EXPLAINING DIFFERENCES IN THE ADAPTABILITY OF OLD INDUSTRIAL AREAS

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Introduction
Explaining the causes and consequences of uneven economic development within and between regions is a core theme in economic geography. The research focus and conceptual frameworks related to this theme have been affected by several meta-theoretical paradigm turns in the discipline, shifting from a material-centric and equilibrium way of thinking to a non-material cultural and institutional–evolutionary perspective (Scott 2000). In recent years, one of the most frequently asked questions in the discipline is why it is that some regional economies are able to adapt more positively and move onto new developmental trajectories, whereas others remain locked in decline over time. This question simultaneously mirrors the reality of increasing cross-region/border interactions and unpredictable crises in a globalizing economy, which raises a new topic of conceptualizing the nature of geographically uneven economic adaptability (Martin and Sunley 2006; MacKinnon et al. 2009; Hassink 2010a; Martin 2010; Cooke 2012). It has been shown that not only many modern theoretical concepts, such as path dependence and lock-in, are applied to help to understand long-term regional evolution, but also several newly imported notions (e.g. regional resilience) are adopted to assess short-lived mutation and adaptation (Pike et al. 2010). This body of work tries to provide a much broader view by combining useful concepts from evolutionary economic geography and other related social sciences, in which not only the micro-level norms, routines and practices within firms and organizations are closely focused, but also multi-actors interactively involved in networks, systems, institutions, power and politics beyond the narrow firm-based scale are taken into account in contributing to a better understanding of the spatial patterns of economic landscape evolution.

Old industrial areas that are blighted by prolonged downturns of traditional industries (e.g. steel, textile, coal mining and shipbuilding etc.) and the lack of sufficient capital, advanced technologies and know-how, face greater challenges in adapting than other regions do. Many formerly prosperous old industrial areas in Western Europe and North America experienced painful processes of de-industrialization in the 1970s and 1980s. Similar industrial restructuring occurred in the first generation of newly industrializing countries in East Asia during the 1990s, and then in the second generation economies after the 2000s. However, one of the most intriguing
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phenomena is that the outcomes of industrial restructuring vary remarkably from region to region. Pittsburgh, for instance, is regarded as a successful model of a transformative shift from a steel-producing region to a steel-related technology and service centre (Treado 2010), while Northeast England is still suffering from cyclical downturn due to the inflexibility of traditional and structured institutions, as well as the tensions of local-central power relations (Hudson 2005; Shaw and Robinson 2012). This spatially uneven phenomenon, in which old industrial regions evolve and adapt following divergent processes and with varying consequences, raises important questions: how can we explain the differences in the adaptability of old industrial areas? What are the inherent mechanisms driving the rise and fall of old industrial areas? What sort of evolutionary paths do different old industrial areas follow and how can we distinguish them? So far, economic geographers working on this topic have been busy in empirically investigating the various processes and causes mainly on the basis of individual cases with place-specific evolutionary features. Much less attention has been paid to the types, mechanisms and patterns of evolutionary trajectories observable in the adaptability of old industrial areas. Furthermore, it still remains unclear how many factors/elements are involved in regional renewal and how to distinguish the features and roles of different factors in shaping the uneven trajectories in a broader context. Drawing upon these points, this chapter will attempt to critically assess impact factors on regional economic adaptability in old industrial areas aiming to promote further multidimensional thinking and disciplinary cross-fertilization in doing evolution in economic geography.

The remainder of this chapter is structured as follows. Section 2 distinguishes two main types of factors affecting the strengths and weaknesses of regional renewal based on a critical review of the literature on the restructuring of old industrial areas across various industries and nations. Section 3 seeks to synthesize positive and negative factors by employing notions from evolutionary economic geography and other sociopolitical sciences to cast greater light on the uneven dynamics of old industrial areas. In section 4 research gaps are identified and several hypotheses as well as research questions for future studies on this topic are proposed. Finally, conclusions are drawn.

What factors are affecting the restructuring of old industrial areas?

A literature review

Based on a series of cross-border comparative studies of industrial dynamics and regional restructuring, Hassink (2010b) initially proposed two types of impact factors (economic-structural impact factors and political-institutional impact factors) as an analytical framework for analysing the differences in the ability of old industrial areas to restructure and reshape. Inspired by this work, we start with a critical review of the literature on the restructuring of old industrial areas with a particular focus on two main impact factors, namely industrial-sectoral impact factors and institutional-political impact factors.

Industrial-sectoral impact factors

Prior to the 2000s, the decline of old industrial areas was often linked to economic over-specialization and the maturity of the product life-cycle, emphasizing the inflexible economic structure and rigid supply-demand linkages that incrementally generate obstacles for further regional growth (Steiner 1985). Grabher (1993) defines those structural obstacles as a ‘functional lock-in’, which refers to strict inter-firm relations, close trade interdependences and mature infrastructures that may lead to a ‘rigid specialization trap’ and the absence of adaptation.
A region with one specific dominating industry may have a strong potential for functional lock-in. Hassink’s (2010b) study of the shipbuilding region of Gyeongnam in South Korea, for example, demonstrates how the ‘chaebol’ (close-knit family corporations), coupled with strong ties to the central government contribute to high exit and entry barriers that impede industrial diversity. Similar examples can be captured in Northeast China, where state owned enterprises (SOEs) and their subsidiaries are firmly embedded in the local economic system. In this sense, little space is left for the formation of new industries (paths), as SOEs dominate market, labour and financial resources (Hu and Lin 2013). In addition, the spatial unevenness in restructuring may also be associated with different types or characteristics of industries, such as firm ownership, size and number. For instance, large and capital intensive SOEs (such as the steel industry) tend to be committed to high sunk costs that make it hard for them to exit and change, while labour intensive and private SMEs (such as the textile industry) seem to be affected rather less due to the low entry barriers, flexible firm relations, and low sunk costs (Chapman 2005).

Additionally, the regional innovation system (RIS) approach, which highlights the power of cross-sector interactions for innovation, has been extensively regarded as a policy priority to foster or revitalize regional economies. Tödtling and Trippl (2005) reveal that the ‘lock-in’ effect in old industrial areas is highly relevant to their performance of RIS (links within industries and with other sectors). Several comparative studies on old industrial areas in Austria (Styria and Upper Austria) and Germany (Saarland) illustrate that regions with thick and networked RIS exhibit stronger dynamism for regional renewal than those with thin and fragmented RIS (Tödtling and Trippl 2004; Trippl and Otto 2009). Since regions differ in their preconditions in terms of university–industry relations, inter–industry networks and the density of supporting agencies, differentiated topologies of RIS as well as the quality of subsystems in old industrial areas influence the nature and geography of adaptation. In addition to the RIS approach, which very much emphasizes the endogenous industrial systemness for regional innovation and economic change, exogenous economic factors such as the national innovation system, international industrial relocations and cross-border economic cooperation play an increasingly important role in helping old firms/industries absorb new technologies and complementary knowledge and, in turn, escape from the lock-in situation (Kaufmann and Tödtling 2000; Hudson and Swanton 2012; Bathelt et al. 2013).

More recently, the concept of path creation has contributed to a historical dialectic perspective for explaining where the sources support for creating new industries/paths, and how contingency and place dependence co-evolve and are geared to a certain path over time (Martin and Sunley 2006; Martin 2010). This concept indicates that the emergence of new industries and paths in old industrial areas is by no means without foundation, but is usually (pre)conditioned by the previous localized legacies and pre-existing paths. For instance, the environmental technology industry is built upon the pollution reduction activities of the coal mining industry in the Ruhr area of Germany, and the fashion design industry in ‘Third Italy’ districts developed from the established close relations between the global market and local specific assets of textile production (Hospers 2004; Belussi and Sammarra 2006). However, it is not to say that all old industrial areas are able to renew themselves like a ‘phoenix from the ashes’. The new path creation seems more likely to benefit from neighbouring or technologically related sectors. Recently, related variety and regional branching have been seen as useful notions to understand endogenous processes of new firm formation and industrial transformation, as Boschma and Frenken (2011: 191) articulated ‘the higher the number of related industries in a region, the higher the number of possible recombinations, and thus the higher the probability that regions will diversify successfully into related products’. As for old industrial areas, Fornahl et al. (2012) examined the causality between the declining shipbuilding industry and the emerging offshore wind energy
in Northern Germany, and concluded that the offshore wind energy industry primarily benefits from related onshore wind firms and other branched sectors rather than from the shipbuilding industry. In contrast, new findings from several Scandinavian industrial regions reveal that new path creation may emerge from the process of interaction or combination based on different or unrelated people, firms and sectors (Cooke 2012). Therefore, industrial relatedness, variety and proximity can be seen as very important explanatory factors for regional path creation. Meanwhile, however, this has raised difficult questions about the extent to which industrial proximity in a region can really facilitate invention and innovation, and why regions still act in different ways when restructuring even though they have similar or the same conditions of industrial relatedness.

**Institutional–political impact factors**

With the theoretical paradigms changing from ‘neoclassicism’ to ‘new regionalism’, attention is increasingly being paid to the role of noneconomic factors in shaping the uneven landscapes of regional economies (Amin and Thrift 1994; Saxenian 1994; Cooke and Morgan 1998). One of the most cited references on the restructuring of old industrial areas shows that thick institutional tissues, together with a common worldview or mindset may lead to a political and cognitive lock-in that incrementally erodes the renewing processes of regional economies (Grabher 1993). This work opens up an alternative perspective for rethinking the continuity and change of old industrial areas by highlighting the role of local culture, institutions, politics and policies. For instance, there is wide agreement in the literature that the slow restructuring process in Northeast England is due to its localized industrial culture (e.g. strong labour unionism and the continuing legacy of recruitment traditions) and strong regional protectionism, which lead to the short-sightedness of local actors and the inability to move on to new activities (Sadler and Thompson 2001). Although the political and cognitive lock-in concept has been used extensively to explain the failure or continuity of old industrial areas, this does not mean that lock-in is a cul-de-sac for the further development of old industrial areas. Hassink (2007) demonstrated how local actors in Westmünsterland in Germany took advantage of weak institutional lock-in to encourage diversification into new activities among textile complexes. Daegu, on the other hand, a textile city-region in South Korea, is regarded as an unsuccessful lesson in restructuring because of the strong regional protectionism of vested interests in textile production, and high institutional resistance to change (Cho and Hassink 2009). In this sense, regional political and cognitive lock-in actually provides varied possibilities for regional further evolution instead of only setting hindrances to stability. Old industrial areas may move beyond the lock-in situation and pave the way to regional renewal if the lock-in effect is relatively weak. In other words, the different paths of restructuring followed in old industrial areas are strongly associated with the degree of regional institutional resistance for restructuring, namely the strength and weakness of political–cognitive lock-ins.

Several concrete political–institutional factors have been examined in an attempt to answer more detailed questions about the type of factor that plays the dominant role in shaping the leeway for regional renewal. Cao and Xi’s (2007) study of China’s coal-mining heartland, Shanxi province, articulates the pessimistic role of regional identity since the long-term coal-driven economy plays an important role in damaging the motivation and aspirations of local actors to attack existing old institutions protected by vested interests and initiate new ones. Likewise, a widely shared cultural (institutional) ideology of collectivism in danwei inherited from the centrally planned economy in the Mao era can be well observed in Northeast China, leading to a severe lack of commercialism and entrepreneurship (Zhang 2008). In the US, a comparative study of
two Rustbelt regions indicates that social capital of the civic networking plays a pivotal role in accessing external resources for coping with external shocks, and encouraging collective action to form adaptive social orders for regional revitalization (Safford 2009). Moreover, there is much evidence presenting political impulses such as institutional reforms, industrial policies and renewal initiatives that provide tailor-made vehicles for enhancing the strength of regional restructuring. But more importantly, the formulation and implementation of those political impulses cannot be inseparable from the efforts of place-specific human actors. Especially, political leaders who have power to develop new institutions, initiate effective policies and nurture new visions can directly facilitate regional renewal of old industrial areas. Taking the examples of the mechanical industry of Prato (Italy) and the automotive industry of the West Midlands (UK), Bailey et al. (2010) explained how forms of leadership vary from region to region in very different ways to influence the processes of decision making, which led to divergent trajectories for industrial renewal.

The impact factors we discussed above tend to overemphasize the role of localized factors in hindering or enabling the restructuring of old industrial areas, which, indeed, remains problematic. Hassink (2010b) pointed out that regional adaptability is a multi-scaled evolutionary process and it is important to take into account the institutional context at all spatial levels. Evidence has also shown that extra-local political–institutional factors such as national political change, cross-state strategies, and international regulations affect or even determine the capacity for regional adaptation. Goodwin et al. (2002) reviewed four British industrial regions and found that devolution altered the institutional architecture and exacerbated the uneven capacities of regional economic development within the UK. Birch et al. (2010) analysed the different patterns of adaptation of old industrial areas across Western Europe and concluded that the varieties of capitalism among different nations play a salient role in shaping different favoured ‘paths’ of regional adaptation. In addition, since several global agreements have been achieved on climate change, such as the Kyoto Protocol, many energy-intensive and manufacturing regions are required to reduce carbon emissions and speed up the processes of deindustrialization and transformation towards a low–carbon economy. Thus, the emergence of endogenous factors may be caused by exogenous triggers and vice versa. This means that political–institutional factors coming from all different spatial levels coexist and co-evolve with each other and jointly affect regional restructuring.

As the above discussions have shown, it is obvious that factors affecting the restructuring of old industrial areas tend to be exceedingly complex. By drawing upon single spatial perspectives or applying one specific concept it may be possible to some extent to understand the evolutionary characteristics of some specialized industries or regions; however, it is hard to generate full and reliable insights into this question within the evolving context of a globalized economy. Therefore, we contend that it is crucial to rethink the restructuring of old industrial areas using an evolutionary, multi-scalar and complex perspective to regard the relationship between adaptation, adaptability and evolution in old industrial areas. This perspective needs to be oriented toward exploring some less well understood questions, such as: how do locally embedded institutional architectures, interacting with regional, national and international institutions, local political dynamics, and the differentiated agency of individuals and organizations, help to shape particular evolutionary paths over time and how are they shaped by them? What is the role of the state in responding to all kinds of external shocks and internal crises, how does it coordinate local agents, power and institutions to create an adaptive environment for regional restructuring and transformation? In general, how many factors are there and what are their roles in shaping distinctive developmental trajectories over time and space that help us to understand the uneven adaptability of economic landscapes in old industrial areas?
The notion of adaptability, originally derived from biology, has been recently employed to explain the evolutionary reaction and response of old industrial areas in a rapidly changing world. It principally refers to the systemic capability to cope with unforeseen events in the future and also the dynamic ability to overcome long-term lock-ins for socio-economic evolution (Hassink 2010b; Dawley et al. 2014). This section, therefore, will not only assess the features of varied impact factors on regional adaptability in old industrial areas, but also introduce related insights in evolutionary economic geography and other social sciences about the interpretation of these features. In particular, we attempt to shed light on two main unsolved issues: study on multidimensioned impact factors that are closely associated with the nature of adaptability in old industrial areas; research on properties and features of the main factors that could give a direction of how to assess the strengths and weaknesses of regional adaptability. Informed by the existing impact factors discussed above, all sorts of factors (e.g. logical and non-logical, local and trans-local, economic and institutional, etc.) interact together in shaping out different degrees of regional adaptability and, in turn, divergent paths of old industrial areas (Figure 11.1). These main impact factors also include the characteristics of sub-factors in different spatial levels as follows.

Figure 11.1 The process of multidimensioned impact factors affecting the adaptability in old industrial areas.

Source: authors’ own compilation.
Industrial-sectoral impact factors

1 Regional economic structure
   (a) The extent of industrial specialization: whether there is an industrial mono-structure or not (indicators include the percentage of the total manufacturing employment made up by the dominant industry in a region; its share of total GDP growth; the extent of other sectors and subsidiaries supporting and serving the dominant industry).
   (b) The characteristics of the dominant industry: ownership (State owned or private or hybrid?), types of capital (labour-intensive or capital-intensive), forms of organization and size (oligopoly companies or SMEs).

2 The industrial-sectorial proximity
   (a) The quality of regional innovation system: the systemic relations among the different industries, agencies and actors, such as, university–industry linkages, the role of intermediates in bridging the gap between knowledge base and application sectors.
   (b) Technologically industrial relatedness and unrelatedness: technologically related industries tend to foster new path creation and diversification as related variety, but unrelated variety can promote industrial portfolio that benefits from regional adaptability against external shocks.

3 International economic influences, consisting of international industrial relocation, labour mobility and circulation, mergers and acquisitions, and project-based technology transfers and science cooperation, which help local traditional industries integrating into global production networks and restructuring economic structures, technological bases, and institutions of regions.

Political–institutional impact factors

1 Regional political–institutional conditions
   (a) Differentiated political status of regions (or the differences of central-local relations): politically decentralized regions have more autonomy than others as they are legally able to formulate institutions such as laws, policies, regulations and other arrangements served for regional needs, which is a fundamental factor in leading to regionally uneven adaptability.
   (b) The degree of regional cognitive and political lock-in: this factor is related to a number of concrete elements such as place-specific cultural traditions, written and unwritten rules of communities, regional identity of individuals and groups, social capital and trust, often place-based and different in degrees across regions, that contribute to the regionally different extent of institutional lock-ins.
   (c) The role of political leaders and their actions: particularly, the functions, aims and incentives of political leadership in regions, namely, the different forms of regional political leadership, that play a key role in initiating and implementing policies, strategies and visionary plans for regional restructuring.

2 A national political system and state strategies
   (a) National varieties of capitalism: the notion of ‘varieties of capitalism’ provides a promising analytical framework to interpret why and how regions with different versions of institutional and political settings influence the degree of adaptive capacity (Peck and Theodore 2007).
   (b) The asymmetric state strategies: many state strategies aiming at spatially bounded regions or specific industries without considering inter-regional coordination that may enhance geographical differences of regional adaptation.
3 Supra-national institutional influences that strongly affect the conditions of industrial policy related to the dominant industry and main old industrial regions.

**Unpredictable and irresistible impact factors**

1 Irresistible slow crises such as resource exhaustion, climate warming and environmental degradation that influence the results of decision making in dealing with regional development in the future.

2 Unpredictable shocks such as financial crises, natural disasters, terrorism and man-made emergencies have been regarded as important indicators to evaluate and test regional adaptability.

In the light of the listed impact factors above, we try to distinguish the key ‘positive’ and ‘negative’ factors for regional adaptability by identifying the different characters of the main generalized impact factors from multiple spatial levels (Table 11.1). In this section, we emphasize the positive impact factors of regional adaptability, as they can provide the potential avenues for regional renewal and show significant implications to policy makers. As we have discussed, the evolutionary school and some related social sciences seem to be useful for understanding the evolving regional adaptability and its geographical nature of old industrial areas. On the one side, there are industrial–sectoral factors that foster regional adaptability. First, the recently developed theoretical concepts in evolutionary economic geography (EEG), such as related variety (Frenken et al. 2007), regional branching (Boschma and Frenken 2011), regional innovation platforms (Harmaakorpi et al. 2011) and transversality (Cooke 2012) pointing into the direction of industrial diversification show effective ways to break the functional lock-in and strengthen the extent of regional adaptability. In contrast to industrial specialization and mono-structure, a region with a diversified industrial structure can positively affect the renewal process. Second, the notion of path creation and positive path dependence conceptualizes how new developmental paths can emerge out of old ones via recombining (pre)existing competences, knowledge, technologies and institutions. A higher degree of industrial relatedness in a region is more likely to develop positive feedback mechanisms of knowledge interaction and recombination that promote the potential of learning and innovation. Third, a thick and well-networked RIS is endowed by regional multi-agent interactions, in which both codified and tacit knowledge can be effectively transferred and embedded into new technologies and products that foster regional transformation. According to the ‘local buzz’ and ‘global pipelines’ concept (Bathelt et al. 2004), too much local buzz in RIS may generate an inward-looking perspective that leads to regional industrial rigidity. In this case, developing an appropriate number of extra-regional linkages or global pipelines may help a local economic system to absorb new resources in order to avoid regional stagnation.

On the other hand, political–institutional factors can facilitate the process of regional adaptation. First, the use of evolutionary perspective within a geographical political economy approach seems to be a useful method to rethink spatially uneven evolution by emphasizing the role of the state, social agency and capital accumulation (Mackinnon et al. 2009). A region that, situating a higher political status in a country or having a close power relation with the central state, is likely to gain more institutional advantages in driving regional economy. We also recognize the specific role of political leaders in affecting regional policy-making processes and planning, supervising and practising the ways, modes and speed of regional economic adaptation. For example, active leaders with transformative leadership can be seen as ‘initiators’ or ‘triggers’ who not only build up new regional images and concrete visions of regional growth.
and change, but also connect with varied actors to participate and take actions in reframing new organizations and widely shared institutions toward regional transformation. Second, the cognitive and political lock-in represents comprehensive institutional conditions that incorporate social relations, cultural norms, political ideologies, and all sorts of formal and informal institutions. A weak cognitive and political lock-in situation has been testified as a positive factor because it implies more room and possibilities for regional renewal than a strong one. Third, a regional economy that is involved in national and international institutions such as national industrial strategies, international laws and policies, among others, might be more capable of strengthening regional economic adaptability.

**Conclusions**

The idea of regional adaptability has rightly attracted increasing attention from economic geography as part of their growing interest in the evolution and geography of regional and local economies in a complex environment. The question, however, is what impact factors affect the adaptability and how they evolve to shape the adaptive path in differences among old industrial areas. To address this question more clearly, the chapter contributes to a conceptual inspiration by synthesizing multi-scaled impact factors and their characters on regional adaptability. It has shown that, first, impact factors affecting the adaptability are derived from all spatial levels (including local, regional, national and international) with varied features (e.g. economic and non-economic; positive and negative; unpredictable and foreseeable, etc.). Second, although EEG and other social sciences have provided several useful concepts such as lock-in, path dependence, relatedness and transversality in helping to conceptualize how impact factors enable or constrain regional economic adaptability over time, several issues still remain unsolved. More empirical research is needed to deal with those issues and a future research agenda should be centred on four broad themes: (1) conceptualizing the term of adaptation, adaptability and evolution in old industrial areas; (2) continuing to conceptualize the role of regional lock-in, path dependence, relatedness and complexity, and other concepts in affecting the strengths or weaknesses of regional adaptability; (3) searching for complementary theoretical perspectives

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**Table 11.1 Placing the key positive and negative factors of adaptability of old industrial areas**

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<tr>
<th>Positive factors facilitating regional adaptability</th>
<th>Negative factors constraining regional adaptability</th>
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<tr>
<td><strong>Industrial–sectoral impact factors</strong></td>
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<tr>
<td>A regional diversified industrial structure;</td>
<td>A strong industrial mono-structure;</td>
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<tr>
<td>An absence of monopoly enterprises;</td>
<td>A presence of large monopoly enterprises;</td>
</tr>
<tr>
<td>Technologically related firms and industries;</td>
<td>A poor performance of RIS;</td>
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<tr>
<td>A good performance of RIS;</td>
<td>A lack of external economic linkages.</td>
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<tr>
<td>Adequate external economic linkages.</td>
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<tr>
<td><strong>Political–institutional impact factors</strong></td>
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<tr>
<td>A high regional political status;</td>
<td>A low regional political status;</td>
</tr>
<tr>
<td>Active leaders and strong transformative leadership;</td>
<td>A weak or lack of transformative leaders and leadership;</td>
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<tr>
<td>A weak cognitive and political lock-in;</td>
<td>A strong cognitive and political lock-in;</td>
</tr>
<tr>
<td>Supporting national and international institutions.</td>
<td>An absence of national and international institutions.</td>
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</table>

Source: Adapted from Hassink (2010b).
(e.g. relational and institutional perspective, global production networks, geographical political economy approach, etc.) and encouraging ‘engaged pluralism’, which is beneficial for further conceptualizing regional adaptability and evolutionary economic geography (Barnes and Sheppard 2010); and (4) conducting more studies on regional adaptability in new contexts, and more cross-sector and intra-regional comparative research between the Western world and emerging economies; by carefully examining the role of ‘varieties of capitalism’, power relations, and international labour divisions in different countries to advance the understanding of uneven economic adaptation and adaptability of old industrial areas.

References


