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Evolutionary Economic Geography

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Abstract

The chapter gives a brief overview of the most recent literature on Evolutionary Economic Geography (EEG). We describe how EEG has provided new and additional insights on a number of topics that belong to the core of the economic geography discipline: why do industries concentrate in space, how do clusters operate and evolve, how are innovation networks structured in space and how do they evolve over time, what types of agglomeration externalities induce urban and regional growth, how do regions diversify, and how do institutions and institutional change matter for the development of new growth paths in regions.

Keywords: Evolutionary Economic Geography, related variety, regional branching, proximity, path dependence, co-evolution, institutional change

1. Introduction

From its start, EEG has aimed to contribute to the understanding of topics in economic geography, as to why industries concentrate in space, how networks evolve in space, and why some regions grow more than others (Boschma and Lambooy 1999; Boschma and Frenken 2006; Martin and Sunley 2006; Boschma and Martin 2010; Kogler 2015; see also special issues on EEG in *Journal of Economic Geography* 2007, *Economic Geography* 2009, *Regional Studies* 2015 and *Journal of Economic and Social Geography* 2015). These core topics are by no means new in economic geography, but theorized and analyzed from an evolutionary perspective, EEG provides new and additional insights, and in some cases alternative explanations. The main topics addressed in EEG so far concern industrial clusters (section 2), networks (section 3), and urban and regional development (section 4). Special attention is increasingly given to institutions and how these co-evolve with industrial dynamics in regions (section 5).

2. Clustering as an evolutionary process

A classic question in economic geography is why some industries are concentrated in space. This question was raised by Marshall (1920) a century ago when he investigated the clustering of the metals industry in Sheffield and South Yorkshire in the UK (Potter and Watts 2011). His explanation of such spatial clustering of an industry has dominated the field of economic geography for a long time: as soon as an industry locates somewhere, economic benefits can be derived from the co-location of firms in that industry, provided by a local pool of specialized knowledge, labor and suppliers, also known as 'localization economies' or 'Marshallian externalities'. What attracted special attention was Marshall's remark that the 'mysteries of trade' in an industry were 'in the air' in clusters. His ideas implied that knowledge spillovers are geographically bounded, that intra-industry knowledge is accessible almost exclusively to firms in clusters, and that cluster firms are expected to perform better than firms outside clusters.

This dominant Marshallian thinking has been challenged, and EEG has made important contributions here. Sorenson and Audia (2000) and Stuart and Sorenson (2003) claimed that clusters emerge and exist because of a self-perpetuating process of local entry: the more local firms in a new industry, the more local entry. This has been called 'cognitive legitimacy' in organizational ecology, in which a high rate of local entry generates information that diffuses to potential entrepreneurs inducing them to create their own firms (Aldrich and Fiol, 1994; Maggioni 2002; Wenting and Frenken 2011). More local entry also generates more local competition rendering it harder for cluster firms to survive. In this ecological view, clusters decrease entry costs while increasing the chances of exit at the same time.

Klepper (2007) challenged Marshallian thinking even more by providing an alternative theory on the industry lifecycle and spatial clustering. Point of departure is an evolutionary micro-perspective in which firms are depicted as being heterogeneous in their routines and capabilities because of bounded rationality, and therefore firms show differential growth rates. Firms have different routines because their pre-entry experience differs. In particular, spinoff companies inherit superior capabilities from successful parents from the same or related industries and, therefore, tend to outperform other types of entrants. As firms often locate in the founder's home region and rarely relocate (Stam 2007; Dahl and Sorenson 2012), a cluster can simply emerge through a local self-reinforcing spinoff process, and there is no need for Marshallian externalities to make that happen. Klepper (2007) found evidence for his spinoff thesis for the US automobile industry which concentrated in the Detroit region. He showed that survival rates depended primarily on the quality of pre-entry experience, not on Marshallian externalities (here, being located in Detroit). This finding has been replicated for other industries as diverse as the semiconductor, tire, fashion design and book publishing industry, while some studies found that both pre-entry experience and Marshallian externalities affected firm performance (for surveys, see Boschma 2015a; Frenken et al. 2015).

When adopting an evolutionary approach, one can not only explain why industries concentrate in space, but also why an industry historically emerged in one particular place, rather than another. As a cluster can, theoretically, emerge from a single successful firm generating many spinoffs, a cluster could emerge anywhere where this firm happens to locate (e.g., in the entrepreneur's home region). The question holds to what extent such a path-dependent process can be said to be place-dependent as well (Martin and Sunley 2006). Though the location of a cluster is indeed unpredictable due to the path-dependent, self-reinforcing logic of the spinoff process, there is also substantial evidence that the first generation of successful firms in an emerging industry are often firms diversifying, or spinning off, from related industries (Klepper 2007; Buenstorf and Klepper 2009). At the regional scale, studies have shown that regions hosting industries that are related to a new industry, have a higher probability to give birth to this new industry (Neffke et al. 2011). Firm-level studies also found evidence that the local presence of related industries increases the survival rate of firms (Staber 2001; Boschma and Wenting 2007).

Combined with Klepper's findings, recent studies suggest that clusters are characterized by positive related-industry externalities and (possibly) negative Marshallian externalities. In the conventional definitions of Marshallian externalities as well as Porter's (1990) original cluster concept, intra-industry externalities and related-industry externalities are not analytically separated. This distinction, however, is very relevant because the two types of externalities tend to have opposite effects on firm survival. Related-industry externalities among local firms are expected to be positive, arising from knowledge spillovers and the mobility of skilled people, while intra-industry externalities among local firms are expected to be mainly negative due to competitive pressure and involuntary knowledge spillovers (Boschma 2015a; Frenken et al. 2015). In particular, intra-industry externalities mostly harm well-performing cluster firms who have most to lose and least to gain from other cluster firms, while young and small firms may still benefit from intra-industry externalities as to compensate for their weak internal capabilities (Rigby and Brown 2015). Similarly, firms are also heterogeneous in the extent to which they profit from the local presence of multinationals, with the most internationalized firms benefitting most (Creszenzi et al. 2015). Thus, given that firms are heterogeneous in their capabilities, the extent to which firms suffer or profit from co-location is expected to vary accordingly.

Another branch in the EEG literature is the ‘cluster life-cycle’ approach that studies the evolution of clusters, in particular, the endogenous dynamics that may turn successful clusters into declining ones (Pouder and St. John 1996; Brenner 2004; Iammarino and McCann 2006; Belussi and Sedita 2009). It is crucial to underline that the life-cycle notion should be understood here in a non-deterministic, evolutionary manner (Martin and Sunley 2011), as a cluster can renew itself, for instance. Menzel and Fornahl (2010) proposed a cluster life-cycle model in which firms enter and exit clusters, capabilities of firms interact and evolve, and inter-organizational linkages are formed and dissolved within and beyond clusters. When a cluster emerges, the heterogeneity of firms’ capabilities initially increases but subsequently decreases, as firms engage in competition, inter-firm learning and networking (Rigby and Essletzbichler 1997; Vicente and Suire 2007). If this convergence continues, the recombinant potential of the cluster decreases and its principal activities will decline. Menzel and Fornahl (2010) argue that a declining cluster can revive itself by upgrading its knowledge base through inflow of new knowledge from outside the cluster (‘adaptation’), by integrating various local knowledge bases (‘renewal’), or by diversifying into new activities while building on the local knowledge base (‘transformation’). Clusters can only adapt if firms and other agents pro-actively engage in such a change process, but this is far from easy, given their proximity to local networks and institutions (Glasmeier 1991). This ‘lock-in’ may be reinforced when public policy is responsive primarily to demands from vested interests (Grabher 1993) and local actors hold on to a collective identity (Staber and Sautter 2011).

Life-cycle dynamics may also stem from herding behavior in location decisions, indicative of hypes. Suire and Vicente (2009) developed a model of cluster emergence and stability that takes into account such herding effects. Firms may locate in clusters not for alleged Marshallian externalities associated with co-location, but for reasons of what Appold (2005) called ‘geographical charisma’. Some clusters have a strong reputation due to very visible and successful firms that attract other firms to the cluster. Here, being located in a cluster with successful firms acts as a signal to their stakeholders that they are present ‘where the action takes place’, hereby legitimating the location choice. The model by Suire and Vicente (2009) shows that if legitimation effects prevail, a cluster can grow very fast, but remains fragile as the pattern of co-location is not based on positive externalities. As a result, once the reputed firm would lose its reputation, or would relocate to another location, the cluster is likely to break down.

To conclude, the main contribution of EEG to the topic of spatial clustering of industries is that the dominant explanation of industry clustering resulting from Marshallian externalities has been challenged: (i) clusters can emerge despite the absence of localization economies; (ii) clusters can emerge and exist because of a self-reinforcing process of local entry, in particular the entry of successful spinoffs; (iii) emerging clusters tend to be characterized by positive related-industry externalities; (iv) not all firms perform equally in clusters: some have better routines, partly due to the pre-entry background of the entrepreneur, and firms differ in their ability to exploit positive externalities and cope with negative externalities in clusters; (v) emergent clusters produce new institutions or adapt existing institutions by the collective action of agents; (vi) declining clusters can revive and overcome lock-in, but not necessarily so.

3. Networking as an evolutionary process

In economic geography, it is well-known that spatial clustering provides opportunities to make connections between people and organizations. Firms not only compete, they also interact and collaborate with a range of organizations like other firms, banks, research institutes or universities. As geographical distance often forms a barrier, organizations in the same region are more likely to connect, but not necessarily all of them. EEG is well-equipped to incorporate these relational issues because it reasons from the heterogeneity of agents (Boschma and Frenken 2010). As capabilities differ between organizations, they do not easily connect, nor do they easily learn from each other. This is exactly why networks in general, and knowledge and innovation networks in particular are not randomly structured but skewed, that is, some organizations are more connected than others (Powell et al. 1996; Giuliani 2007).

Such an evolutionary take on the geography of knowledge networks has led to additional insights in the cluster literature. Contrary to what the literature often suggested, being part of a cluster does not necessarily mean that all cluster firms are connected with each other. There is indeed strong evidence that some cluster firms are highly connected in (local) knowledge networks, while other cluster firms are poorly connected, or not connected at all. Giuliani and Bell (2005) showed in a seminal study on a Chilean wine cluster that firms with a high absorptive capacity occupy a more central position in the local knowledge network. Such firms are attractive partners to connect to and capable of absorbing knowledge from other firms in and outside the cluster. This makes that only a few firms in clusters (the most connected) have access to crucial local knowledge. This goes against the Marshallian view that knowledge is ‘in the air’ in clusters, in which all cluster firms are perceived to have equal access to local knowledge because they share the same location and the same norms and values. As Giuliani (2007) put it, knowledge networks are not pervasive but selective, and networks in clusters are no exception to that rule.

Besides individual features of firms like absorptive capacity, proximities are also key drivers of network tie formation, and this is where the proximity literature and EEG clearly meet (Boschma and Frenken 2010). As actors differ, they show a strong bias with whom they interact and collaborate, preferring those with whom they share similar knowledge (cognitive proximity), norms and values (institutional proximity), the same location (geographical proximity), social ties (social proximity) or organizational boundaries (organizational proximity) (Boschma 2005; Breschi and Lissoni 2009; Balland 2012). As other forms of proximity can substitute for geographical proximity, the proximity concept can explain why networks within clusters are not pervasive, and why some cluster firms, sometimes acting as gatekeepers (Morrison 2008), have most over their relations with firms outside the cluster.

However, the relationship between proximity and firm performance is more ambiguous. While proximity promotes actors to collaborate, it does not necessarily increase the performance of a collaboration, and may even turn out to be harmful. This has been referred to as the 'proximity paradox' (Broekel and Boschma 2012). For instance, cognitive proximity facilitates communication and knowledge transfer between firms, but it also reduces the scope for learning and enhances the risk of involuntary knowledge leakage. Moreover, one expects proximity in relationships to increase over time, as interacting agents tend to become more similar due to social interaction and interactive learning (Balland et al. 2015). This has led to a search for 'optimal' proximity to cope with the negative aspects of proximity (Boschma 2005). Uzzi (1996) argued that firms benefit from having partners with high and low social proximity, as some knowledge relations require high levels of trust while other relations can be organized at arm's length. For geographical proximity, scholars have underlined the importance of a combination of local and non-local knowledge linkages for the long-term development of clusters (Asheim and Isaksen 2002; Bathelt et al. 2004), or the importance of temporary proximity between agents who meet at conferences or trade fairs where they exchange knowledge (Torre 2008). A questionable assumption in most proximity studies, however, holds the assumption of symmetry. A future challenge is to take up and integrate power and asymmetric relations in the proximity framework, as an actor can be proximate to another actor but not necessarily *vice versa*.

The evolution of networks has been a subject of recent research in EEG (Ter Wal and Boschma 2011). Balland et al. (2013) studied network dynamics in the global video game industry by looking at collaborations of co-developers of new video games. Their study demonstrated that geographical proximity became a more important driver of network tie formation as the industry evolved. This increasing tendency of inter-firm collaboration at shorter geographical distances could be explained by the increasing technological complexity of video games (Sorenson et al. 2006) and the project-based nature of video game production in which 'local buzz' and 'who-knows-who' are key inputs (Grabher 2006). Ter Wal (2014) found the opposite result in biotech: geographical proximity became less important as driver of co-inventor networks, possibly due to the increasing codification of biotech knowledge. However, there still is little understanding of how spatial networks change: little is known of how proximities in networks evolve over time (Balland et al. 2015), how network structures in clusters change, to what extent network dynamics exhibit path dependence (Gluckler 2007), and how network dynamics affect the evolution of a cluster (Cantner and Graf 2006; Hendry and Brown 2006; Balland 2012).

In sum, the contributions of EEG to the topic of spatial knowledge networks are the following so far: (i) knowledge is not 'in the air' but channeled through networks that are uneven and selective in clusters; (ii) networks are selective because firms and other agents have different capabilities and routines; (iii) various proximities, including geographical proximity, are important drivers of network formation but proximities do not necessarily increase the performance of firms; (iv) while geographical and institutional proximity may drive network tie formation in clusters, not all cluster firms will connect and perform equally, despite being part of the same local institutional environment; (v) network relations in clusters have a tendency to become more inward-looking over time; (vi) non-local linkages, or temporary proximity, are crucial for the competitiveness of cluster firms, but they require other forms of proximities to enable effective transmission of knowledge.

4. Regional development as an evolutionary process

EEG has devoted attention to how regions can secure their long-term development by developing new industries or new growth paths. A source of inspiration has been Schumpeter's description of innovations as new combinations (Schumpeter 1912). This has been further developed in the notion of recombinant innovations which emerge from recombining parts of pre-existing technologies or services in novel way's (Fleming 2001). When recombinant innovations are the rule rather than the exception, this implies that the existing variety in a region conditions the scope for innovation. This builds on the seminal work by Jacobs (1969) who argued that, "the greater the sheer numbers and varieties of divisions of labor already achieved in an economy, the greater the economy's inherent capacity for adding still more kinds of goods and services. Also the possibilities increase for combining the existing divisions of labor in new ways" (p. 59). This idea was taken up by Glaeser et al. (1992) who tested whether diversified or specialised regions tend to grow more. Diversified regions should be more innovative due to Jacobs' externalities, while specialized regions could benefit from Marshallian externalities. Glaeser's study was followed by many others, but despite massive empirical efforts, there is conflicting evidence for both hypotheses: there are almost as many studies proving that regions benefit from variety as there are studies showing that regions benefit from specialization (De Groot et al. 2009).

A possible reason for the weak evidence on Jacobs' externalities is that many technologies and services cannot be meaningfully combined. Rather, one expects that recombinant innovations more often stem from related industries that share similar knowledge and skills. Frenken et al. (2007) argued that for variety to be supportive in innovation processes, variety must be related, that is, cognitively close, as related variety "… improves the opportunities to interact, copy, modify, and recombine ideas, practices and technologies across industries giving rise to Jacobs externalities" (p. 687). This motivated studies to test whether related variety increases regional employment growth. The evidence collected so far indicates by and large a positive effect of related variety on employment growth (Essletzbichler 2007; Frenken et al. 2007; Quatraro 2010), especially in knowledge-intensive industries (Bishop and Gripiaos 2010; Hartog et al. 2012).

The question of new industry formation is associated with the concept of related variety. Frenken and Boschma (2007) depicted local industry formation as a branching process in which the local presence of industries that are related to a new industry increases the probability for a new industry to occur, given that related industries provide the main source for knowledge, capabilities and potential entrepreneurs (Klepper 2007). The more related the variety of industries is vis-à-vis the new industry, the more likely a region can be successful in that new industry. Hence, the existing set of industries conditions the likelihood of new industries emerging, and in that sense, there exists ‘regional path dependence’ (Iammarino 2005; Martin and Sunley 2006; Fornahl and Guenther 2010).

Empirically, the branching phenomenon has been analyzed at the level of countries by Hidalgo et al. (2007) who demonstrated that countries tend to develop new export products that are related in ‘product space’ with existing export products. The product space specifies the relatedness between products based on the frequency of co-occurrence of products in countries’ portfolios. The same reasoning has been applied to understand the development of regions becoming active in new markets. Neffke et al. (2011) found that an industry had a higher probability of entering a region when technologically related to pre-existing industries in that region. Studies have confirmed relatedness driving regional diversification in new industries (Boschma et al. 2013; Essletzbichler 2015), new technologies (Kogler et al. 2013; Rigby 2013) and new eco-technologies (Tanner 2014; van den Berge and Weterings 2014).

What these studies tend to show is that related diversification in regions is the rule and unrelated diversification the exception. That unrelated diversification is a more rare event does not come as a surprise, as it recombines previously unrelated domains which is more uncertain and risky. It is a crucial question whether regions can keep relying on related diversification to sustain long-term development, or whether they need to diversify in unrelated activities now and then. Studies have started investigating the conditions that make regions more likely to diversify into unrelated activities. Castaldi et al (2015) found that unrelated variety is associated with high rates of breakthrough innovations in U.S. states. In the rare cases that recombination innovations between unrelated technologies or services succeed, they become related (Desrochers and Leppälä, 2011). Such a radical new combination not only opens up complete new markets and innovation opportunities, it might also provide the basis for long-lasting competitive advantage, as other regions will face difficulties in copying with such radical change. A similar issue is analyzed in the expanding literature on new growth paths (Garud et al. 2010) in which new path creation is defined as the emergence of entirely new sectors or products, while path renewal occurs when local activities switch to different but related activities (Isaksen and Trippl 2014). To break with path dependence and create new growth paths, regions will have to rely more on knowledge and resources residing in other regions. Hence, the presence of multinationals, the immigration of entrepreneurs and a targeted government policy, are all elements that come into play in explaining new path creation (Binz et al. 2012; Dawley 2014; Neffke et al. 2015).

In sum, the contributions of EEG on regional development so far are: (i) related variety is a key concept in EEG that has shed new light on the MAR versus Jacobs' externalities debate: there is emerging evidence of positive externalities stemming from the co-presence of firms in related industries; (ii) EEG has shed light on how regions diversify over time. Regional development is depicted as a branching phenomenon in which new recombinations stem from related activities that share similar knowledge and skills, and in which local capabilities in existing industries or technologies conditions the set of industries and technologies that are more likely to emerge; (ii) unrelated diversification, recombining previously unrelated fields, is expected to be a more rare event, and tends to rely more on the inflow of resources and capabilities from other regions.

5. Institutions and EEG

A recurrent critique to evolutionary scholars in economic geography has been the perceived neglect of the role of institutions in firm behavior and economic development processes (MacKinnon et al. 2009). This critique is understandable given that many empirical studies in EEG did not pay explicit attention to the institutional contexts in which economic processes take place, or "bracketed" such processes in dummy variables or "fixed effects".

However, this relative empirical neglect says little about the theoretical possibilities to integrate institutional analysis into the EEG framework. EEG has engaged at length with the question how institutional and evolutionary approaches can be combined (see e.g. Boschma and Lambooy 1999; Boschma 2004; Boschma and Frenken 2009; Martin 2010). Institutions provide incentives but may also form obstacles that make the development of some industries and organizational practices in some places more feasible (Malmberg and Maskell 2010). Institutions are depicted as co-evolving with new technologies and markets which is deemed crucial for the development of new industries (Nelson 1994). The chances for new industry formation in a region depend on the timing and direction in which institutions are adapted in a way that supports the industry's further development (Murmann 2003). This requires more understanding of the conditions that favor or hamper institutional change in regions. In an attempt to come to a theory of institutional change and new industry formation, Battilana et al. (2009) argued that conditions supportive of institutional change are a common sense of urgency (e.g., due to a crisis), institutional contradictions and discontent (e.g., as new industries challenge existing categorizations), and a low degree of past institutionalization. These conditions may have a strong regional dimension, suggesting that regions are not all equally likely to engage in effective institutional change.

EEG has also made progress in taking up explicitly the role of institutions in recent empirical work. There is an increasing attention for how local agents (private and public) engage in collective action to mobilize knowledge, resources and public opinion as to create new or adapt existing institutions, how vested interests may be circumvented, and the key role that both regional and national governments can play in regional economic development (Feldman et al.

2005; Strambach 2010; Sotarauta and Pulkkinen 2011; Binz et al. 2013). In quantitative studies, the role of institutions has been highlighted as well. In their study on the local entry dynamics of fashion designers across the world, Wenting and Frenken (2011) could show that the institutional environment in Paris blocked the starting up of new firms in commercial design due to strict regulations in Paris' design profession, while designers in other cities did not experience such obstacles. A recent study by Boschma and Capone (2015), building on the literature on Varieties of Capitalism (Hall and Soskice 2001) found that institutions associated with 'liberal market economies' give countries considerably more freedom to diversify in more unrelated activities than institutions associated with 'coordinated market economies', thus shedding light on different development logics channelled by national institutional environments.

An issue that has remained little elaborated is how the concept of innovation system can be integrated in EEG. The Regional Innovation System (RIS) literature has explained the clustering of innovative activities by focusing on the nature of relationships between organizations such as firms, governments, universities and NGOs that are involved in the innovation process at the sub-national level (Cooke 1992; Asheim and Isaksen 1997). Having strong evolutionary roots (Freeman 1987), this approach has drawn attention to the importance of localized capabilities for the production and transmission of tacit knowledge (Asheim and Gertler 2005). Given the path-dependent nature of building up localized capabilities, as embodied in local knowledge bases and institutions, it is hard for regions to imitate 'constructed regional advantages' from successful regions (Asheim et al. 2011). Recently, scholars have expressed a need to go beyond a static approach that maps actors and institutions in a RIS, and to concentrate more on how RIS change in response to globalization, technological change and societal challenges. This necessitates an understanding of how changes in RIS are initiated and implemented by agents, how changes in institutions are activated, and how relations at multiple spatial scales are constructed, managed and utilized. Similarly, EEG has still to engage with the literature of Technological Innovation Systems (TIS) (Hekkert et al. 2007; Bergek et al. 2008; Markard and Truffer 2008). TIS studies focus on how countries build up knowledge and institutions required to innovate in new technologies. Recently, there is more attention to the global dynamics that underlie the early formation of new TIS (Binz et al. 2013; Binz et al. 2014). To what extent extant capabilities and institutions in related industries as well as extant networks and global value chains shape new technological systems, remains an open question. Indeed, the understanding of where new technologies emerge requires not only insight in the local mechanisms of capability transfer from related technologies to emerging ones, but also into the organization of knowledge production and regulatory processes at the national and international level (Morrison and Cusmano 2015).

In short, EEG has a particular take on the role of institutions: (i) the influence of (local) institutions is contingent given the existence and persistence of heterogeneity of firms in the same institutional context; (ii) institutions have an effect on the intensity and nature of interactions between agents in IS, and therefore affect the process of regional diversification; (iii) new industry formation is depicted as co-evolving with the establishment of new institutions or the adaptation of existing ones; (iv) local agents engage in collective action to create new or adapt existing institutions, and challenge vested interests that may oppose such change; (v) regions may differ in their ability to induce required institutional change; (vi) there is still little understanding of what conditions at various spatial scales support or hamper institutional change.

6. Final remarks

This chapter has given a brief outline of recent theoretical and empirical contributions of EEG with respect to clustering, networking, urban and regional development, and the role of institutions. Give the limited space available, this outline has been partial at best. Studies in EEG have provided new but often still preliminary answers to old enduring questions in economic geography, but also bring up new questions and problems not yet explored. Although advancing, the empirical literature on EEG is work in progress. This also applies to the development of its main concepts like path dependence (Martin 2010), life-cycle (Martin and Sunley 2011), development (Martin and Sunley 2015), institutions (MacKinnon et al. 2009), and the use of appropriate methodologies that do justice to evolutionary principles (Hassink et al. 2014).

Recently, EEG is moving into topics like resilience (Simmie and Martin 2010; Boschma 2015b), the geography of transition (Truffer and Coenen 2012; Patchell and Hayter 2013), and public policy and governance, for example, in the context of the smart specialization debate (McCann and Ortega-Argiles 2013; Foray 2015). An EEG approach on resilience aims to leave behind an equilibrium perspective that is primarily interested in a recovery to pre-existing or new equilibrium states, and proposes an evolutionary perspective instead, in which regional resilience is redefined and analyzed in terms of the impact of shocks on the capacity of regions to develop new growth paths (Boschma 2015b). The newly emerging literature of the geography of transition (Truffer and Coenen 2012) is also promising, as it provides a comprehensive view on niche formation and the role of collective agents which have not yet been fully developed in EEG. In turn, EEG provides concepts like regional branching that seem to be promising to describe how regions move into new green technologies, and why some regions are more successful in doing so (Tanner 2014; van den Berge and Weterings 2014). The smart specialization literature explores how the entrepreneurial discovery process can be organized and governed to make regions move in new specializations. To the main adherents of smart specialization strategies, related variety and regional branching are regarded as key building blocks of smart specialization policies (McCann and Ortega-Argiles 2013; Foray 2015). Without doubt, this future work on smart specialization will boost the further development of regional innovation policy in an EEG framework which is far from fully developed (Coenen et al. 2015).

The continuing debates and emerging topics bear testimony to the fact that EEG is alive and evolving, and has yet to develop into a more refined and comprehensive approach.

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