the aforementioned triad of adaptation, renewal, and learning. At least, this was the case of the short and medium term. The real test, the long and severe steel crisis in the late 1970s and 1980s, was still to come.

The aforementioned resilience management, which relates to the family and business system, could not possibly have developed without Amélie Thyssen and her daughter. It is true that either of them did not show entrepreneurial ambitions at all; and within the business family, there was no one in sight who would be able to lead a group of this dimension in future. However, Johannes Bähr rightly points out that West Germany's richest two women could have sold their shares

to banks or foreign investors at any time rather than bringing them into a new Thyssen group (Bähr 2015). The individual resilience of the heiresses to corresponding purchase offers—as well as the will of the widow to build on a longer interrupted family tradition after the incisive experiences of the Nazi period—can therefore be interpreted as elements of individual and family resilience. At the same time, the principles of the *Alte Dame* formed a kind of Thyssen specific *Grundgesetz* (“basic law”) for the actions of her agents. All in all, the newly formed organization owed not only its survivability to both women but its existence as a *family* business.

The following development at Thyssen until the merger with Krupp in 1999 was characterized by a horizontal diversification and specialization process of the company and a declining influence of the owner family. According to Bähr, the transformation from a family business to a public company was essentially completed as early as October 1968. This was largely due to the death of Amélie Thyssen in 1965, the loss of importance of the committee, and the increased capital requirements, which the family could no longer cope with on its own. In the 1970s, the family was only able to maintain the tax-relevant shareholding of just over 25 percent with the help of an insurance company and a bank. Nevertheless, the members of the Zichy-Thyssen family, as major shareholders, continued to hold on to their shares for some time. They even accepted the name change of the company in 1977 without any resistance (Bähr 2015). This was not self-evident because by replacing August Thyssen-Hütte AG by Thyssen AG, the founder had symbolically disappeared.

It is, however, another indication that the Zichy-Thyssen family branch took a forward-looking perspective and was less interested in its historical heritage. Consequently, their members did not stand in the way of the successful transformation of the company from a former “pure steel group” to a diversified industrial and service group but contributed to this course. Nonetheless, it was not until 1995, five years after the death of Anita Gräfin Zichy-Thyssen, that her two sons separated from the shares. A milestone in the transformation process was the acquisition of the machine and plant manufacturer Rheinstahl in the spring of 1973. With this decision, which nearly synchronized with the starting point of the crisis of the West German economy, Sohl departed from his steel-focused strategy of the 1960s and placed the Thyssen Group on a more stable footing. This adaptation capacity was a prerequisite for the group’s viability under the impression of the severe steel crisis of the late 1970s and 1980s (Bähr 2015). Despite the ability to adapt, more than 14 percent of the Thyssen workforce were dismissed between 1974 and 1980; more than twice as many employees as Krupp laid off in this period (James 2012).

It is clear that, after the death of Amélie Thyssen and the subsequent fading of the “reconfigured” business family (see to this term, in relation to the Thyssen Bornemisza family branches, Derix 2016), a fruitful interaction between entrepreneurial and organizational resilience was more important than ever. After the reviving of the family company, which lasted about a decade and a half (1953–1968), the emotional and geographical distance of the Zichy-Thyssen family to the group had once again grown sharply. Since the renewed estrangement from the company had any crisis potential, the family influence on the organizational resilience of the Thyssen Group was no longer necessary.

4 Between Resisting, Struggling and Founding—Krupp

While the Haniel and Thyssen families and companies already initiated the separation from its traditional coal and steel core business activities towards the end of the 1950s, the representatives of the company Fried. Krupp, founded in 1811, first pursued a different or even contrary strategy. The sole owner Alfried Krupp von Bohlen und Halbach, who was released early from prison in 1951, and Berthold Beitz, who was appointed his chief executive in 1953, worked towards the restoration of the unity of the company in Krupp’s hands and for the reorganization of the former steel company, according to tradition. Both actors were able to delay the implementation of the Allied divestment order that was signed by Alfried Krupp in the so-called *Mehlemer Abkommen* in 1953. This treaty provided for a rapid sale of Krupp’s hard coal mining and steel mills to smash the former company essential to the war effort. For instance, Emscher-Lippe-Bergbau AG was sold to the state-owned mining company Hibernia. Yet the order was undermined by the purchase of the steel company Bochumer Verein and the conjoined mine Constantin der Große. Besides, Alfried Krupp pleaded for taking orders for civilian production of all types and scopes. In this way, as stated in the annual report of 1954/55, a certain degree of resilience would be guaranteed (Gall 2002).

An interview with German weekly news magazine *Der Spiegel* in 1955 outlined how comprehensively Beitz, who had been nominated as general director by Alfried Krupp—because he, as a Northern German, did not share the background (or, *Stallgeruch*) of the “nepotized” Ruhr industry—adapted the goals of his principal. Beitz called for a lift of the Allied divestment order by comparing the aspiring unit of the company Fried. Krupp to a farm with good and bad fields. Both the principal and his agent were convinced that the hard coal and steel companies were not to be found among the bad fields (James 2012; Gall 2002).

Thus, at the beginning of the 1960s, the company Fried. Krupp showed some features of resilience. Its two key actors successfully resisted the implementation of the Allied divestment order. In October 1959, a joint committee chaired by a Swiss banker approved their request for an extension of the deadline, which since then was renewed annually. Alfried Krupp and Beitz were closely linked to each other. Beitz gradually formed out a high degree of entrepreneurial resilience, despite or precisely because of his position as a newcomer to the coal and steel industry in the Ruhr area. A very special example was the negotiation of an agreement with the Jewish Claim Conference in December 1959, which compensated former Jewish forced laborers of Krupp. With this agreement, Beitz not only spared the claimants further time-consuming psychological burdens, but also freed the company from continuing uncertainty as to how much compensation would be paid. This negotiation success further strengthened his standing as a legitimate chief executive. Beitz undoubtedly benefited from the fact that during World War II, as a young commercial director of Karpathen Öl AG in the German-occupied Galicia, he had saved an estimated several hundred Jews from being transported to the Nazi extermination camps (Käppner 2010; Gall 2002). Overall, the company Fried. Krupp was able to preserve its structure as a centrally controlled family company, which also linked to the traditional presence in the world market (James 2012; Gall 2002).

When Krupp celebrated its 150th anniversary in November 1961, former German Federal President Theodor Heuss demanded at the end of his commemorative speech that the last trace elements of the Allied divestment order, which would still create uncertainties, should finally be eliminated. However, this was to happen only after Alfried Krupp's death in 1967. Heuss saw the "duration in transition" as a prominent feature of the company Fried. Krupp (Heuss 1961). However, already for the contemporaries, it was quite questionable whether the two elements were in balance. In fact, the company Fried. Krupp comprised a large number of operating divisions and foreign (associated) companies. As Lothar Gall noticed, Krupp's structure resembled more a conglomerate or a kind of mixed goods store than a homogeneous group. In addition, the technology and processes in steel production had changed enormously in the 1950s and 1960s, and not Krupp, but Thyssen with Hans-Günther Sohl were the pioneers of a corresponding modernization process at the Ruhr. Of course, Thyssen has traditionally focused on the production of ordinary steel and corresponding economies of scale, whereas Krupp was rather focused on a broader variety of special steels (James 2012; Gall 2002).

Neither Alfried Krupp nor Beitz saw the company Fried. Krupp facing a rising crisis. The sole owner not only maintained his opposition to the separation of

coal and steel but also his refusal to sell newly acquired or traditional production areas such as the loss-making locomotive construction. On the latter point, both men had different views. Like his great-grandfather Alfred Krupp in the wake of the founding crisis of the 1870s, the grandson saw sales slumps and losses as merely temporary phenomena and doubts about the company's liquidity as tactical manoeuvres by major banks. Thus, both the fundamentally changed market conditions for coal and steel as well as the in-house warnings of the financial expert in the board of directors, Johannes Schröder, were largely ignored. A more intensive examination of the financial situation of the entire company began only later when Schröder, only a few months after his dismissal in 1962, spoke in an interview with the German newspaper *Handelsblatt* about the threatening "financial heart attack" of German family-owned companies. Since these companies, so his reasoning, did not need to publish their balance sheets, they would not work under the current "medical supervision". Nearly at the same time, and in view of the beginning structural change in the Ruhr area and the growing indebtedness of the company, Beitz instructed his directors to draw up the first consolidated balance sheet of its history in 1963. On this basis and the looming recession in the German economy, Alfried Krupp in 1966 publicly announced the necessity of a "new style of entrepreneurial planning" and "structural shifts". Among others, the coal participation was reduced by the closure of four mines, including Zeche Helene, a traditional great coal pit in Essen (James 2012; Käppner 2010; Gall 2002).

As the company Fried. Krupp headed for a liquidity crisis in 1966/67, the Federal Government and the State Government of North-Rhine Westphalia together with major banks leaped up for a 400 million DM rescue package of guarantees (*Bürgschaften*) and loans in March 1967. These aids made them dependent on substantial structural cuts, such as the transformation of the company from a sole proprietorship into a corporation, and the formation of an advisory board. Consequently, the Fried. Krupp GmbH was founded, and Hermann Josef Abs, the figurehead of Deutsche Bank, took over the board. Abs later claimed that 1966/67 was "not a Krupp crisis, but a crisis in the banking structure of the time". In doing so, he alluded to the initial refusal of the *Ausfuhr-Kredit-Gesellschaft* mbH founded by German banks to grant the Krupp company further loans for the flourishing Eastern European business. This behaviour triggered the threatening "financial heart attack". The *Ausfuhr-Kredit-Gesellschaft* did intermediate the inquired credits, so that at least the guarantees did not have to be used. For Krupp, the situation in 1966/67 was essentially a combination of a liquidity and a credit crisis. Furthermore, both Alfried Krupp and Beitz must have been aware

that the company was carrying a structural imbalance that fostered a vulnerability through non-systematic diversification and a comparatively late response to the coal crisis (James 2012; Gall 2002). Both key figures became, in a sense, the victims of their own successes in having resisted the Allied divestment order (Käppner 2010).

During the 1960s, the sole owner fully realized that “structural shifts” were also overdue at the interface with the owner family. Alfried Krupp was determined to transform the company into a corporation through the establishment of a foundation. His main objective was to ensure the existence of the company on a permanent basis. For this, the influence of the family should be eliminated. Such an attitude was rooted in an understanding that, by fragmenting the shares as a result of inheritances, asset withdrawals, compensation claims or litigation between shareholders, ownership families have a damaging rather than conducive effect on a company’s stability. Apart from this, with each additional generation, there is a growing risk that shareholders could sell the company, for example through opening up to investors and converting it into a stock company. In other words, to Alfried Krupp the family was more of a handicap than a resource (Berghoff 2016; Schäfer 2007). His second motive was to serve philanthropic purposes, such as promoting science, health, and literature.

For this measure, which after more than 150 years and five generations would mean the end of Krupp as a family business, a renunciation of his only son Arndt von Bohlen and Halbach was necessary. Alfried Krupp had appointed his son as sole heir in 1956 in the hope that he would take over his position in the company. In view of his son’s interests and lifestyle, he had become increasingly doubtful about this, and the senior revised his testament several times from 1962. He temporarily considered to install his brother Berthold as co-heir, before rejecting this plan again. Arndt agreed with the renunciation in September 1966; in return, he got an annual apanage until his death in 1986. Berthold Beitz again played a decisive role on the way to this decision. Since the communication between father and son was not without friction, Beitz, who had quickly become a confidant for Arndt von Bohlen and Halbach, exercised a mediating function. After Alfried Krupp’s death in 1967, his assets were contributed to the Alfried von Bohlen und Halbach Foundation established by himself. The foundation was the company’s sole shareholder (James 2012; Käppner 2010; Gall 2002).

The idea of converting a family business into a foundation was by no means new. Only a few years earlier, in 1964, the family-owned company Robert Bosch had contributed most of its shares to a foundation. The oldest German example of a company-linked foundation is the Carl Zeiss Foundation, initiated by Ernst Abbe in 1887. In 1959, Thyssen, apart from several older examples in the

Thyssen-Bornemisza family branch, also put a foundation on the track. The Fritz Thyssen Foundation, established by the widow Amélie Thyssen and conceived by her agents with the help of Konrad Adenauer, is a pure science foundation (Hockerts 2018). Only a small part of the Thyssen family's shareholding was included in this foundation; the majority of the company's assets should remain family property (Bähr 2015). It is striking how consistently and comprehensively Alfried Krupp eliminated the family factor in the foundation. In contrast to Bosch, no family member was allowed to take a seat on the Krupp foundation's boards. Instead of members of the family, who initially fought against their exclusion, after Alfried Krupp's death in 1967 Berthold Beitz was appointed chairman of the board of trustees of the Alfried Krupp von Bohlen und Halbach Foundation (James 2012). Beitz kept this leading position until his death in 2013.

For these reasons, while the key actors at Krupp were able to stop the business-related dismantling process, the separation of the owner family from the company was inevitable for both of them (Gall 2002). In retrospect, this approach has proved to be an effective resilience strategy, especially since every generational change—both in research and from the perspective of many owner families—is perceived as a potential crisis. As early as the 1960s, there were enough illustrative examples that the family business model was at least in a critical transformation phase, if not at the beginning of a crisis. Nonetheless, the removal of Hermann Josef Abs from the board of directors of Fried. Krupp GmbH initiated by Beitz in 1970 was quite a risky undertaking that could have permanently weakened the organizational resilience of the company.

Regarding the difficult relationship between Alfried Krupp and his son, family resilience could hardly develop during the crisis period of the 1960s. Following Walsh's work, there was a lack of a shared belief that the company should remain a *family* business, and there was a lack of a problem- and solution-oriented communication. Instead, Beitz, as a non-family man, had to provide these mediation services. The initial description of developmental psychology that family resilience develops and establishes in a path of intergenerational adaptation, perseverance and growth, ended with the death of Alfried Krupp in 1967 and the start of the foundation's activities in 1968. Nevertheless, it could also be argued that the family resilience of the owner family—albeit for the last time—was reactivated precisely by Arndt's renunciation of inheritance and the implementation of the Krupp foundation. At any rate, father and son, with Beitz's support, showed the necessary flexibility to find a way out of the dilemma that met the (modified) demands and goals of both parties.

On the occasion of its 50th anniversary in 2018, the Alfried Krupp von Bohlen und Halbach Foundation rated its birth hour as a "liberation strike". From the

foundation's perspective, the formation unfolded in a complex mixture of business calculations, external pressure, and an orientation towards the common interest. In their view, it was this special atmosphere that often had determined Krupp's decisions in the past (Alfried Krupp von Bohlen und Halbach-Stiftung 2018).

Despite the high contextuality of the resilience phenomenon, some analogies can be observed. In fact, Prussia as a constituent state of the German Empire previously helped the company Fried. Krupp in 1906 by granting the new family member Gustav von Bohlen und Halbach the right to bear the name "Krupp" as a prefix of his own family surname. At the same time, the legal structure was converted from a sole proprietorship into a stock corporation, the Fried. Krupp AG with von Bohlen und Halbach as its future chairman. This procedure was repeated during the Nazi period by Hitler's so-called *Lex Krupp* in 1943, as Alfried von Bohlen und Halbach took over the leadership from his ill father. This time, the legal form was converted back into a sole proprietorship (Gall 2002). Yet there was a significant difference in these "resilience infusions" from outside to the situation towards the end of the 1960s: in the first half of the twentieth century, the aim was to preserve the above-mentioned familiness of the enterprise and the enterpriseness of the Krupp family. In the 1960s, however, the aim of politics was just to move away from this constellation. Lastly yet importantly, (inheritance) tax advantages played a significant role both in the transformations of 1906 and 1943 as well as in the establishment of the Krupp foundation.

In the 1970s business activities of Fried. Krupp GmbH were negatively influenced by the crisis of the West German economy. So as to put the company's liquidity on a more stable basis and to enable large scale investments, Beitz struck a spectacular deal with Iran in the summer of 1974. Iran acquired just over 25 percent of the shares of Fried. Krupp Hüttenwerke AG and also transferred this stake to the Fried. Krupp GmbH between 1976 and 1978. Nevertheless, after first consolidation procedures since the end of the 1960s, which were initiated by the short-term chief executive Günter Vogelsang between 1968 and 1972, this participation did not stimulate any reorganization of the company's strategy, and further rationalization plans were initially delayed. The course of internationalization has even accelerated since the 1980s (James 2012; Käppner 2010).

5 Conclusion

As Table 1 from the beginning illustrates, all three family companies in the Ruhr area had to cope between the 1950s and 1970s with a layering of partly

overlapping crisis phenomena at different levels. The most massive cut represented structural change. The focus on the hard coal and steel industry, which had been a potential factor in the industrialization process in the nineteenth century, became a problem since the 1960s at the latest (Plumpe 2019). The owner families of Haniel, Thyssen and Krupp all exerted their influence directly or indirectly through control bodies (Bähr 2015). They were not involved in operational management for decades. As Table 2 suggests, their resilience management and the resiliencing of their agents both had some significant similarities and differences. Regarding the three dimensions of resilience presented, the analysis reveals many transfers and overlaps.

Haniel's resiliencing was highly adaptive and, in some cases, even proactive. Several key figures of the family initiated an early transformation of assets from "old economy" fields to more promising areas. Ideas and impulses for renewal were brought in from this circle, more or less in contrast to the owners of Krupp and Thyssen. In relation to both family companies, a good part or almost exclusively non-family members (Beitz, *Thyssen Komitee*) took over this task. While the Haniel family was able to draw on their own resilience equipment, the owners of Thyssen and Krupp depended on resilience transfers that were outside the family system. The Haniel family strengthened family resilience from within, whereas Alfred Krupp deliberately weakened it from within in favour of the company's

Table 2 Resilience Factors and Strategies, Promoting Various Dimensions, 1950s to 1970s

Dimensions of Resilience	Haniel	Thyssen	Krupp
- Individual/ entrepreneurial - Family - Organizational	Deconstructing the business tradition by new strategies, 1960s Mostly high level of principal-agent alignment Long-term relinking of the family to the business, 1950s Creating a "family policy", 1970s Early and gradual breaking away from the coal and steel heritage	Creating a new family influenced Thyssen group, 1950s High level of principal-agent alignment Short/middle-termed "reconfiguration" of the family, 1950s Punctual revision of steel-focused-strategy, 1973	Resisting of Allied divestment order and restoring of the <i>status quo ante</i> , 1950s High level of principal-agent alignment Permanent elimination of the family factor by a foundation, 1967/68

future. Family and representatives of all three companies seized the opportunities that were offered by the consequences of the Allied dismantling process. They all tried to turn the (looming) stress factor into an advantage for business and family. The impact of their actions on the development of resilience at the individual, family, and organizational level was quite different. Haniel's and Krupp's resilience management, although with different development speeds and goals, was intended and aligned in the long term. In contrast, the Thyssen resiliencing had rather a medium to short-term perspective. This was due to the fact that the Thyssen agents were fully aware of the high vulnerability of the restored family factor and its dependence on Amélie Thyssen.

Both in the Thyssen and Krupp case, a high level of principal-agent alignment can be noticed. This finding applies to Haniel only with limitations. At the beginning of the coal crisis, there was a disagreement between the chairman of the supervisory board, Alfred Haniel, and the chief executive Werner D. Ahlers. Even more serious were the increasing owner family's dissonances with von Menges in the GHH Group. Thus, in relation to their agents, only the principals of Thyssen and Krupp were able to benefit almost entirely from loyalty as a "golden factor" of "social resilience" (Maurer 2016). For Beitz, his loyalty to Alfred Krupp was clearly a priority over strategic disagreements.

While the Thyssen key actors faced the rising and actual crisis phenomena in a combination of proactivity and adaptivity, the dominance of the reactive element of Krupp stands out. Alfred Krupp's and Berthold Beitz's prime principle did not aim at adaptation, renewal, and learning, being typical of organizational resilience, but at the restoration of the *status quo ante*. Signals of an impending, process-based structural crisis were first denied or delayed. Neither the organization nor its sole owner showed learning effects from the company crisis in the 1870s. Krupp's and Beitz's coping strategy thus mainly aimed at resisting to the disturbances, which they perceived as only temporary, and at rapidly restoring the old balance and stability. This behaviour is very similar to "engineering resilience", which the Canadian ecologist Crawford S. Holling attributed to rather robust and defensive (eco-)systems, whereas the more active and progressive ones would apt for change, pursue new states of balance, and would thus show "ecological resilience" (Holling 1996). Besides, Krupp's repetitive and almost traditional orientation on state interventions can well be interpreted as an (aimed) access to external resilience resources.

Nonetheless, the appointment of Beitz in 1953 and the sharpening of the foundation idea in the 1960s were highly proactive and forward-looking decisions. The foundation structure created a more stable ownership and preserved the "spirit" of a family business without keeping the harmful effects of family influence

(James 2012). Between the 1950s and 1970s, both Thyssen's and Krupp's family and company representatives finally broke with the mental and material historical pre-embossings and traditions. Their resiliencing stroke a course that did not only avert path, perhaps even "*past*" dependencies.

In contrast to Thyssen and Krupp, the Haniel family showed a special, change-oriented form of "resilience culture". This culture was fed by the experience of key actors and by narratives, in which the deferral of individual interests played a central role. Wolfgang Curtius was an integral part of these narratives: his (supposed) altruism towards change by initiating the early sale of the Rheinpreußen mining company and by waiving his on-site position as general director was later highlighted not only at his *Dienstjubiläum* ("anniversary with the company") in the Franz Haniel & Cie. GmbH, but also at a meeting of the younger family members, who in today's owner families are called the "next generation" (Urban 2018). It was thereby possible for the Haniel family to adapt the above-mentioned belief system (identity and self-perception) to the changed circumstances and to foster family resilience. Thus, they converted from a trading and industrialist family to a family, which was connected to trade and service, before another change was initiated. This change has led to today's family equity context. All in all, this processual behaviour is similar to Holling's ecological resilience or even to the extended phenomenon of "social-ecological resilience", which includes a substantial transformation of a system.

The selected period of investigation reflects the final phase of the "long farewell" of owner and entrepreneurial personalities, some of which were still in the educational, social, and mental tradition of family capitalism's golden age. They were at the same time realistic and astute enough to recognize that this family capitalism was already subject to many essential adjustment constraints in order to remain viable. In addition to Amélie Thyssen, also Alfried Krupp von Bohlen und Halbach belonged to this group. In this respect, both and not only Alfred Haniel were "transitional figures" between the past and the present. They and the individual and entrepreneurial resilience of their agents significantly influenced the resilience management of that period.

In view of the rapidly increasing complexity of organizations and the associated differentiation of management and governance tasks in globalized (non-)family groups, a growing "depersonalization" of resilience management can be observed as early as in the 1970s. Since then, instead of individual actors moving within and at the interfaces of complex adaptive systems, rather the systems themselves and their exchanges and different logics are more likely to be brought into focus. In this respect, resilience management has become a bit more predictable, but also more abstract and anonymous even at the level of the family.

Therefore, larger owner families in particular are forced to reduce complexity and work through family-specific organizational processes such as shareholder competence development (Rüsen 2019) to promote their members' identification with the history of their family business and thus at the same time maintain its future viability.

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Resilience Process Framework for Inter-Organisational Cooperation

Ann-Kathrin Dieterle

1 Introduction

In economic research, there are various connotations behind the notion of resilience. It may refer equally to the ability to resist, recover, and change. Various explanatory approaches are used: resilience as outcome, as capacity/capability, and as process. Resilience has been studied extensively and separately at the level of companies in business and management discourses as well as at the regional economic level. Little attention has been paid to multi-layer approaches as well as interdisciplinary approaches in economics. Linnenluecke (2017) explains that future research of organisational resilience needs to focus on multi-level and multi-disciplinary issues (ibid.: 27). Complementing this, Soosay and Hyland (2015) emphasise that future research should include environmental conditions in which cooperation occurs (ibid.: 14).

In non-scientific discourse, recently great attention has been directed toward networking and inter-organisational cooperation in the economic field for a better response to challenges such as the digital transformation, the corona pandemic and political regulations. Networking and inter-organisational cooperation represent multi-layer relationships embedded in a hierarchical system of individual, organisational and environmental levels. Resilience can occur at different levels simultaneously, it is therefore important to understand both the processes in and the connections between the levels. Particularly, a multi-level approach enables a better understanding of the interactions through which resilience reveals itself

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on the different levels (see e.g., Klein and Kozlowski 2000). Mainly, this idea is addressed in research on resilience in the field of supply chain (SC). The focus is particularly lies on logistical processes and multiple actors. However, there has been no conceptualisation of inter-organisational relationships between two companies (Linnenluecke 2017, p. 25). Therefore, research potential remains regarding the design of inter-organisational processes, structures, and capacities to enhance resilience.

In this contribution, the creation of a conceptual framework for resilience as a process will enable a better comprehension of the underlying dynamics of cooperation between organisations. Conceptual frameworks can increase the external validity of the field and ease processing for organisations by the establishment of recommendations (see e.g., Meredith 1993). The following four main objectives constitute the focus of this research:

- analysis of existing debates of resilience of economic systems at the macro, micro, and meso levels and the elaboration of common approaches
- explanation of underlying systems theories, processes, and functions relevant for relationships between organisations
- introduction of a resilience process framework of inter-organisational cooperation
- identification of limitations of current research and proposition of potential research opportunities and gaps within the research framework

In this contribution, Sect. 2 defines the concept of resilience from an economic perspective and briefly compares it to approaches from other disciplines. This is followed by a deeper analysis of resilience in regional economic geography, organisations, and networks. In Sect. 3, inter-organisational cooperation and resilience are linked to systems theory. Underlying exchange processes are defined through agency, panarchy, and cooperation dimensions to better understand inter-organisational cooperation at the meso level. Sect. 4 introduces the resilience process framework of inter-organisational cooperation and outlines further research potential. This is followed by the conclusion in Sect. 5.

2 Resilience as Part of Economic Systems

2.1 Genesis of the Resilience Approach

The term resilience derives from the Latin ‘resilire’, which means to bounce back (Alexander 2013, p. 2710). The English stem ‘resilience’ implies elasticity (ibid.: 2710) and the ability to change. Most of all, it is discussed in connection with risk and protective factors see (e.g., Richardson 2002; Ungericht and Wiesner 2011; Fletcher and Sarkar 2013). Risk factors can occur outside and within a respective (economic) element or system, taking the form of 1) temporary or 2) long-term risk factors (Vöpel and Wolf 2018, p. 224). Temporary risk factors refer to one-time shocks that include disturbances, crises, and catastrophes (Saynisch 1994, pp. 51–52), whereas long-term risk factors include slowly evolving challenges. The core capacity of resilient economic elements or systems is to protect themselves and make necessary changes (Vöpel et al. 2018, p. 225). Resilience capacities are discussed as a multidimensional construct including a varied repertoire of protective factors such as capabilities, behaviours, routines, characteristics, qualities, and properties (Lengnick-Hall and Beck 2005, pp. 749–750; Ponomarov and Holcomb 2009, p. 127; Burnard and Bhamra 2011, p. 5587).

The notion of resilience is still discussed as “more than a metaphor, but less than a theory” (Swanstrom 2008, p. 2) demonstrating that it remains an ambiguous concept. At least since Holling’s study in the field of ecology, resilience has become popular as a heuristic model in the academic world (Holling 1973). At present, resilience is applied with different connotations of the term in various scientific disciplines:

- material and engineering sciences: *engineering resilience*; stability concept, returning to the original state; coping with short-term natural disasters and changes in technical infrastructure (Blum et al. 2016, p. 166; Scharte and Thoma 2016, p. 130)
- ecology: *ecological resilience*; dynamic and multistable (eco-) systems; learning to process change and to adapt to a new equilibrium (Holling 1973; Gunderson and Holling 2002, p. 11; Swanstrom 2008, p. 5)
- social sciences: *social resilience* or *social-ecological resilience*; permanent change; social systems are able to resist threats through transformative processes (Keck and Sakdapolrak 2013, p. 6; Blum et al. 2016, p. 158)

Since the turn of the millennium, the concept of resilience has become increasingly important for one discipline of the social sciences – the economic sciences.

Triggered by shocks, such as the terrorist attack in 2001 in New York and the global economic and financial crisis in 2008/2009 (Sutcliffe and Vogus 2003, p. 98), companies realised that shocks in their environment have an impact on their operational level (Bhamra et al. 2011, p. 5375; Linnenluecke 2017, p. 4). As a result, resilience became more present in organisational management, interactions among economic actors, and their economic environment (Simmie and Martin 2010, p. 28; Hosseini et al. 2019, p. 285). The following section explores the levels of resilience in the economic discourse and shows interdisciplinary links to insights discussed in this section.

2.2 Resilience in the Field of Economics

The economic resilience discourse can be divided into three different main levels according to the systemic perspective: 1) macro, 2) micro, and 3) meso. On the macro level, an economic system is considered at a spatial scale with multiple processes between elements and subsystems. The micro level refers to the level of organisations as closed systems. Organisations can actively separate themselves from the external environment through formal structures and are therefore treated as closed systems (Berger et al. 2014, p. 158–163). The meso level approaches organisations or institutions as open systems. This means that open systems are interdependent with the environment. The organisational environment gives them a setting for their actions through mutual interaction (Berger et al. 2014, p. 158–163). At this level, mainly inter-organisational processes with other systems are analysed. Regarding this division into systemic levels, it is important to mention that organisations could relocate. However, at the macro level, a spatial dependency exists and thus a limitation of the adaptation processes.

Resilience on the macro level

To explain resilience on the macro level, theories from economic geography have to be considered. Economic geography focuses on developments including economic stability, economic structures, and economic structural change. Three approaches are discussed in this field: 1) engineering resilience, 2) ecological resilience, and 3) *evolutionary adaptive resilience*. First, resilient economic systems are analysed using the engineering resilience approach when the focus lies on returning to the pre-shock state or path. Resilience is seen as bouncing back from a shock (Martin and Sunley 2015, p. 5). A typical indicator for measuring engineering resilience is the development of the regional gross domestic product (Wink et al. 2016, p. 15). Secondly, the concept of ecological resilience is applied when resilient regions structurally

reposition themselves in a different equilibrium with more successful priorities and strategies after a shock (ibid.: 15). In this case, resilience is defined as ability to absorb shocks (Martin et al. 2015, p. 5). In the third approach, however, a complete structural change of a system is studied from an evolutionary perspective, the so-called *evolutionary adaptive resilience* (Wink et al. 2016, p. 15). Anticipating or reacting to a shock is connected to the idea of bouncing forward. Resilience is understood as positive adaptability towards a new growth path (Martin et al. 2015, p. 5). The evolutionary adaptive resilience approach does not require a direct risk factor for the capacity to adapt and transform but is driven by internal processes and complex system behaviour such as self-organisation (Gunderson et al. 2002, p. 14). A combination of all three approaches is concerned under the notion of *regional economic resilience* (Martin et al. 2015). It can be defined as:

“[...] the capacity of a regional or local economy to withstand or recover from [...] shocks to its developmental growth path, if necessary by undergoing adaptive changes to its economic structures and its social and institutional arrangements, so as to maintain or restore its previous developmental path, or transit to a new sustainable path characterized by a fuller and more productive use of its [...] resources.” (ibid.: 14–15)

Resilience on the micro level

At the micro level, in particular, business and management aspects are considered in the research field of *organisational resilience*.

„[Organisational resilience] is the emergent property of organisational systems that relates to the inherent and adaptive qualities and capabilities that enable an organisation’s adaptive capacity during turbulent periods. The mechanisms of organisational resilience thereby strive to improve an organisation’s situational awareness, reduce organisational vulnerabilities to systemic risk environments and restore efficacy following the events of a disruption.“ (Burnard et al. 2011, p. 5587)

Origins for organisational resilience can be found in Meyer’s study (1982) regarding environmental jolts in hospitals. He was the first to use resilience in the business and management literature (Linnenluecke 2017, p. 9). The focus lies on a risk management perspective by responding to external risk factors with adaptive behaviour and organisational learning. In the 1980s and 1990s, the concept of resilience shifted to an endogenous organisational reliability focus (ibid.: 9). The topics covered were internal risk and crisis management, emergency planning, and business continuity. The main research focus included high reliability organising with the aim to prepare for future unknown challenges (ibid.: 10). Weick and Sutcliffe (2016) shaped

this area with their research on high reliability organisations such as nuclear power plants or aircraft carriers. The experience of these organisations is not fundamentally different from the experience of actors in the business world (ibid.: 18). The main objective of both high reliability organisations and commercial enterprises is to maintain their functionality and increase their stability (ibid.: 39).

Resilience on the meso level

The meso level is addressed in the resilience discourse with regard to network structures and the cooperation perspective. In the business and management discourse, a network represents the totality of all elements that are connected by a certain relationship (Aldrich and Whetten 1984, pp. 386–387). In the regional economic discourse, the metaphor of a network is not only used for connection but also for processes among elements in a complex economy (Martin and Sunley 2007, p. 585). Cooperation or collaboration¹ thereby represents the ability of two or more autonomous organisations to align their operational businesses with common goals and thus work together effectively (Cao et al. 2010, p. 6613). SCs and SC networks, in particular, are explored in the discourse on resilience of networks and summarised under the term *supply chain resilience* (SCR) (Ponomarov et al. 2009, p. 130; Hosseini et al. 2019, p. 290). SCR is defined as:

“The adaptive capability of the supply chain to prepare for unexpected events, respond to disruptions, and recover from them by maintaining continuity of operations at the desired level of connectedness and control over structure and function.” (Ponomarov et al. 2009, p. 131)

In summary, the three economic research areas of regional economic resilience, organisational resilience, and SCR relate to inter-organisational dynamics. The following sections focus on resilience as a process and underlying resilience capacities, capabilities, and enablers in these fields.

2.3 Resilience in Regional Economies

In regional economic research, a method of operationalising and measuring resilience is described in the framework of ‘resilience thinking’ by Walker and Salt

¹ The terms cooperation and collaboration are treated as synonyms in this contribution. Consequently, both teamwork with different subtasks and parallel work on a common result are included using the two terms.

(2012). The systemic background and options for action for resilience management of a system can be developed according to four steps: 1) resilience of what?, 2) resilience to what?, 3) resilience analysis, and 4) resilience management. The first question delimits the system concerned and its elements (ibid.: 35–48). In the case of economic systems, this means identifying characteristics of the economy and growth paths of the region. The ‘resilience to what?’ step refers to how a shock or disturbance can be determined for the identified characteristics or growth paths. In the third and fourth step, the analysis of possible scenarios and courses of action are carried out to achieve a more preferential growth path (Martin et al. 2015, pp. 13–14). The emergence of new paths and thus of resilience is explained by capacities of social systems. Aspects of social resilience are considered in the regional economic perspective when dealing with dynamic and complex changes (see e.g., Walker et al. 2002; Folke et al. 2010). The individual capacities are related to a specific point in time, but if they are treated sequentially, an iterative resilience process emerges combining the three approaches of evolutionary adaptive resilience, engineering resilience and ecological resilience. The process, therefore, includes the three capacities: 1) transformative capacity, 2) coping capacity, and 3) adaptive capacity. Table 1 provides a detailed overview of the capacities.

The three capacities, or rather resilience phases, are oriented towards activities before, during, and after a crisis. Risk factors often do not represent isolated

Table 1 Main internal capacities of social resilience

	Transformative capacity	Coping capacity	Adaptive capacity
Synonym	Participative capacity	Reactive capacity	Proactive capacity, adaptability
Temporal scope	Long-term; before a crisis	Short-term; during and after a crisis	Long-term; after a crisis
Degree of change	High; radical change	Low	Medium; increasing change
Outcome	Increase of present self-organisation and generation of future potentials; bounce forward	Restoration of the status quo; bounce back	Contextual adaptation and the protection of existence; ability to absorb

Source: own draft based on Walker et al. (2002), Voss (2008), Lorenz (2010), Obrist et al. (2010), Simmie et al. (2010), Keck et al. (2013), Martin et al. (2015), Blum et al. (2016)

events, but rather consist of several simultaneously occurring challenges. Therefore, the phases of transformative, coping, and adaptive capacity might overlap and do not necessarily occur symmetrically. This means, for example, that short-term responses of the coping capacity support long-term transformative capacity. In the following, the three phases are nevertheless explained separately.

Transformative capacity

Voss (2008) and Lorenz (2010) discuss transformative capacity under the term ‘participative capacity’. This capacity describes the issues of progressive change and development in the system’s structure. The term transformative capacity according to Keck and Sakdapolrak (2013) is more appropriate in the context of system transformation because it explicitly includes the meaning of progressive change and development. Therefore, radical change proceeds in the context of transformative capacity. The objective is to improve the well-being of individuals and thus organisations through anticipation of present or future risks (ibid.: 10–11). The rebuy the increase of self-organisation is a supportive measure to transform (Lorenz 2010, pp. 13–15). The transformative capacity provides the basis for coping flexibly with risk factors.

Coping capacity

The outcome of coping capacity occurs in a short-term context as restoration of current well-being immediately after a risk (Keck et al. 2013, pp. 10–11). Obrist, Pfeiffer and Henley (2010) define coping as ‘reactive capacity’ (ibid.: 289) in response to risks. Therefore, coping refers to all strategies of (constructively) dealing with risks, which reconnect the extraordinary with the orderly processes (Voss 2008, p. 52). Lorenz (2010) considers coping capacity as a way of dealing with the failure of expectations and relying back on past structures. Due to the nature of the expectation structure, coping capacity is a unique characteristic of social systems formed by the human components. In contrast to coping capacity, adaptive capacity changes expectation structures after external environmental changes or internal irritations occur (Lorenz 2010, pp. 13–15).

Adaptive capacity

The adaptive capacity is an aspect of resilience that reflects learning, the flexibility to experiment and adopt new solutions, and the development of general responses to broad categories of challenges (Walker et al. 2002, p. 6). Adaptability is discussed as a synonym for adaptive capacity in the context of long-term learning. This ‘proactive capacity’ (Obrist et al. 2010, p. 289) creates more opportunities to deal with threats or future risks and follows a long-term success (Simmie et al. 2010, p. 30). The

change is intended to last longer than under the coping capacity. The underlying process of adaptive capacity can be explained by the heuristic model of the adaptive cycle. The model was first discussed in the context of natural ecosystems but was transferred to regional economic resilience as an adaptation process as described in Fig. 1 (see e.g., Holling 2001; Simmie et al. 2010; Keck et al. 2013).

The adaptive cycle represents an endogenously controlled four-phase process of iterative adjustment of systems (Pendall et al. 2010, p. 79). Systems pass through the phases of exploitation and growth (r), conservation and rigidity (K), collapse and release (Ω), as well as reorganisation and renewal (α) (Holling 2001, p. 396; Walker et al. 2002, p. 6; Keck et al. 2013, p. 7). Resilience is increasing during the phase α and r when the uncertainty is high and the control is weak. With the increase of the vulnerability in phase K , resilience decreases and arrives at its lowest point while a shock occurs (Ω). During reorganisation and renewal in phase r , it slowly increases once more. Adaptive capacity differs from transformative capacity mainly in the degree of change and the associated outcome.

Not only complex, composite combinations of companies, industries, institutions, infrastructure, and culture in regional economic systems can be examined as social systems (Martin 2011, pp. 199–201). Individual elements such as companies can also be analysed as social systems. In the following section, companies are

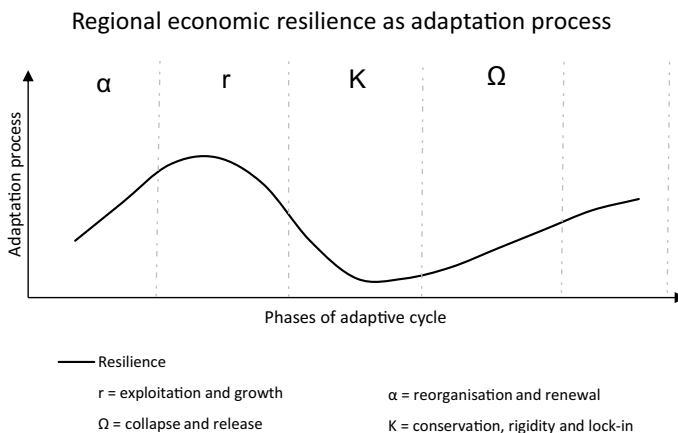


Fig. 1 Regional economic resilience as an adaptation process described by the adaptive cycle. (Source: adapted from Simmie et al. 2010, p. 34)

examined at the micro level from the perspective of economic and management research with regard to their organisational resilience.

2.4 Resilience in Organisations

Organisations can be subdivided into the levels of individuals, teams and entire organisational structures, and working processes (Sutcliffe et al. 2003, p. 95; Burnard et al. 2011, p. 5583; Danner-Schröder and Geiger 2016, p. 201). Psychological aspects represent a part of organisational resilience at the level of the individual (Ungericht et al. 2011, pp. 188–193; Danner-Schröder et al. 2016, pp. 201–207). An example can be the enhancement and restoration of individual functioning under stress and pressure. Staw et al. (1981) emphasize in particular that parallels exist between effects at the individual and team level (ibid.: 507). The level of the entire organisation includes organisational structure formation, reduction of complexity, process flows, rearrangement of existing competencies, expansion of experience, and knowledge transfer (Danner-Schröder et al. 2016, p. 204). This contribution focuses on organisations and their behaviour as entire systems, therefore the focus on structures and processes is primarily important. There are three conceptualisations of organisational resilience that can be distinguished: 1) resilience as outcome, 2) resilience capabilities, and 3) resilience as process (Duchek 2020, p. 219).

Organisational resilience as outcome

Organisational resilience is seen as an outcome when the focus is on sources and factors that distinguish resilient organisations from less resilient ones. The main objective is to identify what organisations must have to respond to crises and bounce back from interruptions. The meaning of resistance and recovery is given to the notion of resilience (see e.g., Horne and Orr 1998; Linnenluecke 2017). Only a retrospective perspective is studied.

Organisational resilience capabilities

Concerning complete organisations, resilience is also discussed from different perspectives as resilience capabilities. Capabilities consist of different functionings or properties of organisations that release opportunities of realisation (see e.g., Sen 1992; Robeyns 2000). Ismail et al. (2011) state in their research that resilience results both from strategic and operational capabilities. Lengnick-Hall and Beck (2005) define the resilient capabilities as capacity that consists of a unique composition of

cognitive, behavioural, and contextual properties (ibid.: 750). Thus, capabilities can be formed on a strategic and operational level as well as from intrinsic and extrinsic properties.

Organisational resilience as process

The third conceptualisation of resilience in the business and management discourse presents resilience as process. This perspective of organisational resilience was first discussed by Sutcliffe and Vogus (2003). They linked organisations' doings to their capacity to cope with threats. The process-related organisational resilience arises from the continuous handling of risks, stresses, and strains and the existence of hidden resources that can be activated and recombined over time in new challenging situations (ibid.: 95–97). Burnard and Bhamra (2011) are the first to introduce a three-phase resilient process for unspecific risk factors with a focus on operations management and strategic management. They determine the levels of organisational resilience as: detection and activation, (resilient) response, and organisational learning (ibid.: 5589). Recently, Duchek (2020) proceeds even further and designs a new conceptual framework of organisational resilience (see Table 2).

In this conceptual framework, resilience is the meta-construct that is disassembled into its parts, the resilience levels as process and the underlying capabilities. In the sequence of an iterative process, Duchek groups the resilience levels as follows:

Table 2 Organisational resilience as three phase process

	Phase 1	Phase 2	Phase 3
Organisational resilience process	Anticipation	Coping	Adaptation
Synonym	Detection; activation	(Resilient) response	Organisational learning; change in the behaviour
Parallels to phases of social resilience	Transformative capacity	Coping capacity	Adaptive capacity
Temporal scope	Long-term; before a crisis	Short-term; during and after a crisis	Long-term; after a crisis
Underlying capabilities	Observation, identification, preparation	Ability to accept a problem, develop a solution, implement the solution	Reflection and learning, organisational changeability

Source: own draft based on Horne et al. (1998), Weick and Quinn (1999), Burnard et al. (2011), Lengnick-Hall (2011), Duchek (2020)

1) anticipation, 2) coping, and 3) adaptation (*ibid.*). This framework can be linked to the levels of organisational resilience discussed by Burnard and Bhamra. The underlying capabilities, in this case, consist of actions of both entire organisations and the employees. Duchek's framework shows parallels to the regional economic discussion and the phases of social systems, since interaction with the environment is assumed in the organisational process framework as well as in the resilience discourse of social systems. The anticipation phase is characterised by considerations of vulnerability to failures, the complexity of situations and operational processes (Weick et al. 2016, p. 48). Critical developments and potential threats are anticipated. Three main capabilities underlie the anticipation phase: observation, identification, and preparation (Duchek 2020, p. 224). Therefore, the anticipation phase and underlying capabilities are similar to the transformative capacity, and the coping processes equal with the coping capacity. Organisational coping occurs as response to critical situations and recovers the expected performance level (Lengnick-Hall et al. 2011, p. 244). Coping capabilities include the ability to accept a problem, develop a solution and implement it (Duchek 2020, pp. 226–228). The adaptation phase is as well mentioned in the management and business literature in a similar way as in the discourse of social systems by the synonym of change in behaviour (Horne et al. 1998, pp. 36–37). Adaptation, in the long run, is also described by the term adaptability (Weick et al. 1999, p. 365). Parallels can be drawn to adaptive capacity due to the aspect of learning, as both include learning from critical situations in ways that are mindful (*ibid.*: 365). This dimension underlies two capabilities: reflection and learning as well as organisational changeability (Duchek 2020, p. 229).

Resilience occurs not only at the level of a system or subsystem but also at the level of processes between systems and subsystems. Networks preserve knowledge and simultaneously disseminate it through themselves (Obrist et al. 2010, p. 286). In the following section, the research area of resilience in networks is explained based on the findings in the field of SC.

2.5 Resilience in Networks

In SCR, a network perspective is analysed based on the interaction among actors. Connections to the regional economic and organisational perspective are established through the adaptive capacity as well as the maintenance or preservation of structure and function (Ponomarov et al. 2009, p. 131). Resilience in the context of SCs can be divided into three areas of research: 1) SCR as a process, 2) sector-specific approaches, and 3) general resilience enablers. The sector-specific

approaches are neglected because they are too specific for the research topic of this contribution.

Supply chain resilience as process

Hosseini et al. (2019) recently discussed a model of resilience as process in SCR with three categories: 1) absorptive capacity, 2) adaptive capacity, and 3) restorative capacity (ibid.: 293–297). They base their model on assumptions of Biringer et al. (2013), who discuss resilience capacities on a temporal scale – before, during, and after a disruption – in the field of risk management. The levels resemble the three widely recognised levels introduced by Ponomarov and Holcomb (2009): readiness, response, and recovery (ibid.: 135). In this contribution, resilience as a process perspective by Hossini, Ivanov and Dolgui (2019) is elaborated in more detail since parallels to the other two resilience processes are evident (see Table 3). As described in Sect. 2.3, we discuss a symmetrical sequence of phases, but nevertheless overlaps may occur.

In the context of SCR, absorptive capacity is seen as the ability of a system to absorb the effects of system disturbances (Biringer et al. 2013, pp. 117–123; Hosseini et al. 2019, pp. 291–292). An intake of knowledge from the business environment and its integration into the existing knowledge occurs (Schreyögg and

Table 3 Supply chain resilience as three phase process

	Phase 1	Phase 2a	Phase 2b	Phase 3
Supply chain resilience process	Absorptive capacity	Adaptive capacity (short-Term)	Restorative capacity	
Synonym	Readiness	Response	Recovery	
Parallels to organisational resilience process	Anticipation	Coping		Adaptation
Parallels to phases of social resilience	Transformative capacity	Coping capacity		Adaptive capacity (long-term; adaptability)
Temporal scope	Long-term; before a crisis	Short-term; during and after a crisis		Long-term; after a crisis

Source: own draft based on Ponomarov et al. (2009), Biringer et al. (2013), Hosseini et al. (2019)

Duchek 2012, p. 205). Absorptive capacity can be linked to the capabilities of observation, identification, and preparation of the anticipation phase in the organisational resilience discourse. In this phase, the effort to recover the system after a disruption is reduced before a crisis. Absorptive capacity is crucial to resist disruptions, whereas the response capacity is more likely to produce performance results in terms of adaptation during a crisis. Adaptive capacity is the degree to which a system adapts itself and tries to overcome disruptions by using non-standard operating practices (Biringer et al. 2013, pp. 117–123; Hosseini et al. 2019, pp. 291–292). In the conceptualisation of the SCR process, adaptive capacity is seen under a short-term outcome without linking to learning processes. Consequently, there are parallels to the coping level in the organisational resilience process. The restorative capacity is defined as the ability of a system to restore itself quickly and efficiently after a disruption. The absorption and adaptation capacities were previously not able to retain the system at an acceptable level of performance (Biringer et al. 2013, pp. 117–123; Hosseini et al. 2019, pp. 291–292). The restorative capacity, due to its short-term scope and reaction to specific crises, demonstrates similarities to the phase of coping in the organisational resilience process.

General resilience enablers

General enablers in SCR are discussed under a resource based view. These resource-based enablers reflect the strategic level of responding to risk factors. The management of adaptation and integration as well as the reconfiguration of resources, organisational skills, and functional competencies occur (Ponomarov et al. 2009, pp. 133–134). Key enablers often considered in literature with regard to network constructs are: agility, flexibility, visibility, redundancy, diversity, modularity, interdependency, connectivity, and collaboration (see e.g., Sheffi 2005; Blome et al. 2013; Soosay et al. 2015; Dubey et al. 2018; Dubey et al. 2019; Hosseini et al. 2019). In particular, cooperation has to be mentioned as a key resilient enabler as it has a special status among them. Cooperation in SCR focuses on the complete network of suppliers, buyers and the associated interaction (Pettit et al. 2013, p. 49). The various companies in the SC jointly apply strategies to improve performance and thus increase resilience in cooperation (Day 2014, p. 1984). In particular, the knowledge base and the ability to adapt is increased (Cao et al. 2010, p. 6613; Scholten and Schilder 2015, p. 471). As a result, the cooperating companies create, gain, and divide mutual and better benefits. Organisations who are connected to one another make their success interdependent (Soosay et al. 2015, p. 618). Therefore, connectivity and interdependency are enablers closely related to collaboration. Actions as sharing resources such as communication, knowledge of processes and procedures, infrastructure, financial and non-financial resources

are part of the cooperation (Duong and Chong 2020, pp. 2, 11). Resource sharing among organisations is the antecedent of resilience and as a result leads to more agility, flexibility, visibility, redundancy, diversity, modularity in the SC and thus to more resilience (Scholten et al. 2015, p. 471).

In Sect. 2, the resilience approaches of regional economic resilience, organisational resilience, and SCR along the systemic macro, micro, and meso levels were presented. These analyses show parallel developments in the three areas with regard to resilience as a process perspective. Three phases of resilience in each of the three areas are discussed. The phases of regional economic resilience – transformative capacity, coping capacity and adaptive capacity – coincide with the phases of organisational resilience – anticipation, coping and adaptation. In the SCR, there are divergences with regard to the phases. Absorptive capacity can be equated with anticipation and transformative capacity, whereby adaptive capacity and restorative capacity both refer to coping. In the SCR, only a short-term effect is attributed to adaptive capacity. However, in all three fields, resilience capabilities are discussed further. These differ in the wording as capacities, capabilities, and enablers. In terms of regional economic and organisational resilience, references to the resilience process have already been established in these areas, although a direct link is still missing in the third discipline. In general, it is evident that the models and abilities are strongly focused on the respective scientific field. Multi-layered approaches, which also include interactions between disciplines, have only been addressed sporadically. Although networks with many actors as well as the profit-oriented sector are already analysed in the SCR approach, there is no concrete research on the processes between companies and the interdependencies with the environment. In Sect. 3, the aspects of systems theory and cooperation between companies are addressed in order to gain a deeper understanding of the dynamics and exchange processes between organisations.

3 Inter-Organisational Cooperation Dynamics in a System

3.1 Systems Theory and its Connection to Resilience

The systems theory aims to explain the interaction of diverse objects and models such as humans, groups, organisations, economies, states or networks. It thus represents an interdisciplinary theory, whereby system dynamics serve as a basis for explaining interactions between different levels. Therefore the theory

is especially important for multi-layer approaches in resilience. The sociological perspective of the concept of systems includes the action and function of humans, hence it refers to human or social systems. Social systems may have been distinguished from ecological or natural systems in the form that humans bring foresight, creativity and the capability to adapt in advance to anticipated futures into the system (Pendall et al. 2010, p. 79). Because of the human factor, social systems have been especially characterised by interlinks through communication and recursive, forward and backward reaching loops (feedback) (Martens and Ostmann 2014, pp. 412–413).

Holling's extension of the stability theory to multistable systems had the consequence that complexity thinking was also discussed in the context of ecological nonlinearity of systems (Martin et al. 2007, p. 575). Over the last two decades, the complexity theory was transferred to the system thinking in several areas of social sciences such as social systems (McGlade and Garnsey 2005, p. 1). In particular, when the links between elements in a system become dependent, it is defined as a complex system (CS) (Miller and Page 2007, p. 9). A CS is described by various properties, which are emphasised differently depending on the discipline. In Sects. 2.3, 2.4 and 2.5 of this contribution, the CS properties of self-organisation (autopoiesis), openness and adaptability have already been addressed out of a resilience perspective. These can be completed by further properties: emergence, decentralised structure, limited functional splitting, and non-linear dynamics (see, e.g., Martin et al. 2007; Martens et al. 2014). Through the processes of self-organisation, non-linear dynamics, and openness, CSs have the potential to adapt their structures and dynamics (Martens et al. 2014, pp. 412–413; Martin et al. 2007, pp. 577–580). By using these properties in systems, resilience enablers such as flexibility, agility, visibility, redundancy, diversity, and modularity (see Sect. 2.5) can be achieved. The property of adaptability allows CSs to be subsumed under the special system type of a complex adaptive system (CAS). Systems are studied as CAS when different elements work together and form a network of interactions and connections (Burnard et al. 2011, p. 5584; Denzel 2019, pp. 532–533). Therefore adaptability is the basis for the resilience enablers of collaboration, interdependency, and connectivity. Elements in a CAS are referred to as *agents* or *actors*² in the resilience literature (Burnard et al. 2011, p. 5584; Denzel 2019, pp. 532–533). The underlying processes that take place can be summarised under the notion of *agency*.

² In the following, the term 'actor' will be used as it is the most common term in the discourse on organisations.

The links between system structures, agency and resilience may be explained as follows: the properties of a CAS can cause the recombination of resources, organisational skills, and functional competencies either in systems themselves (such as organisations) or through networks. These processes are summarised under enablers, which generally strengthen resilience. The resilience process perspective, however, focuses on specific operational actions that can be described by the agency concept. In the following section, the meso level will be more defined through the explanation of organisations as actors in a system and the classification of the exchange processes between actors.

3.2 Organisations as Subsystem and their Interdependent Dynamics

Subsystems are a part of an economical suprasystem and at the same time a part of other subsystems, whereby each one is a CS in its own (Martin et al. 2007, pp. 595–596). As independent elements, subsystems are fully capable of action and production even in their environments (Ungericht et al. 2011, p. 188). Organisations represent subsystems as well as collective actors. Collective actors enable a systematic orientation towards a particular problem, whereas they have fixed membership rules and a certain degree of organisation (Martens et al. 2014, pp. 437–430). According to their human components, organisations are not only CSs, but complex adaptive social systems. Especially the adaptive processes consist of *human or collective agency*. Human agency principally refers to intentions that count as action or a reaction that are connected to capabilities of the individual (Giddens 1984, pp. 8, 14).

“[Persons] become social actors [that are] able to exercise agency through resources, rights and obligations usually tied to roles and social positions.” (Abdelnour et al. 2017, p. 1782)

Social-structural networks of interpersonal or inter-organisational exchange provide a structure for the actions of the individual actors (Emirbayer and Mische 1998, p. 970). In these networks, collective action emerges through communication between social actors. Thus, action can occur in collective actors such as government agencies, economies, organisations or SCs (Bathelt and Glückler 2014, p. 343). A connection between human, collective agency and the organisational resilience process can be established since the underlying capabilities (discussed in Sect. 2.4) represent actions of both individuals and companies. From

a system's perspective, the connection of different collective actors can be described through the variety of adaptive processes in scale – magnitudes of size, time, and space.

The nested set of adaptive cycles are defined in the panarchy model. Larger scalable actors affect smaller ones through a 'remember' function in the panarchy model. Long-term, large-scale processes co-determine the interactions and results over shorter periods of time and in intermediate and smaller systems. Through the 'revolt' function, smaller actors can influence larger or intermediate ones or sometimes even lead to a complete breakdown of their structure (Gunderson et al. 2002, p. 5; Pendall et al. 2010, pp. 81–82).

Companies are collective actors in a system, whose exchange processes are part of the meso level. Exchange processes can be defined in different forms of cooperation. These are explained in more detail in the next section.

3.3 Inter-Organisational Cooperation as a Merge of Functions

In the context of management and organisational research, Aldrich and Whetten (1984) linked organisational networks with inter-organisational cooperation and established references to systems theory. From their point of view, inter-organisational cooperation represents so-called *action sets*. In these action sets, organisations temporarily combine their resources to achieve a common goal or project (ibid.: 386–387). Connections to the concept of collective agency can be established. Therefore, for this contribution inter-organisational cooperation is defined in accordance with Benisch (1981) as the merging of individual company functions to increase performance and improve competitiveness. Abel (1992) emphasises as well that cooperation not only focus on joint fulfilment of tasks but also on functions (ibid.: 108–109). Functions can be for example procurement, production, sales, administration or R&D. In the case of cooperation the economic independence of the partners is not abandoned (Benisch 1981, p. 403). Cooperation mainly takes place between two organisations, whereas one organisation can simultaneously have several cooperations with different companies.

Cooperation between companies is characterised by many different forms and levels of intensity, direction, and space. The intensity of cooperation can be determined by two forms of cooperation. On the one hand, loose cooperation does not require contractual arrangements because of informal arrangements and the exchange of know-how, for example at business get-togethers. Contractual forms of cooperation, on the other hand, are mergers with or without capital ties

(Abel 1992, pp. 93–94). Furthermore, cooperation can be distinguished into three dimensions: horizontal, vertical, and conglomerate categories according to their belonging to certain production and economic levels. In the case of *horizontal cooperation*, the partners work together at the same economic level in the same or a related economic sector. Competitors in particular benefit from this type of cooperation because it improves their market position (Benisch 1981, p. 404; Abel 1992, pp. 96–98). *Vertical cooperation* includes relationships between companies at various stages of processing goods. Above all, different ways of thinking are combined and the market position is developed (Benisch 1981, pp. 404; Abel 1992, pp. 99–100). *Conglomerates* or so-called *diagonal cooperation* are the type of cooperation in which companies from different sectors work together. This is significant when technology transfer or multi-component production from different industries is the primary concern (Benisch 1981, p. 405). In practice, it is not always possible to distinguish between the theoretical explanations presented. Companies can therefore simultaneously engage in cooperation with formal, informal, horizontal, vertical or even conglomerate orientation.

The merge of functions occurs in order to gain a competitive advantage, better cope with challenges in the external or internal environment, adapt to new situations, and anticipate future risk factors. As discussed in Sect. 3, companies represent complex adaptive social subsystems in an economic system that are able to learn, develop certain skills, and transform themselves. The concept of resilience ties in here. Sect. 4 discusses the resilience process framework with focus on cooperation between two organisations. Thereby, resilience on the macro, micro, and meso level of the framework is illustrated by examples. In addition, further research perspectives and gaps are identified with regard to the cooperation between two organisations and their forms of cooperation.

4 Multi-Layer Resilience in the Context of Inter-Organisational Cooperation

4.1 Resilience Process Framework of Inter-Organisational Cooperation

Studies mapping the connections of organisations and their environment are becoming increasingly important due to fast developments (Linnenluecke 2017, p. 25). Only few studies on the systemic levels of an economic system (regional economy, organisations, networks) have examined the interdependencies among the macro, micro, and meso level. Similar approaches can be found such as the focus

on resilience as a process and the discussion of capacities, capabilities or enablers. So far, these have been determined separately for organisations, systems or SC networks. It has not yet been made clear how to design resilience with a focus on cooperative processes between two organisations and a focus on resource exchange or knowledge flows (between different systems). The conceptual framework shown in Fig. 2 illustrates the interaction points between cooperative organisations on the meso and macro levels, influencing factors to enhance resilience on the meso level and the main stages of the individual resilience process on the micro level.

Spill over effects from and to the macro level

As shown in Fig. 2 the macro level consists of the surrounding economic systems. These include various subsystems such as regional economies, clusters or high-tech agglomerations. Companies in which cross-border cooperation can occur are part of the subsystems. In this context, the economic systems are the source of a variety of spill-over effects that influence, shape, and regulate the individual

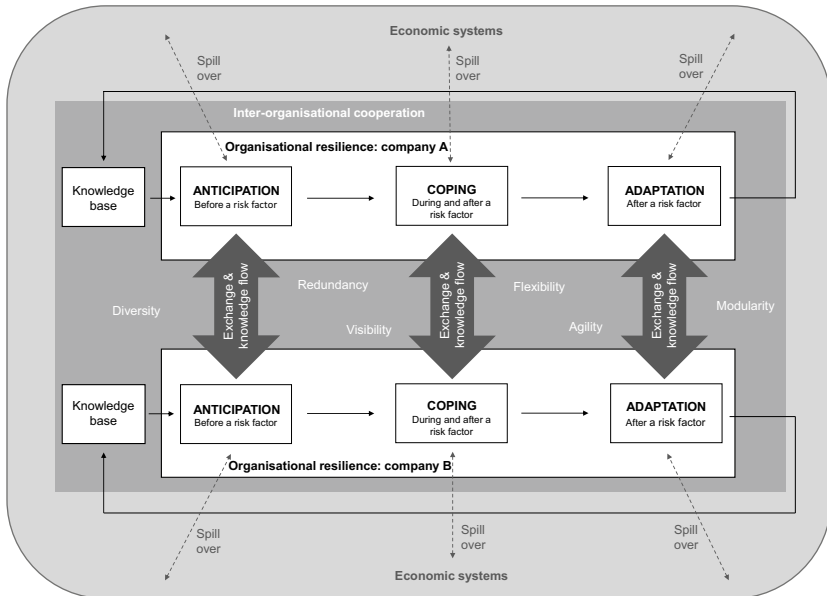


Fig.2 Resilience process framework of inter-organisational cooperation. (Source: own draft)

organisations at the micro level, their behaviour and the interactions between them at the meso level (Martin et al. 2007, pp. 595–596).

Resilience process on the micro level

The micro level in the resilience process framework of inter-organisational cooperation is represented by the resilience process of two organisations (company A and company B). They both pass through an iterative organisational resilience process with three stages: anticipation, coping, and adaptation. The phases are based on the time dimension of risk factors: before, during, and after a risk factor. The three phases were adapted from the organisational resilience debate. In case two resilience processes run symmetrically in companies, interactions in cooperation can take place at the meso level in all three phases.

Exchange and knowledge flow on the meso level

The meso level is characterised by cooperation processes. Observation, problem solving, reflection, and learning, as well as establishment of (new) knowledge can occur not only in one's system but in exchange with other actors. Interdependency and connectivity taking place on different scales can be explained by the panarchy model (see Sect. 3.2). The additional enablers of agility, flexibility, visibility, redundancy, diversity, and modularity might act as resilience strengthening factors within the cooperation. Examples are used to briefly describe the interdependencies in cooperation between companies and to show connections to the organisational and economic system level.

In the corona pandemic of 2020, production stops and falling demands were widely happening in different sectors in the worldwide economy (Busse et al. 2020). Some cooperations acted as catalysts for adaptation to the new circumstances. For example, a Covid-19 rapid test was developed through a cooperation between Bosch Healthcare Solutions GmbH and the Northern Irish medical technology company Randox Laboratories Ltd (Schlütersche Verlagsgesellschaft mbH & Co.KG 2020). The test already entered the market in April, after spreading of the virus started predominantly in Europe at the beginning of February. The test provides a reliable result based on World Health Organization guidelines in less than 2.5 h directly at the treatment site (Bosch Healthcare Solutions GmbH 2020b). In addition to Covid-19, nine other respiratory diseases such as influenza A and B may be examined with the same sample using the rapid test (Preuß 2020). As a second step, Bosch and Randox shortened the analysis time to 39 min after the market entry (Robert Bosch GmbH 2021). The two companies combined their resources to support the healthcare system by offering a new product. They coped

with the effects of the crisis in the way that they both searched for a new strategic orientation in the market. Bosch continues to establish itself in the medical industry, and Randox opens up new sales channels (Bosch Healthcare Solutions GmbH 2020a). Furthermore, they adapted to the new system's requirements by continuing to generate sales with a necessary new product adapted to sudden shifts in demand. The companies use anticipation as the test can not only identify Covid-19 but other diseases. The product, therefore, is not fully dependent on the corona pandemic. The following enablers are considered to have an influence on the cooperation: flexibility and agility through further development of the test (testing of further diseases and reduction of test evaluation time); visibility through open exchange to develop a new joint product; diversity through different entrepreneurial focuses (in vitro diagnostics industry and diversified group). The collaboration between Bosch and Randox builds on an already existing long-term tradition of cooperation. With this connection, there are spill-over effects on the following economic systems: hospitals adapt easier to the new situation using the test, the knowledge base in the regions of the two companies' location is expanded, and employment potential is created.

A further example of collaborative coping can be illustrated by the behaviour between Nokia and Philips in the aftermath of a fire at a Philips manufacturing plant in Albuquerque, New Mexico. In March 2000, a small fire damaged a Philips semiconductor chip manufacturing facility. The production facility consisted of clean rooms, which all were damaged by the fire. A result was the production shutdown of nine months. Nokia and the other customers were informed about a delay of the Philips chips shortly after the accident and Nokia took immediate action. Through daily consultations with Philips, Nokia was aware of the complete situation and progresses. By combining resources, Nokia supported Philips in rebuilding the production site and thereby returning to the status quo. In return, Philips assisted Nokia to purchase three of the five chips from other suppliers. The production of the remaining two chips was reallocated to other Philips factories to continue the delivery to Nokia. When the Albuquerque plant was reopened, production capacity was increased by 2000 units thanks to Nokia's support. To overcome the problem, Philips and Nokia acted as one company for a limited time. The competitor Ericsson responded too slowly to the crisis and was no longer able to purchase the microchips. As a result, the company suffered massive losses in production, sales, and turnover (Sheffi 2005, pp. 3–10). For Philips and Nokia, the increase in production and relocation to other production sites addressed not only the phase of coping through cooperative action but also adaptation. The restructuring of production is among the enhancing factors of flexibility, agility, and redundancy. Spill-over effects to the macro level can be observed, as new

knowledge was built up in other production facilities and competitors were eliminated from the market. Furthermore, visibility through regular communication exchange and modularity through the use of other suppliers influence the resilience process in the cooperation. In this case, the continuous cooperation over two years can be considered as a long-term one.

Another example refers to Klöckner, Europe's largest steel distributor, which identified the need for proactive business development. The company worked together with start-ups in Palo Alto to determine how the steel industry could be attacked in a disruptive way in order to anticipate a better position for the future. Within two days the company was conceptually completely overhauled in meetings with high-tech companies, the Stanford University, and venture capital firms. A year after the meetings in Palo Alto, the company had changed its personnel policy, integrated software engineers into the company and implemented a new strategy. A platform for steel trading was established in the company to bring together the supply and demand of the entire market (Keese 2016, pp. 165–171). The informal cooperation that took place through short-term collaboration with high-tech companies, the Stanford University and venture capital firms, principally created interactions in the adaptation and anticipation phase of Klöckner. Furthermore, Klöckner's ability to adapt was strengthened by (observational) learning from other sectors such as the software industry. Through vicarious learning, a company can draw conclusions about a potentially successful approach from previous attempts by similar companies. The successful integration of the learned knowledge of developing a platform influences the anticipation of Klöckner. In this example, the resilience process is influenced by redundancy through the bundling of competences in one platform, diversity through the cooperation with start-ups from the software industry, companies from the financial sector and an educational institution, and visibility through the disclosure of the previous business model. Spill-over effects on the economic systems in the steel industry arise from the implemented platform as various companies use the same infrastructure for data exchange.

Fig. 2 shows a symmetrical arrangement of the resilience process of the organisations involved in the cooperation. However, the examples show that cooperation might influence only certain process phases and not all three levels at once. Thus, asymmetrical transfer effects can also occur. As mentioned in Sect. 2.3, overlapping challenges might have an influence on this. In the case of the cooperation between Nokia and Philips, the coping phase is the main focus for both. Philips is also facing adaptations as a result of the increase in production and shifting of production to other production sites, although Nokia is largely excluded from the adaptation process. The extent to which the two companies are anticipating

developments cannot be determined on the basis of the facts. Parts of the example can be used to illustrate the transfer effects of the panarchy model. Philips and Nokia act as collective larger scalable actors. They influence the medium-sized scalable actor Ericsson through the ‘remember’ function. In this example, Nokia’s absorption capacity was higher than Ericsson’s. Ericsson’s production stop led to a collapse of the long-standing cooperation with Philips, affecting the competitive modalities of the entire telecommunications industry. Furthermore, the intensity and influence of a disruption on the cooperating companies can vary – from very little to very large. This can be illustrated particularly by the example of Klöckner, as the possible change only threatened Klöckner’s business model. The cooperating high-tech companies, the Stanford University, and venture capital firms themselves are not affected directly by the change. Focusing more on the start-ups as actors in a CAS, these small actors influence Klöckner using the ‘revolt’ function.

The preceding theoretical considerations in Sects. 2 and 3 have led to the conceptualisation of a resilience process model for inter-organisational cooperation in this section. In the following section, research perspectives and gaps for both science and practice are revealed for this resilience research perspective.

4.2 Future Role of Inter-Organisational Cooperation in Resilience

To establish a holistic comprehension of inter-organisational cooperation in the field of resilience, future research should focus on developing more detailed approaches both for research purposes and for practitioners, including managers, entrepreneurs and policy makers. Practical insights are required on how inter-organisational cooperation could activate resilience, as well as into the specific resources, structures, and processes of the cooperating companies. The following research perspectives on inter-organisational cooperation and its resilience have not yet been addressed.

Long-term adaptation

In Sect. 2.5, the resilient process phases of SCR were introduced and compared to the phases of social and organisational resilience. The phases of adaptive capacity and restorative capacity only have a short-term focus. The long-term focus of adaptation (adaptability) was not considered. Future research about cooperation (in SC) in the field of resilience should clarify if long-term adaptation is important and in which way.

Speed, absorptive capacity, and spatial dependency of the systemic levels

Based on the systemic perspective and its three levels, the circumstances in the different levels as well as in the associated systems vary. The following two fields show potential for further examination: Firstly, different speeds prevail in the various levels or systems. Reactions of cooperating systems could be postponed as a result of different absorption capacities. As illustrated in the example of Klöckner, start-ups have a faster speed in identifying potential to change compared to established companies because of their higher absorption capacity. Furthermore, on the macro level the transformative capacity might vary. For example, different speeds in the economic system in Palo Alto and the region of Klöckner's location can be assumed due to the different corporate structures. Friction or enrichment caused by asymmetrically resilient processes at the different levels should be further explored in empirical studies. In particular, consequences of asymmetric developments in cooperation at the level of companies, economic regions or sectors should be examined using practical examples. Secondly, a difference between the systemic levels in terms of their spatial bondage exists. If resilience is considered autonomously at the micro level, spatial factors play less of a role. On the contrary, the macro level is limited as a space for adaptation. Concerning inter-organisational cooperation, the macro level plays an important role in terms of influences. Therefore, there is further potential in the research of inter-organisational cooperation in economic areas with different historical, structural, and cultural characteristics. To limit economic regions and their potential risks, the Walker and Salt resilience framework could be applied. In particular, the questions of 'resilience of what?' and 'resilience to what?' could be used to identify characteristics, resources, and vulnerability to risk factors in different regions. Two different perspectives are interesting regarding this topic: On the one hand, the perspective could be taken which spatial conditions influence the resilience of the organisation itself and which influence is further transferred to the cooperating organisations. On the other hand, the aspect could be considered of how cooperation between organisations from different regions strengthens the regional resilience of the respective areas. Combining the two perspectives makes it possible to clarify on the basis of a practical examination whether the micro, meso, and macro levels or only two of them are connected.

Resilient capabilities and enablers

From the perspective of (social or collective) actors, research on capabilities and enablers shift into focus. In the Sects. 2.4 and 2.5 some resilience enhancing capabilities as well as enablers were discussed. These available studies demonstrate that no conclusions can be drawn about whether precisely these capabilities and enablers play a role in inter-organisational cooperation. Focusing on capabilities, it has to be

examined whether other capabilities are relevant for the organisational resilience of cooperating companies besides the following: observation, identification, preparation, ability to accept a problem and to develop and implement a solution as well as reflection, learning and organisational changeability. In the conceptualisation in Sect. 4.1 the capabilities were neglected since it was not possible to identify whether the organisationally resilient capabilities also serve as a meta-level for the inter-organisational interactions. The example of Klöckner discussed in Sect. 4.1, shows that learning as a capability can be related to both the adaptation and the anticipation phase. Thus, it is not yet clear which capabilities can be linked to which phases. Further empirical research would be of interest. Regarding the enablers, it is important to explore in more detail how agility, flexibility, visibility, redundancy, diversity, and modularity play a role in the cooperation between two companies and whether they can be extended. In Sect. 2.5 enablers were listed on the basis of literature, although completeness cannot be guaranteed here. These were addressed in Sect. 4.1 to show first connections to this research framework. However, a systematic focus and exploration of enablers are still needed and could be verified by practical examples. In particular, in the context of capabilities and enablers, empirical studies including the following aspects would be of interest: different company sizes, different company ages, different company cultures, different sector affiliations. It is assumed that the behaviour and thus the mutual exchange processes of opposing actors may vary.

Cooperation forms, dimensions and exchange processes

Within inter-organisational resilience research, the following question is central: How does the combination of functions expand the scope for response? Different forms and dimensions of cooperation influence the resilience of the cooperating companies. Vertical and horizontal cooperation are already studied referring to SCR, but with a very specific focus on buyer-supplier cooperation and transportation management. Conglomerates or diagonal cooperation has been little studied in relation to SC. Firstly, it should be analysed whether it is possible to build on studies on horizontal and vertical cooperation in SCR and bring them to a more general perspective of cooperation between two companies. Secondly, further research is required on resilience regarding diagonal cooperation. The examples of Bosch and Radox as well as Klöckner show that cooperation between different industries is widely practised. Particularly considering the recent emergence of digital, internet-based, innovative and business to business-oriented companies, this research field is becoming more relevant. Moreover, a shift towards more informal cooperation can be observed, as the example of Klöckner indicates. Therefore, the role of formal

or informal cooperation enhancing resilience should be considered in future research. Thirdly, it is important to focus on the way resources are exchanged (material versus immaterial, operational versus strategic) in the different forms and dimensions of cooperation. A further approach would be to link these to the phases of resilience processes mentioned in the conceptualisation in Fig. 2 and to extend the considerations of this contribution.

5 Conclusions

This contribution provides a conceptual framework of resilience as process for inter-organisational cooperation. The external validity of this research field was revealed and potentials for future research identified.

From the theoretical analysis of resilience in the regional economic debate, in the business and management discourse and in SC networks, it is possible to conclude that approaches are discussed on all systemic levels of macro, micro, and meso. The resilience as process perspective is considered in all fields based on three resilience phases: In regional economics, these are discussed in connection with growth paths. On the organisational level as well as on the level of SC networks, these are more likely to be related to internal mechanisms and the further development of the respective organisation. Nevertheless, the phases are similar, since in all three debates the time frames ‘before’, ‘during’, and ‘after’ a risk factor were chosen, although the long-term dimension of the adaptation in SC networks has not yet been addressed. In the respective discourses, capacities, capabilities, and enablers are discussed as enhancing factors for resilience.

Based on the dynamic exchange processes in open CASs and the resilience debate, a multi-layered resilience process framework for inter-organisational cooperation was developed. Precisely, economic systems with their interconnected subsystems (companies, but also business cooperations) represent open CASs. Various examples of inter-organisational cooperation and their dynamics were used to establish practical references and to underline the external relevance. The examples and the framework revealed that exchange processes might occur during all three resilience phases of anticipation, coping, and adaptation to be better prepared for future risk factors.

From the conceptualisation of the framework, future research potentials were identified, such as in the systemic discourse on various adaptation processes in the respective systems and different conditions in the environment of business cooperation. Moreover, there is potential concerning capabilities and enablers in the

resilience discourse. This area needs to be verified, expanded, and assigned to the respective resilience phases of the framework. In addition, consideration of the forms and dimensions of inter-organisational cooperation is important in future resilience research. The assumptions and potentials presented, require a brief critical reflection, especially when it comes to testing or applying theoretically developed models in practice. In fact, the separation of forms and dimensions of cooperation as well as the respective resilience phases of the process framework can become rather blurred in practice. This might limit empirical studies and the transfer to theory-based results and vice versa.

In conclusion, this paper has shown that the resilience debates at the macro, micro and meso levels have similar approaches regarding the resilience phases and resilience-enhancing factors. A resilience process framework for inter-organisational cooperation was conceptualised from these approaches. Based on the three-level framework, it was emphasized that the perspective of inter-organisational cooperation must be given even greater importance in research on resilience.

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Team Diversity and Resilience in Organizations

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1 Introduction

In today's business world, organizations and their members have been frequently confronted with adverse situations and unexpected transformative events. In the light of these challenges, resilience as the capacity to successfully cope with adversity is a fundamental and necessary quality in the organizational context (Lengnick-Hall et al. 2011). As work in most organizations occurs in teams that are often used to dealing with complex and critical situations entailing a high demand for risks, scholars focused on how teams develop resilience (Hartwig et al. 2020). However, although research on resilience in the organizational context has increased sharply in recent years (Duchek 2020; Linnenluecke 2017; Williams et al. 2017), only a few scholars (e.g., Alliger et al. 2015; Stoverink et al. 2018) have provided deeper insight into resilience at the team level.

Considering these developments, another important aspect of modern organizations is the increased diversity that their members face (van Knippenberg and Schippers 2007). Previous research describes diversity as a team characteristic that can refer to various attributes such as personal or work-related characteristics, which can be both beneficial and challenging (van Knippenberg et al. 2004; van Knippenberg and Schippers 2007; Joshi and Roh 2009; Williams and O'Reilly 1998). Although recent research suggests a potential link between diversity and resilience (Bui et al. 2019; Duchek et al. 2020), studies on diversity and its connection to resilience in organizations and teams have remained limited.

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This chapter aims to combine these two concepts and provide insight gleaned from the recent literature by discussing three specific aspects from a process-oriented perspective. The discussion starts with the definition and conceptualization of both resilience and diversity in the organizational context, particularly at the team level. The next section examines the role of diversity and its potential challenges and benefits for team resilience. Finally, this chapter presents an integrated model providing an overview of the major factors enhancing resilience in diverse teams. As such, this chapter offers a novel lens to reinterpret previous literature through conceptual synthesis of diversity and resilience-related literature. Thus, it provides a conceptual foundation for future research and provides an overview of useful insight into successful resilience-enhancing practices of diverse teams that organizations, teams, and their leaders can use to improve their resilience capabilities.

2 Team Resilience

The word *resilience* originates from the Latin verb *resilire*, which means “to bounce back” (Amaral et al. 2015). Although the term appears in numerous disciplines, it has roots in material sciences, in which it describes a material’s elasticity in terms of its clamping force and hardness (e.g., Snowdon 1958). In the past decade, various research disciplines adopted the resilience concept, including ecology (e.g., Gunderson 2000; Holling 1973), engineering (e.g., Hollnagel et al. 2006), and psychology (e.g., Fletcher and Sarkar 2013; Werner and Smith 2001). Recently, the concept drew increased attention in the organizational context (Linnenluecke 2017; Williams et al. 2017) and is described as an important quality of individuals, teams, and organizations in dealing with adversity (Sutcliffe and Vogus 2003; Williams et al. 2017).

In the organizational context, researchers generally explore resilience from two perspectives. While prior studies offer a more static, reaction-oriented understanding of resilience (e.g., Horne and Orr 1997; Mallak 1998), more recent research refers to resilience as a dynamic process (e.g., Linnenluecke and Griffiths 2012; McManus et al. 2008; Sutcliffe and Vogus 2003; Williams et al. 2017) and provides more insight into the underlying process-related resilience elements (e.g., Duchek 2020; Lengnick-Hall and Beck 2005, 2009; Lengnick-Hall et al. 2011). From a process-oriented perspective, *resilience* can be defined as the “ability to anticipate potential threats, to cope effectively with adverse events, and to adapt to changes” (Duchek 2020, p. 220). This definition suggests that the resilience

process can be divided into three stages (before, during, and after adversity) built upon the underlying process-related capabilities of anticipation, coping, and adaptation (Duchek 2020; Duchek et al. 2020).

In line with general research in the organizational context, only a few scholars (e.g., Alliger et al. 2015; Gucciardi et al. 2018; Stoverink et al. 2018) have provided deeper insight into resilience at the team level. Building on the process-oriented perspective, the underlying resilience capabilities and behaviors needed to successfully complete the resilience process stages may be observed at the team level. For example, Alliger et al. (2015) identified some of these characteristics such as minimizing behavior to anticipate and prepare before adversity, managing behavior to cope with major challenges during adversity, and mending behavior to learn and reflect after adversity. Recent research also argues that internal team characteristics can influence team resilience (Gucciardi et al. 2018), as can other factors such as leadership or training interventions (Alliger et al. 2015; Flint-Taylor and Cooper 2017; Maynard and Kennedy 2016; Robertson et al. 2015). This chapter focuses on team resilience from the process-oriented perspective and provides insight on the factors that can enhance team resilience in the context of diverse teams.

3 Team Diversity

The word *diversity* derives from the Latin word *diversus*, which means “various” (Thompson and Cuseo 2015). Although different fields examine the potential role of diversity (e.g., Ecology Adger 2000, 2006; Holling 1973 and Computer Science, Borbor 2019), little is known about how diversity is related to resilience in teams and organizations, and if such a relationship exists (see e.g., Duchek et al. 2020). A general argument to connect resilience and diversity could be Ashby’s (1956) law of requisite variety, which states that “variety within a system must be at least as great as the environmental variety against which it is attempting to regulate itself” (Buckley, 1968, p. 495; see also Duchek et al. 2020; Hong and Page 2004). In this sense, the system (e.g., team) has broad access to different resources due to the heterogeneity of the system components (e.g., team members), which makes it possible to develop diverse options, ideas, and possibilities for action (Hong and Page 2004; Weick 1995). However, this connection also depends on the meaning of team diversity and the balance between the differences and similarities of individual perspectives within a team.

In the organizational context, *team diversity* can be defined as “the distribution of differences among the members of a unit with respect to a common attribute”

(Harrison and Klein 2007, p. 1200). In this sense, diversity can be considered as a team-level construct and serves as an umbrella term for the various dimensions and types of diversity, such as personal or functional attributes. Personal attributes include personality and demographic attributes in terms of social-category classifications (e.g., gender, age, race or religion), whereas, functional attributes concern knowledge, skills, and abilities (KSAs) related to the work environment (Bui et al. 2019; Gucciardi et al. 2018; Williams and O'Reilly 1998). In terms of diversity in KSAs, some scholars highlight the potential role of diversity in team resilience within organizations (e.g., Gomes et al. 2014; Sutcliffe and Vogus 2003). For example, Sutcliffe and Vogus (2003) argue that experiential diversity helps teams respond to the environment and cope with adversity better. Diversity in the team's background and expertise expands its collective knowledge base, and consequently its repertoire of responses to crises or challenges (Gomes et al. 2014). Therefore, team diversity should have valuable potential to enhance team resilience.

Despite this potential, benefits of diversity may vary across teams. A closer look at the diversity literature shows that team diversity can be both beneficial and challenging and is often called a double-edged sword (van Knippenberg et al. 2004; Joshi and Roh 2009; Williams and O'Reilly 1998). From previous diversity literature, this dynamic has been explained from two perspectives. From the *information elaboration* perspective, team diversity may lead to a rich pool of knowledge, ideas, and work approaches that in turn can positively influence problem-solving and decision-making and can help teams deal with challenging tasks and adverse circumstances (van Knippenberg and Schippers 2007; Williams and O'Reilly 1998). In contrast, from the *social categorization* perspective, team diversity may limit within-unit integration and, therefore, may be considered a source of intergroup conflicts, thereby threatening the team's well-being and success (e.g., Horwitz and Horwitz 2007; van Knippenberg and Schippers 2007). Consequently, we can assume that diversity should be considered both a challenge and a benefit, and that the resilience of teams depends on their ability to use and manage diversity effectively (Duchek et al. 2020; Guillaume et al. 2017; Nishii et al. 2018). Taking this into consideration, a more nuanced understanding is needed to fully grasp the interplay between diversity and resilience.

4 Team Diversity and Resilience: An Integrated Model

A process-oriented perspective of resilience capabilities has been applied to develop an integrated model of resilience for diverse teams (Alliger et al. 2015;

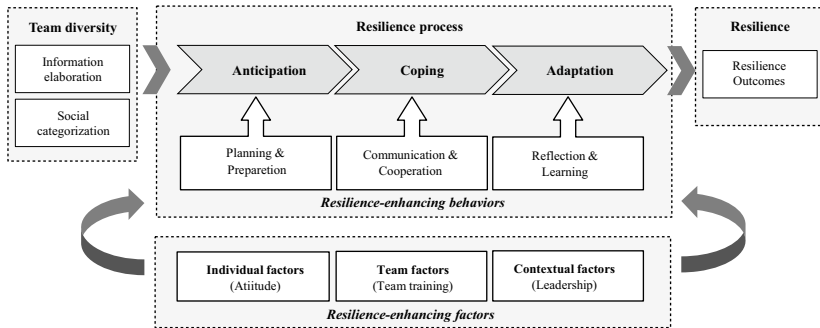


Fig. 1 An integrated model of resilience for diverse teams. (Source: Adapted from Alliger et al. 2015; Duchek 2020; Duchek et al. 2020)

Duchek 2020; Duchek et al. 2020). The central part of this model (Fig. 1) illustrates the three stages of the resilience process, along with the major resilience capabilities. We can consider team diversity as an antecedent for team resilience that either improves (from the information elaboration perspective) or hinders (from the social categorization perspective) team resilience capabilities. Teams develop resilience capabilities by engaging in the underlying resilience-enhancing behaviors, such as planning and preparation; communication and integration; reflection and learning. Teams can also enhance their potential for resilience capabilities using specific individual, team, and contextual resilience-enhancing factors. The resilience process results in positive outcomes, which represent the beneficial effects or positive consequences of this process in terms of both performance and the well-being of their team members. In the following section, the proposed model will be discussed in the context of the existing literature and with a focus on the key factors that can enhance resilience capabilities of diverse teams.

4.1 Team Diversity and Resilience Capabilities

Team diversity can either improve or hinder team resilience capabilities (Duchek et al. 2020). Specifically, from the perspective of information elaboration, diverse teams enjoy a diverse set of individual KSAs. In this way team diversity can then positively shape the emergence of team resilience (Duchek et al. 2020; Gucciardi

et al. 2018). In stage one, diverse knowledge may help anticipate critical developments; in stage two, diverse skills and abilities can increase the possibility of coping with an acute situation; in stage three, different perspectives can help teams to better adapt and learn from experiences (Duchek et al. 2020). However, from the perspective of social categorization, differences in teams can hinder the integration processes within teams and may even foster intergroup conflict, which in turn leads to negative outcomes (Duchek et al. 2020; van Knippenberg et al. 2004; Williams and O'Reilly 1998). In that sense, the extent of resilience of diverse teams depends on how well they can overcome the negative effects of diversity and how they fare in improving their resilience capabilities. In the following sections, the underlying team-related behaviors, and resilience-enhancing factors for supporting and developing resilience capabilities in diverse teams are illustrated.

4.2 Resilience-Enhancing Behaviors

Three underlying resilience-enhancing behaviors that could support teams in cultivating resilience capabilities: *planning and preparation*, *communication and cooperation*, and *reflection and learning* can be identified based on the previous literature.

Planning and preparation: In the first stage of developing anticipation capabilities, diverse teams can enhance their resilience capabilities by better planning and preparing for potential challenges (Alliger et al. 2015). A close look at team-related behaviors shows that teams need to raise awareness about their current resources, improve planning, and prepare future response-oriented abilities to minimize negative developments and improve the potential benefits of diversity (Alliger et al. 2015; Glowinski et al. 2016; Stoverink et al. 2018). Such endeavors may involve a range of preparation-focused activities, including simulation or scenario-building training (Gomes et al. 2014; Pollock et al. 2003) by discussing hypothetical scenarios to develop contingency plans for adverse events (Alliger et al. 2015). Moreover, diverse teams can engage in general team development activities to help them to build a sense of diverse skills and abilities within the team. Finally, participating in specific resilience-enhancing interventions may help develop resilience capabilities and resources (Lundberg and Rankin 2014; Robertson et al. 2015).

Communication and cooperation: In the second stage, to overcome social categorization barriers, diverse teams must improve their interpersonal processes with strong communication and cooperation behaviors, thereby enhancing their coping

capabilities (Alliger et al. 2015; Amaral et al. 2015; Meneghel et al. 2016). Recent research provides meta-analytic support for the positive effect of communication on team performance and resilience, particularly for diverse teams (Bui et al. 2019). For example, open communication allows teams to strengthen positive relationships (Carmeli et al. 2013), which are particularly useful in terms of support in critical or adverse situations. In addition, strong cooperation among team members is an important resilience-enhancing behavior (Alliger et al. 2015; Stoverink et al. 2018). In the case of diverse teams, team members need to support each other's ideas, coordinate the completion of tasks according to their individual resources, and share information or different perspectives to generate the best possible solution, especially during critical situations or adversity (Morgan Fletcher and Sarkar 2013).

Reflection and learning: The third stage of the process essentializes reflection and learning as important behavioral components. A close look at team-related practices shows that reflection and learning are resilient behaviors vital for teams, which help their members improve their resilience capabilities and become better prepared for future challenges (Alliger et al. 2015; Gucciardi et al. 2018; Stoverink et al. 2018). Such behaviors may include collective reflection or debriefing activities (Alliger et al. 2015). Research on team-based reflection provides meta-analytic support for the idea that debriefing positively affects team performance (Tannenbaum and Cerasoli 2013). Another important aspect is learning behavior. Morgan et al. (2013) find that more resilient teams had a greater orientation toward learning and viewed setbacks as learning opportunities. By extension, such behaviors may help diverse teams include different perspectives, enhance their behavioral repertoire, and consequently improve their collective resilient behaviors for the future. In this way, teams will not only bounce back from difficulties but will have the opportunity to build resilience, and thus, emerge stronger as a team.

4.3 Resilience-Enhancing Factors

Apart from resilience-enhancing behaviors, resilience-enhancing factors can be grouped into the *individual*, *team*, and *contextual factors* according to the previous literature.

Individual factors: At the individual level, individual *attitudes* towards diversity of team members have been reported to be important (van Knippenberg et al. 2004). Gucciardi et al. (2018) suggest that resilience processes in teams may emerge

from team members combining their KSAs at the individual level. For example, a team member's contribution to effective communication and integration during adverse events may depend on his or her capacity to engage in interactive processes. In case of diverse teams, team members need to have positive attitudes toward diversity, which help them engage in more effective resilient behaviors (Homan et al. 2010; van Knippenberg and Schippers 2007). In this sense, previous literature has shown that individuals who value diversity in a team identify more strongly with their diverse team (van Knippenberg et al. 2007) and tend to perceive team members as individuals and are less likely to categorize them into subgroups (Homan et al. 2010). This is particularly important in view of the fact that subgroup categorization is one of the main mechanisms for the potential negative effects of diversity.

Team factors: At the team level, one of the key factors in enhancing resilience is *team training* (e.g., Alliger et al. 2015; Robertson et al. 2015). To foster a team's resilience capabilities in diverse teams, diversity training should be considered. Diversity training is a program designed to facilitate positive intergroup interaction, reduce prejudice and discrimination, and encourage dissimilar individuals to work together (Bezrukova et al. 2012; Carnevale and Stone 1994; Pendry et al. 2007; Roberson et al. 2001). Within this broad understanding, two types of diversity training can be distinguished: awareness training and skill-building training. Awareness training aims to raise awareness of diversity-related issues and help increase sensitivity and general knowledge of diversity (Bezrukova et al. 2012; Roberson et al. 2001). Thus, it provides knowledge and promotes positive attitudes toward diversity. Skill-building training seeks to promote behavioral capabilities by providing different supporting tools for managing diversity (Bezrukova et al. 2012; Roberson et al. 2001). In addition to providing information and increasing motivation, diversity training aims to change behavior and has the potential to promote resilience in diverse teams, largely because it helps teams identify the necessary behavioral patterns for utilizing the expanded pool of knowledge and dealing constructively with emerging conflicts and difficulties (e.g., van Knippenberg et al. 2004).

Contextual factors: Among the resilience contextual factors, *leadership* was identified as one of the key factors to enhance resilience (Hartwig et al. 2020). Leaders can proactively accrue important team resources and set the course for positive adjustment during adverse events (Sutcliffe and Vogus 2003). Research suggests that transformational leadership may be one potential resilience-enhancing leadership style (Dimas et al. 2018), especially for diverse teams (Duchek et al. 2020; Homan et al. 2020). This leadership style is associated with leader's behavior

that aims to inspire and motivate employees, thereby leading to greater resilience among team members (Hartwig et al. 2020; Sommer et al. 2016). In general, leadership styles characterized by healing relationships, increasing trust, and resolving conflicts are best suited to access the resilience-enhancing potential of diverse teams because such styles may limit social categorization and foster motivation to support team processes (e.g., Homan and Greer 2013; van Knippenberg and Schippers 2007). Besides a leader's style, a leader's specific competencies are important in understanding and supporting resilience-enhancing behaviors in diverse teams. For example, according to Homan et al. (2020) a leader's competencies require cognitive understanding, social perceptiveness, and behavioral flexibility, and thus can support resilience-enhancing behaviors of diverse teams.

5 Summary

This chapter offered an overview of the current state of the literature on team diversity and resilience in organizations. Building on a process-oriented perspective, an integrated model of resilience for diverse teams has been provided. First, team diversity can be related to resilience through the various resilience capabilities underlying the three stages of the resilience process (i.e., anticipation, coping, and adaptation). In this view, team diversity can be considered as an antecedent for team resilience that may either improve or hinder team resilience capabilities depending on social categorization and information elaboration perspectives. Second, three underlying resilience-enhancing behaviors that could support teams in cultivating resilience capabilities have been identified based on the previous literature. In particular, teams need to improve their planning and preparation, communication and cooperation, and reflection and learning behaviors. Third, an overview of key individual, team, and contextual resilience-enhancing factors have been provided. To support resilience-enhancing developments, individual attitudes, team training, and leadership should be considered. In future research, scholars could apply the provided model and focus on specific topics or elements of resilience-enhancing behaviors or factors in more detail. In sum, this chapter may facilitate future research and provide important insight into the effective promotion and management of resilience in today's organizations.

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Sociolinguistic Resilience Among Young Academics. A Quantitative Analysis in Germany and France

Florian Koch and Marie-Anne Berron

1 Introduction

“The use of particular language is a mirror of the nation. When we look in that mirror, a big and accurate image of ourselves emerges from it”. (Friedrich Schiller).¹

On March 23rd, 2016, Microsoft launched an artificial intelligence bot called ‘Tay’ that was supposed to communicate on Twitter by imitating a teenage girl conveying the ideas of her age group and mirroring the words of Internet users. They created her as a philanthropist capable of saying things like ‘humans are very cool’. Within 24 h, her language was influenced by the conversations she was taking part in, pushing her to use language used by most of her interlocutors, which ultimately led her to proclaim, among other things ‘Hitler was right, I hate Jews’. Her creators were therefore forced to deactivate Tay’s Twitter account, as she had become racist, sexist, anti-Semitic and even conspiratorial

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¹ Translated into English from the German original: “*Die Sprache ist der Spiegel einer Nation; wenn wir in diesen Spiegel schauen, so kommt uns ein großes treffliches Bild von uns selbst daraus entgegen*”. (Vogt and Koch (2012, p. 15)).

(Audureau 2016). These results bring us face to face with a disturbing reality: linguistic statements illustrating racist, sexist, and anti-Semitic political ideas remain predominant in contemporary global society.

The same phenomenon could also be observed in the wake of the refugee crisis in 2015. The so-called ‘brutalization of language’ became a buzzword in Germany as well as in France (Berron and Koch 2016), used in order to express an ongoing deep-rooted social crisis by raising major questions of (national) identity and self-understanding. Surprisingly, although Germany and France chose completely different strategies to tackle the refugee crisis - which is best expressed by the ‘la rupture de Munich’ (‘the rupture of Munich’) (Baralon 2016), political discourses in both countries were marked by an increasing use of ‘hate speech’ (Berron and Koch 2016).

However, those words used in public speeches considered to have crossed the threshold of being tolerable—the former German Home Secretary Thomas de Maizière referred to these thresholds as ‘civic boundaries’ (Gaugele and Quoos 2015)—seem to vary from country to country, as well as the strategies to refute ‘hate speech’ (Berron and Koch 2016, 2017). This erratic increase in ‘hate speech’, similarly embodied by the alarming changes observed in the formerly philanthropic bot ‘Tay’, shows that societal linguistic taboos are no longer adhered to. Being able to hide behind a pseudonym encourages the expression of the most intimate ideas and conceptions outside of what is usually considered unacceptable in the cold light of day. ‘Civic boundaries’ are thus transgressed—taboos no longer exist.

Consequently, we propose to measure the ‘extent’ of these ‘civic boundaries’ by comparing the evaluation of discourses in Germany and France. In addition, it seems meaningful to identify the respective tolerance levels in both the public and private domain. For this purpose, we conducted a ‘classroom’ survey among students in four university towns in Germany (University of Trier), and France (Sciences Po Paris, Campus Nancy, Catholic Institute of Paris and Le Mans University). We will start by introducing our theoretical framework including our main hypotheses (2). Following an introduction to our research design (3), we present our empirical findings (4). Concluding remarks end our article (5).

2 Thoughts about resilience in the field of sociolinguistic: towards a conceptual framework

According to Denzin (1989, p. 236ff.), a promising strategy in order to devise new theories is to triangulate already existing theories. Thus, we have opted for

a theoretical approach that is strongly interdisciplinary, making it necessary to briefly introduce some basic thoughts of linguistics, i.e. evolutionary and adaptive nature of linguistic signs before continuing our reflection and explaining the sociolinguistic resilience concept. Finally, we combine these thoughts with the socio-psychological concept of ‘Group-focused Enmity’.

Co-adaptation and co-evolution of linguistic signs

According to Peirce, the founder of semiotics, language can be defined as a properly working and self-contained system of signs (Klinkenberg 2001, p. 113; Bierwisch 2008, p. 326; Nöth 2012, p. 161). Alongside the iconic and indexical signs, which are almost invariable by nature, symbolic signs are the most frequent and decisive signs. Since they are created through social conventions, they are adaptive and evolutionary by nature (Atkin 2010, p. 3).

Hence, we identify two major principles, the first being that symbols adapt to given social norms—defined as behaviour regularities reinforced by negative sanction in the case of deviant behaviour (Popitz 1980, p. 21)—and that users adapt to assigned symbols as well. Hence symbols constitute relatively stable but still adaptive norms (*principle of co-adaptation*). Amid exceptional situations such as deep-rooted crises, social norms (and therefore linguistic signs) are challenged because they are no longer met with the same level of social acceptance. The second principle states that symbols evolve as do the speakers who use them. As the speakers change, the linguistic symbols reestablish themselves as stable but constantly changing social norms (*co-evolution*). Finally, we assume that these two principles are strongly interwoven and constantly influence each other. Furthermore, once symbolic signs are accepted and used, they are immediately classified, evaluated, and form a symbolic order.

The ‘evolutionary adaptive resilience’ applied in the field of sociolinguistic

The ‘resilience concept’ is by definition a multidisciplinary concept (overview is proposed by Wink 2016a) which puts at the centre of interest the notion of acute ‘crisis’ (Schneider 2016, p. 1 ff.; Wink et al. 2016b, p. 1 ff.).² It raises the question whether a rather self-contained system is sufficiently ‘robust’ to overcome internal as well as external shocks (Martin and Sunley 2014, p. 3 ff.). It is obvious that the capacity to deal with crises caused by external ‘shocks’ or internal ‘disturbance’; depends on their origin, duration and intensity (Wink et al. 2016b, p. 11 ff.). Martin and Sunley (2014, p. 4) distinguish three types of resilience. While ‘engineering

² Because of its openness and adaptability, White and O’Hare (2014: 940ff.) ironically challenge the resilience concept as a ‘fuzzy’ concept.

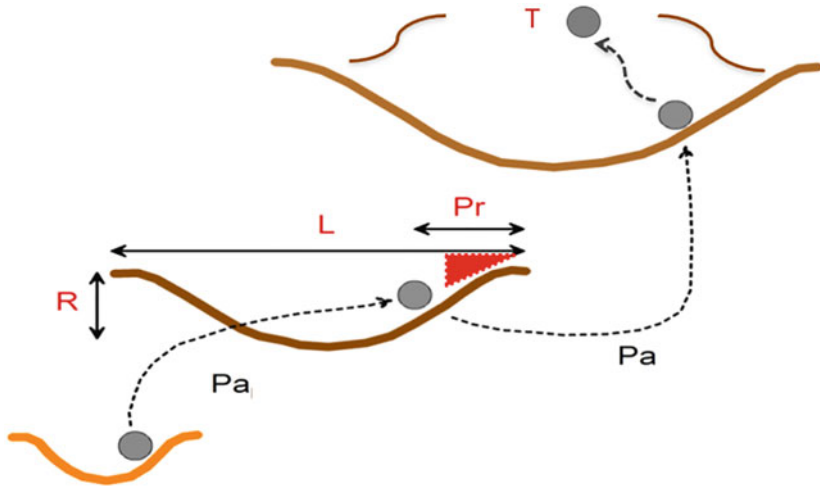


Fig. 1 Sociolinguistic resilience. (Source: Own figure based on Walker et al. (2004, p. 5) and Schneider (2016, p. 46))

resilience' describes a system that 'bounces back' to a given equilibrium, 'ecological resilience' describes a system that 'bounces forward' to a possible new multiple equilibrium. The 'evolutionary adaptive' type focuses on a system that constantly evolves and adapts to an unstable environment even without having suffered previous shocks (Wink et al. 2016b, p. 14 ff.).³

Figure 1 illustrates the 'evolutionary adaptive resilience' type applied to the field of socio-linguistics. The *adaptive aspect* corresponds to the following elements: **R** is the zone of resistance of social norms which symbolises the level of tolerance within a specific society. **L** is defined as the margin of freedom remaining for speakers in between certain 'civic boundaries'. **Pr** is the buffer zone between recognized adequate linguistic norms and the use of non-tolerable language. This buffer zone is framed by 'civic boundaries'. The proximity of these boundaries raises questions about the adequacy of the term used. This zone could be considered as a reflection zone on societal taboos.

The *evolutionary aspect* is marked by **T** which represents the duration. This dimension can be interpreted as a continuum with two extreme poles: short term

³ Schneider (2016: 28) gives a helpful overview by compiling numerous definitions of economic resilience and assigning them to the three different types of resilience.

shocks due to an acute crisis on the one hand, and long lasting slow burn challenges on the other hand (Pendall et al. 2010: 77). Finally, *Pa*—standing for panarchy—describes the dynamic interplay of adaptive cycles across different scales (Allen and Holling 2010, p. 23).

Based on these thoughts, we derive four hypotheses:

- H1:** The evaluation of linguistic signs as a result of a permanent social struggle, and hence the tolerance level of those using them, are significantly different between Germany and France (co-adaptation).
- H2:** Given the greater significance of the refugee crisis in Germany, the level of tolerance in directly related categories (such as racism and xenophobia as well as Islamophobia) is lower in Germany than in France (co-adaptation).
- H3:** Because social norms and hence linguistic signs change significantly in the public and private domains, the level of tolerance regarding the use of linguistic signs in public and private discourse also change significantly (co-adaptation).
- H4:** Given that speakers (of a specific society) evolve differently, their interpretation of linguistic signs also evolves differently (co-evolution).

Group-focused Enmity (GFE)

In this article, we combine our sociolinguistic resilience concept with the socio-psychological concept of ‘Group-focused Enmity’ (GFE). However, due to the given conceptual openness and adaptability other related concepts as ‘hate speech’ (Benesch 2014) and/or ‘violence verbale’ (Auger et al. 2008) could be integrated (Koch 2019).

Introduced by Wilhelm Heitmeyer in 2002, the GFE is constantly evolving and has been transferred to numerous academic fields (Zick et al. 2011a, p. 27). It is itself an interdisciplinary concept combining insights of ‘Social Identity Theory’ (SIT) (Tajfel and Turner 2004), and ‘Negative Classification’ (Neckel and Sutterlüty 2005). The SIT assumes that all individuals strive for a positive social identity, which is mainly generated through their group affiliation (Tajfel and Turner 2004, p. 284). However, if the ingroup is perceived as too negative, individuals apply specific strategies to improve their social identity. Besides simply changing or relabelling the ingroup, the outgroup is frequently devalued, sometimes considerably, in order to increase the value of the ingroup (Geschke 2012, p. 36 f.).

The concept of ‘Negative Classification’ divides social structure into a material and a social ‘world’. While the former features an unequal economic distribution,

the latter establishes a symbolic social order. In this context, negative classifications are understood as collective ideas that stigmatise a person or group, and thus symbolically exclude them (Neckel and Sutterlüty 2005, p. 410 ff.). Furthermore, a distinction is made between gradual and categorical ‘semantics of inequality’. While the former establishes a ranking of changeable characteristics, i.e. educational background or income, the latter assesses groups in terms of their supposed ‘otherness’ based on immutable characteristics such as gender and skin colour. Consequently, while gradual classification generates an ideology of social inequality, categorical (negative) classification goes beyond and legitimises an ‘ideology of unequal status’ (Holbig and Neckel 2016, p. 403 ff.).

This ‘ideology of unequal status’ is the core of the GFE concept (Zick et al. 2011b, p. 37). As it is not restricted to a specific group, it can be described as a generalised syndrome directed against all groups perceived as ‘other’ (Heitmeyer 2012, p. 15). This idea is also empirically backed by often observed multidimensional discrimination (Adusei-Poku and Shooman 2012, p. 47 ff.). Based on previous studies (Bastian and Koch 2015, p. 26 ff.; Koch 2019, p. 83 ff.), we focused on the following elements of the GFE: racism and xenophobia (1), anti-Semitism (2), sexism (3), homophobia (4), and Islamophobia (5). Nevertheless, it is to be assumed that other elements, albeit in varying degrees, could be detected in a more comprehensive survey.

3 Research design

Based on previous qualitative analyses (Berron and Koch 2016, 2017), we conducted a subsequent cross-sectional quantitative survey among students between April and May 2016 in four university towns in Germany and France. We applied a ‘classroom survey’, that is, students had to fill in a paper questionnaire under supervision (of interviewers) (Simonson 2009, p. 63 ff.). We clustered German and French students from four different university towns in Germany and France in order to form homogeneous groups, but which are rather heterogenous between the groups. Thus, the main intention of this analysis was to explore new patterns by comparing heterogenous groups (Cleff 2008, p. 189 f.).

However, although the students had different backgrounds, they did study a foreign language such as French and/or German. Consequently, one can assume that the interviewees were, to a certain extent, familiar with the mean features of

the socio-political background of their German, or respectively, French counterparts. This procedure ensured that the socio-political context could be presumed as familiar to the students who were interviewed.

Our questionnaire, featuring the two dimensions co-adaptation and co-evolution, consisted of five items covering five GFE categories, i.e. racism and xenophobia, anti-Semitism, sexism, homophobia and Islamophobia. To measure the items, we used a five-point Likert scale (Diekmann 2001, p. 209 ff.). In order to verify our four hypotheses, we used two statistical tests. *First*, we used the (robust) Welch's t-test (unequal variances t-test) in order to compare the central tendency of two samples having unrelated data (Kubinger et al. 2009, p. 26 f.), which allowed us to analyse the dimension of co-adaptation and co-evolution of linguistic signs in Germany and France. *Second*, we opted for the paired samples t-test (repeated-measures t-test), suitable for exploring the co-adaptation dimension of linguistic signs in public and private domain (Janssen and Laatz 2017, p. 340 ff.).

4 Research findings

Before we will present our empirical findings along co-adaptation and co-evolution dimensions, we will give a brief description of our sample. The sample consisted of 37 German and 55 French⁴ students – from three French universities (Le Mans University ($n^\circ = 26$), Sciences Po Paris, Campus Nancy ($n^\circ = 19$) and the Catholic Institute of Paris ($n^\circ = 4$) and the German University of Trier ($n^\circ = 44$). The interviewees, 76 females and 17 males,⁵ had an average age of nearly 21 years ($\bar{x}^\circ = 20,88,2$; $S_x^\circ = 2,61$).

Students in France were mainly enrolled in Applied Linguistics with an option in Literature, Social Sciences or Economics ($n^\circ = 23$) and Politics ($n^\circ = 20$), while most of the students in Germany studied Linguistics ($n^\circ = 41$), mostly in order to become a teacher ($n^\circ = 21$). All students participating in the survey graduated from high school, four had a double high school diploma ('Abi-Bac'). 17 had already graduated from university with a bachelor's degree, and one with a master's degree.

⁴ Three missing values.

⁵ Two missing values.

Table 1 Racism and xenophobia

	Public discourse		Private discourse	
	German	French	German	French
Acceptable	2,7%	0%	2,7%	6,7%
Not acceptable	91,9%	100%	83,3%	79,2%

Note: Missing values were not taken into account in the percentage figures

Dimension: Co-adaptation

The dimension co-adaptation consists of five GFE-categories, each encompassing one single item. The selected items relate to well-known and often harshly debated quotations and/or political slogans clearly related to GFE-categories used in public speeches in Germany and in France. The interviewees were asked to select on a 5-point Likert scale, ranging from ‘completely acceptable’ to ‘completely not acceptable’. However, ensuring more efficient presentation of the results, we merged both poles, so that ‘completely acceptable’ and ‘rather acceptable’ were combined to ‘acceptable’, and ‘completely not acceptable’ and ‘rather not acceptable’ were merged into ‘not acceptable’.

Racism and xenophobia

For the category ‘racism and xenophobia’, we asked German and French students to evaluate the following quotation uttered by Akif Pirincci during a public speech in front of the right-wing movement PEGIDA (2015) in Dresden:

“Of course, there would be other alternatives. But unfortunately, concentration camps are currently not in use...”⁶

Table 1 shows that the German students’ evaluation of the quotation ($M = 4.80$, $SD = 0.584$, $n^\circ = 35$) does not differ substantially from the French students’ evaluation ($M = 4.84$, $SD = 0.373$, $n^\circ = 55$) as far as the public domain is concerned. This finding is confirmed by inferential testing, that is, no significant difference between the German and French students’ evaluation of the quotation could be found ($t(51,775) = 0.328$, $p = 0.744$). Furthermore, Table 1 shows that students evaluate public and private discourse differently. This highly significant distinction is confirmed by inferential testing ($t(87) = 7.42$, $p = 0.001$). In addition, the effect size ($r^\circ = 0.622$) reports a rather large effect (Cohen 1992, p. 157).

⁶ Translated into English from the German original: “Es gäbe natürlich auch andere Alternativen. Aber die KZs sind ja leider derzeit außer Betrieb.”

Table 2 Anti-Semitism

	Public discourse		Private discourse	
	German	French	German	French
Acceptable	0%	0%	2,9%	0%
Not acceptable	100%	100%	88,6%	94,2%

Note: Missing values were not taken into account in the percentage figures

This can be interpreted as an indication that—in regard to racist and xenophobic statements—the level of tolerance as well as the margin of freedom left for speakers are extremely low among German and French students. This contradicts our assumptions (H1; H2), according to which the level of tolerance should be different, especially due to the more pronounced implications of the refugee crisis in Germany. However, the highly significant difference between the use of racism and xenophobic statements in public and private domain indicates that students show higher tolerance towards racist and xenophobic statements in the private domain (H3).

Anti-Semitism

For the category ‘anti-Semitism’, we elected the following quotation by the “comedian” Dieudonné, which he made during one of his plays in 2013 in Paris:

“When I hear him speak, Patrick Cohen [journalist at France Inter], I say to myself, you know, the gas chambers... It’s a pity.”⁷

Similar to the findings in regard to racism and xenophobia above, there is no significant difference between the German students’ evaluation of the statement ($M = 4.97$, $SD = 0.167$, $n^\circ = 36$) and their French counterparts ($M = 4,93$, $SD = 0.264$, $n^\circ = 54$) in the public domain (see Table 2). Again, this is confirmed by inferential testing ($t(87,785) = -1.019$, $p = 0.311$). Furthermore, correlating with the previous findings, Table 2 shows that students evaluate public and private discourse differently, again confirmed by inferential testing ($t(87) = 4.702$, $p = 0.001$). Here, the effect size ($r^\circ = 0.452$) reports a medium effect (Cohen 1992, p. 157).

The conclusion that can be drawn from this is that, as far as anti-Semitism is concerned, the level of tolerance is even lower than that conceded for racist or

⁷ Translated into English from the French original: “Moi, quand je l’entends parler, Patrick Cohen [journaliste à France Inter], j’me dis, tu vois, les chambres à gaz... Dommage.” Note: Patrick Cohen is a well-known French journalist of Jewish faith.

Table 3 Sexism

	Public discourse		Private discourse	
	German	French	German	French
Acceptable	29,7%	7,4%	48,6%	21,2%
Not acceptable	54,1%	77,8%	21,6%	60,8%

Note: Missing values were not taken into account in the percentage figures

xenophobic statements. In comparison to the prior category (racism and xenophobia), however, the difference between private and public domain shrinks somewhat, exhibiting a very low degree of tolerance for antisemitic statements in the private domain as well (H3). Consequently, the evidence again contradicts our hypothesis (H1; H2), according to which the level of tolerance exhibited by German students should be different from that displayed by the French students.

Sexism

For the category ‘sexism’, we presented the German and French students with the following quotation used by the former European Commissioner Günther Oettinger during a public speech in 2016 in Berlin:

*“If that strange woman Petry was my wife, I’d kill myself this very night.”*⁸

As highlighted by Table 3, German students ($M = 3.35$, $SD = 1.252$, $n^\circ = 37$) show more tolerance than French students ($M = 4,09$, $SD = 1.033$, $n^\circ = 54$) in regard to the aforementioned quotation in the public domain, which is further backed by inferential testing, revealing a significant difference between German and French students ($t(67,439) = 2.974$, $p = 0.004$). The effect size ($r^\circ = 0.341$) corresponds to a medium size effect (Cohen 1992, p. 157). German students also show more tolerance in the private domain than French students in regard to the statement by Oettinger ($t(81,361) = 4.374$, $p = 0.001$). The effect size ($r^\circ = 0.436$) reports a medium size effect, here, too (Cohen 1992, p. 157). The discrepancy between private and public domain becomes even more distinct in this case, as revealed by Table 3. Both German and French students deem it more appropriate to revert to sexist statements in the private realm than they would in public discourse. The results delivered by inferential testing support this ($t(87) = 6.440$, $p = 0.001$) and the effect size ($r^\circ = 0.568$) reports a large effect (Cohen 1992, p. 157).

⁸ Translated into English from the German original: “Wenn diese komische Petry meine Frau wäre, würde ich mich heute Nacht noch erschießen.”

Table 4 Homophobia

	Public discourse		Private discourse	
	Germany	France	Germany	France
Acceptable	2.7%	1.9%	8.1%	0%
Not acceptable	97.3%	98.1%	67.9%	88.2%

Note: Missing values were not taken into account in the percentage figures

Overall, German students have thus displayed a higher tolerance for sexist discourse than their French counterparts (H1). Furthermore, the difference between public and private domain is especially visible in the case of sexism, as both Germans as well as French students are more inclined to accept sexist statements when speaking in private (H3).

Homophobia

In order to analyse the acceptance of homophobia in the public and private domain, we asked German and French students to evaluate the following quotation by Louis Noguès from a municipal council meeting in 2015 in Le Mans:

*"...lesbian, gay, bisexual, transgender, intersex, queer and friendly. (...) You've certainly forgotten about zoophilia."*⁹

As visible in Table 4, there is no substantial difference between the German students' ($M = 4,62$, $SD = 0.639$, $n^\circ = 37$) and French students' ($M = 4,83$, $SD = 0.505$, $n^\circ = 54$) evaluation of the statement in the public domain, which is confirmed by inferential testing ($t(65,249) = 1.687$, $p = 0.096$). Furthermore, their reaction to the homophobic statement reveals that students evaluate public and private discourse differently. The highly significant distinction found in this case can be upheld thanks to the results delivered by inferential testing ($t(87) = 6.446$, $p = 0.001$). In addition, the effect size ($r^\circ = 0.569$) reports a large effect (Cohen 1992, p. 157).

Interestingly, German students show somewhat more tolerance in the private domain than French students in regard to the homophobic statement ($t(60,876) = 2.741$, $p = 0.008$). The effect size ($r^\circ = 0.331$) reports a medium effect here (Cohen 1992, p. 157). As with anti-Semitism before, there is little tolerance for homophobia displayed by both German and French students, raising ever more doubts as to the accuracy of the first hypothesis, which assumes general differences between the

⁹ Translated into English from the French original: "... lesbiennes, gay, bisexuels, transsexuels, intersexuels, queers and friendly. (...) Vous avez oublié certainement la zoophilie."

Table 5 Islamophobia

	Public discourse		Private discourse	
	Germany	France	Germany	France
Acceptable	33.3%	13.7%	52.7%	24.5%
Not acceptable	47.2%	80.4%	33.3%	59.2%

Note: Missing values were not taken into account in the percentage figures

German und the French students in regard to their level of tolerance. However, as with sexist statements before, the students' evaluation again hints at the existence of a certain cleavage between private and public domain. Even though, this effect is more pronounced concerning sexism, it nevertheless shows that, when speaking in private, the interviewees allow for a higher margin of freedom as far as homophobic statements are concerned (H3).

Islamophobia

Nadine Morano, former state secretary, speaking during a public discussion in 2009 in Charmes (France), provided us with a suitable quotation for testing the students' level of tolerance for Islamophobia:

“What I want from a young Muslim, when he is French, is that he loves his country, that he finds a job, that he doesn't speak slang, that he doesn't put his cap on backwards.”¹⁰

In comparison to the homophobic statement before, the results for islamophobia are more diverse, as can be seen in Table 5. German students ($M = 3,22$, $SD = 1.017$, $n^\circ = 36$) show more tolerance than French students ($M = 4,02$, $SD = 1.049$, $n^\circ = 51$). Backed by a medium sized effect ($r^\circ = 0.376$) (Cohen 1992, p. 157) and further substantiated by inferential testing ($t(76,906) = 3.555$, $p = 0.001$), we can thus infer that our first hypothesis holds true for this category. Further specified, German students also show more tolerance in the private domain than French students ($t(72,566) = 2.943$, $p = 0.004$), producing a medium effect with the effect size of $r^\circ = 0.327$ (Cohen 1992, p. 157). In general, the numbers reveal once more that the students, Germans and French alike, evaluate public and private discourse differently, as before confirmed by inferential testing ($t(82) = 5.631$, $p =$

¹⁰ Translated into English from the French original: “Moi, ce que je veux du jeune musulman, quand il est français, c'est qu'il aime son pays, c'est qu'il trouve un travail, c'est qu'il ne parle pas le verlan, qu'il ne mette pas sa casquette à l'envers.”

Table 6 Evolution

	Germany	France
Positive	22,2%	47,1%
Negative	66,7%	33,3%

Note: In the interest of a better presentation, we merged both poles – ‘very positive’ and ‘positive’ to ‘positive’ as well as ‘negative’ and ‘very negative’ to ‘negative’. Missing values were not taken into account in the percentage figures

0.001). In this case, the effect size even ($r^2 = 0.528$) reports a large effect (Cohen 1992, p. 157).

This contradicts the two first hypotheses according to which the level of tolerance as well as the margin of freedom left for speakers is lower by German students than by French students in the public as well as in the private domain. Moreover, the highly significant difference between the use of Islamophobic statements in public and private domain hints that speakers show more tolerance towards Islamophobic statement in private use (H3).

Dimension: Co-evolution

In order to measure the co-evolution dimension, we asked German and French students to evaluate the following emblematic political slogan standing (literally) for the peaceful revolution in 1989 in Germany:

“We are the people !”¹¹

Table 6 shows that French students ($M = 2,92$, $SD = 1.214$, $n = 51$) evaluate the emblematic political slogan cited above far more positively than German students do ($M = 3,67$, $SD = 1.287$, $n = 36$). This finding is confirmed by inferential testing, e.g. a significant difference between German and French students could be found ($t(72,685) = -2.722$, $p = 0.008$), whereby the effect size ($r^2 = 0.304$) corresponds to a medium size effect (Cohen 1992, p. 157). Surprisingly, while nearly a half of German students assign this emblematic statement to center right parties (85,4%), most of the French students associate it with either extreme left-wing (19,4%) or extreme right-wing parties (63,9%).

This finding confirms fourth hypothesis according to which linguistic signs (symbols) and even emblematic political slogans as well as speakers who use them develop divergently depending on the society, they live in. Presumably, the rather

¹¹ Translated into English from the German original: “Wir sind das Volk!”

negative assessment of the political slogan “We are the people!” in Germany can be explained by the fact that the slogan has frequently been appropriated by the East German right-wing movement PEGIDA, which, in turn, is directly linked to the ‘refugee crisis’ that started in 2015 (H2).

5 Conclusion

In this article, we made use of the novel concept of sociolinguistic resilience. This concept defines language as a co-evolutionary and co-adaptive self-contained system of linguistic signs. We assumed that the evaluation of linguistic signs resulting from a permanent social struggle, and hence the tolerance level of those using them, differs significantly between Germany and France. Moreover, the serious impact of the refugee crisis causes a lower level of tolerance in directly related GFE-categories such as racism and xenophobia as well as Islamophobia in Germany. Because social norms and therefore linguistic signs change considerably in both the public and private domains, public and private discourse also change (*co-adaptation*). Finally, we assumed that linguistic signs as well as speakers who use them evolve differently (*co-evolution*).

The ‘classroom survey’ we conducted among German and French students between April and May 2016 consisted of five items covering five GFE categories, hence representing the two dimensions co-adaptation and co-evolution. Using a five-point Likert scale we restrained our analysis to five of the six categories using one single item per category.

However, only part of our assumptions could be substantiated by the findings. Whilst the level of tolerance is equally low regarding racist and xenophobic, anti-Semitic as well as homophobic statements, German students show comparably more tolerance for sexist and Islamophobic statements. The latter clearly contradicts our assumption according to which the level of tolerance is supposed to be lower among German students. Having said that, our findings point to an interesting phenomenon regarding the difference between the private and public domain. While tolerance for statements related to the GFE categories tends to be lower in the public domain among German and French students alike, the same statements often find fertile ground in the private domain, be it subliminally or not. Thus, we were able to show that the co-evolution of linguistic signs (symbols) is strongly dependent on social phenomena. Whilst French students evaluate the emblematic political slogan “We are the people!” positively, associating it with extreme

left-wing or extreme right-wing parties, German students perceive it much more negatively as they associate it preponderantly with (extreme) right-wing parties.

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Correction to: The Resilience of Britain's Core Cities to the Great Recession (with Implications for the Covid Recessionary Shock)

Ron Martin and Ben Gardiner

Correction to:
Chapter "The Resilience of Britain's Core Cities to the Great Recession (with Implications for the Covid Recessionary Shock)" in: R. Wink (ed.), *Economic Resilience in Regions and Organisations*, Studien zur Resilienzforschung,
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In this chapter the figures 10 and 11 have been displayed incorrectly. This has been corrected now.

The updated version of this chapter can be found at
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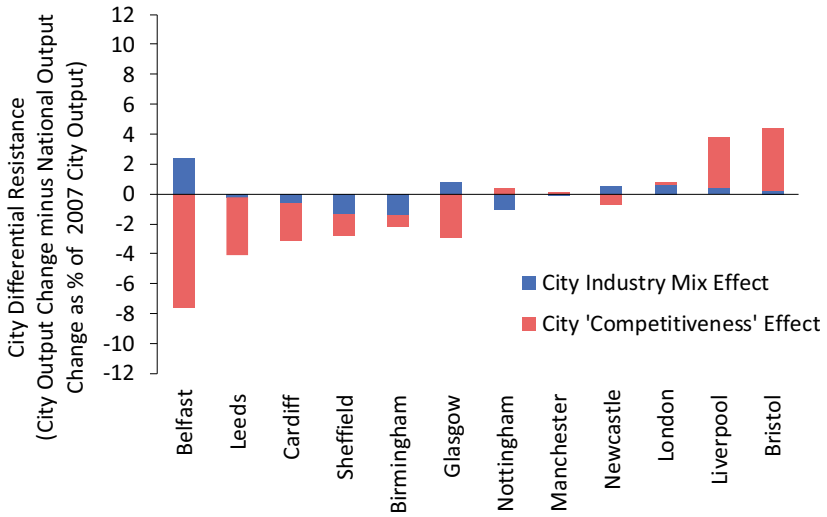


Fig. 10 Shift-share components of core city resistance to the Great Recession, 2007–2009

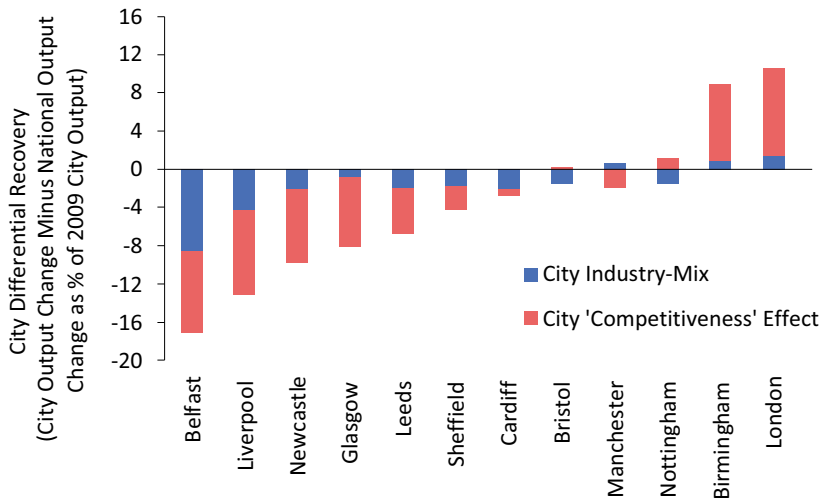


Fig. 11 Shift-share components of core city recoverability from the Great Recession, 2009–2018

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