

Innovation without regional development? The complex interplay of innovation, institutions and development

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Key words: Less developed regions; Innovation; Productivity; Organisational capabilities; Institutions; Regional Development

JEL codes: O31; O43; P48; R11

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Abstract

This paper argues that the development of regional innovation concepts drawing primarily on the experiences of advanced regions, has meant that the dominant narratives about regional development are not adequate to explain the experiences of less developed regions (LDRs). Drawing on the extensive experience of the authors doing research in LDRs, the paper develops three main arguments: first, the emphasis put on networks and systems means that not enough attention is paid to the internal capabilities of organisations, including those of

firms, Universities and the public sector. These capabilities shape the strategies of these organisations regarding innovation and collaboration, and therefore influence the nature and content of innovation systems. Second, the paper argues that too much attention has been paid to the importance of informal institutions, rather than analysing the dynamic interaction between formal and informal institutions. The latter approach allows us to avoid culturally deterministic interpretations of under-development and to think about ways in which formal policies could help to improve innovation environments. Third, the paper argues that innovation at the firm level does not always lead to improvement in productivity and economic growth at the aggregate scale. This is partly due to the effects of the dynamics discussed in the two previous points, but is also because advanced regions benefit from a socio-economic ecosystem which supports the translation of new ideas into economic activity. This means that though innovation is fundamental for long-term economic growth, it is not sufficient without mechanisms that ensure its dissemination through the entirety of the economic system.

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1. Introduction

Over the past couple of decades regional development theories have become dominated by the notion that innovation is the most important factor explaining territorial inequalities (Pike et al 2016). In economic geography this idea took root due to the emergence of new regionalism, which tends to explain uneven development primarily on the basis of endogenous regional characteristics (Moulaert and Sekia 2003). From this perspective, the level of development of a territory is explained by the capability of the regional agents to

innovate and to create conditions for the embedding of foreign investment, especially in unique or complex economic activities (Coe and Yeung 2019). This tendency has also shaped regional development policy, where instruments aimed at improving innovation in firms have become ever more dominant (Foray et al 2017, Hassink and Marques 2015).

Although this framework is useful in understanding the performance of growing regions, we argue that it does not provide adequate theoretical tools to understand regions where GDP and productivity growth has stagnated or has been declining. Furthermore, we argue that the emphasis given in these models to the factors which explain growth in the most advanced regions has epistemic consequences, since only those elements identified as having a positive economic effect are studied, while those that may have negative effects are ignored. As such, rather than adapting the concepts to capture the characteristics of LDRs (Tödtling and Trippel 2005), we argue that it is necessary to modify them in significant ways.

In more practical terms our critique is based on revising three main aspects within these models. First, we discuss the excessive emphasis afforded to system analysis to the detriment of research on the *capabilities* of the organisations which compose the system (Bell 2009, Radošević 2018, Radošević et al 2017). These capabilities affect the logic, nature and content of regional networks, with an impact on innovation performance (Rabellotti and Schmitz 1999, Marques 2017). Second, we argue that there is an excessive focus on *informal* institutions, rather than on the dynamic interaction between formal and informal rules (Farole et al 2011). Third, we argue that due to the interaction between the first two dimensions, *innovation* at the firm level does not always translate into *development* at the regional level (Fratesi 2017).

Section 2 introduces the state-of-the-art in concepts of regional innovation. Sections 3-5 explore each of the three aspects identified above, while section 6 summarises our main

arguments and identifies some gaps that would merit further research. Though this is a theoretical contribution, the paper builds on the experience of the authors doing research in LDRs and is therefore informed by a significant amount of empirical work.

2. Regional Innovation Systems: state-of-the-art

The concept of innovation systems argued that the interactions between a variety of organisations within a country, and the institutional framing of these interactions, influenced innovation dynamics and economic outcomes (Freeman 1987, Lundvall 2010). One of the most important contributions made by these authors was the notion that innovation is a non-linear, systemic activity, involving multiple feedback loops among a wide range of agents. Later, researchers working from a territorial perspective observed that even when organisations and institutions are generated, managed or funded at the national level, innovation dynamics and outputs are not equally distributed through space (Cooke and Morgan 1998, Morgan 1997). It was argued that in some territories the physical proximity between private firms, universities (and or research centres), and myriad other supporting institutions facilitated the emergence of unique local dynamics that supported the generation and dissemination of knowledge externalities. Case studies of successful regions (Saxenian 1994), together with quantitative analysis (Rodríguez-Pose and Crescenzi 2008), suggested that it was the characteristics of the system that distinguished the most successful regions, by making the whole greater than the sum of its parts.

The findings on the localised nature of innovation systems were informed by a variety of concepts and approaches, dating back to the literature on industrial districts (which in turn draws on the work of Marshall in the 19th century), and were summarised by Moulaert and Sekia (2003) as territorial innovation systems. Out of these, the concept of regional innovation systems (RIS) has been one of the most influential and one that is still common

currency in research and policy (Doloreux and Gomez 2017, Isaksen et al 2018). It is based on a stylised distinction between two sub-systems: one which generates knowledge and one which exploits knowledge. The system is framed by an institutional setting, which includes cultural and social dynamics that may hinder or encourage innovation dynamics. Some authors also emphasise the role of public entities, such as regional development or innovation agencies, that can provide support to the organisations in both sub-systems (Tödting and Tripl 2005).

The concept of RIS, and similar approaches, has been critiqued and improved over the past decade on a variety of fronts (Isaksen et al 2018). The debate that is most relevant to this paper is the one which reflects on its applicability to less developed regions (LDRs). We are particularly concerned with those regions that are economically poorer relative to the national or international averages, rather than with regions that are wealthy (when measured in terms of GDP per capita) but have less developed innovation systems. The latter situation is common for instance in the periphery of European Nordic countries, or in resource-region regions (Isaksen and Karlsen 2013). We are also particularly focusing on European LDRs, particularly in Southern Europe and Central and Eastern European countries, though some of our arguments would also be useful for regions in North American or in other developed nations.

The seminal paper by Tödting and Tripl (2005) was one of the first to highlight the distinctive characteristics of innovation systems in LDRs, by arguing that peripheral, old industrial and metropolitan regions exhibit different type of RIS deficiencies. More recently, Tripl et al (2016) updated this categorisation to argue that regions can be classified according to how they perform in two dimensions: organisational thickness/thinness and institutional thickness/thinness. The former refers to the presence (or absence) of

organisations (public, private, research and third sector) that can generate critical mass. The latter to the existence of formal and informal institutions that can sustain innovation dynamics and knowledge externalities. These contributions, and others (e.g. Rodríguez-Pose and Fitjar 2013), have been fundamental to improve our understanding of innovation dynamics in LDRs, and to demonstrate that it is necessary to study the specific characteristics of LDRs, rather than merely contrasting them with the experiences of more advanced places. However this paper argues that there are three fundamental elements that have not yet been adequately addressed by this literature and we discuss each in turn.

3. The nodes in the system

As the paper by Trippel et al (2016) cited in the previous section indicates, the RIS concept is still fundamentally concerned with the quantity of organisations that are present in the region, and the links between them (Trippel et al, 2016). However, we argue that the most important dimension is *quality* not quantity, particularly in terms of the internal capabilities of firms (Bell 2009, Cimoli et al 2009), of Universities (Bonaccorsi 2017), and the *quality* of the institutional context (Rodríguez-Pose and Di Cataldo 2015). These phenomena cannot be explained by looking only at thickness or thinness of the systems. This is of course not a denial that systems matter, but rather that the nature and content of the system is shaped by the characteristics and strategic intent of the organisations that create and maintain it, and the institutional environment that frames their actions (Giuliani 2007, Marques 2017).

As a way to understand the importance of organisational capabilities for development outcomes, it is useful to draw on the literature on the development of East Asian countries. According to various authors, the key challenge for firms in East Asia was not only the creation of specific technical competencies, or even to improve their absorptive capacity, but rather the development of wider organisational capabilities which allow them to perform,

plan and implement ever more complex tasks (Amsden 2001, Bell 2009, Wade 2003).

According to Amsden (2001) these capabilities can be divided into productive, investment and innovation capabilities, which refer to different degrees of complexity. Productive capabilities exist when a firm can optimise established facilities and technologies. Investment capabilities involve the capacity to impart skills, to decide on multiple investment opportunities and to plan further investments, normally involving an expansion of current facilities. Innovation capabilities require the skills that allow organisations to create new products or processes. Therefore, the latter are the most advanced type and the ones that are usually found in highly dynamic, innovative firms.

There are several indicators suggesting that firms located in European LDRs tend to have primarily productive or investment capabilities, such as a recent evaluation of regional innovation performance by Camagni and Capello (2010) and Capello and Lenzi (2015, 2017). Drawing on a wide range of indicators, the authors divided European regions into five macro-areas: an European science based area, an applied science area, a smart technological application area, a smart and creative diversification area, and an imitative innovation area. Most peripheral regions of Southern Europe (SE) and Central and Eastern Europe (CEE) fall into the last two categories. Those that belong to the smart and creative diversification group are characterised by limited application of local knowledge and high levels of tacit knowledge and skills embodied in human capital. In turn, imitative innovation regions, primarily located in CEE countries, are characterised by the capacity to attract foreign direct investment and limited local knowledge.

The goal of this taxonomy was to demonstrate that innovation potential exists in LDRs, even if its nature is different to the potential in more advanced territories. In this sense, it echoes the arguments made for example by authors working on knowledge bases (Asheim et al 2011,

Marques 2018), who have also tried to demonstrate how competitiveness can be built on different types of knowledge and innovation activities. Nonetheless, it also has another implication: though there is recognisable innovative potential everywhere, firms in those regions with the lowest innovation performance are more likely to have limited *organisational* capabilities. This means that if these regions were to upgrade their economic specialisation, it would not be sufficient to improve the functioning of their innovation systems, or the quality of supporting institutions, but firms themselves would have to be capable of developing internal competencies that would allow them to perform more complex tasks (Dosi et al 2008). A similar argument was developed by Radosevic (2018), based on the observation that innovation in European LDRs is primarily about the acquisition of new machinery, rather than R&D.

Another important implication is that though one can indeed identify innovation potential everywhere, this does not mean that all innovation activities lead to the same economic (or even social, if one considers job creation and the quality of employment, for instance) outputs (Fonseca and Fratesi 2017). It is commonly accepted that process and organizational innovations, as much as product innovation, are fundamental for increased competitiveness (OECD/Eurostat 2018). Furthermore, incremental innovations, alongside radical ones, are fundamental in the dissemination of new technologies, which is known to be an essential step in their life cycle and allows for their full potential to be absorbed into the economy (Lipsey et al 2005). However, a regional economy which primarily generates process or organisational innovations, and where its firms lack the capabilities for product innovation that can generate new specialisations, may experience difficulties in generating economic and employment growth in the long term (Fonseca and Fratesi 2017). This is a topic to which we return.

Furthermore, not only are firms in LDRs characterised by having organisational capabilities of a lower level of complexity, but the highest capabilities are also concentrated in a smaller number of firms, when compared to more advanced regions. This empirical fact has been evidenced by various case studies, in both developed and less developed countries. Though there are differences between both settings, the overall conclusions are similar: economic sectors in peripheral regions tend to host a small core of technologically advanced firms, capable of participating in competitive global value chains and of sourcing knowledge in other locations, when it is not available within the region (Lorentzen 2007, Marques 2017, Murphy 2003, Murphy and Schindler 2011). ‘Behind’ these firms, lie a small but significant number of organisations with catching-up trajectories, followed by a long-tail of low productivity, low competitiveness firms (Marques 2017).

Lundvall (2007), talking specifically about the context of developing countries, distinguishes between firms that are pioneers, the early adopters and the late adopters of new technology, and argues that the distance between these three groups is more significant in less developed contexts. Importantly, the author stresses that “for economic performance of the overall national economy the capacity of late-comers to absorb and use new technology may be as important as the capacity of pioneer firms and early followers and users.” (Lundvall 2007: 103). This is because even if a small number of firms is technologically advanced, aggregate productivity will only improve if productivity increases in all firms, especially those that lag the most.

In terms of quantitative analyses, data on firm-level productivity gaps are not easily obtainable, mostly due to privacy concerns. Nonetheless, a recent project by the OECD has concluded that there are significant differences in labour productivity and multi-factor productivity for top and bottom-performing firms in 10 selected countries (Berlingieri et al

2017). In their own words, “in 2011, on average across countries, firms in the top decile of the distribution can produce more than six times as much value added per worker as firms in the bottom decile of the same country’s manufacturing sector, and nine times in services.” (Berlingieri et al 2017, pp. 27). Though the authors did not correlate these data with GDP, they did find that the highest heterogeneity was found in Chile, Indonesia and Hungary.

In turn, Aiello and Ricotta (2016) analysed productivity heterogeneity across 7 European countries, and find that in the model which contains only firm characteristics and regional characteristics, the former are responsible for 85% of total factor productivity (TFP) variance, and regional characteristics for 15%. When they add a national dummy to the model, regions account for only 5% of variability. This does not mean that regional differences are not relevant since for instance in Spain, which exhibits significant inter-regional disparities in this indicator, regional characteristics account for 9% of variation (Aiello and Ricotta 2016). Though these results are not easily triangulated with our analysis, partly because they are designed to answer a different set of questions, they do show that productivity heterogeneity at the firm level is to a great extent caused by the characteristics of the firms themselves, rather than regional features.

There are several consequences to regional innovation in LDRs from the combination of lower levels of organisational capability and high capability gaps between firms. The first is the fragmentation of formal networks. Contrary to what is observed in more advanced territories, informal networks, which may extend to all co-located firms through personal and family connections, are not necessarily leveraged for formal collaboration (Giuliani 2007, Rabellotti and Schmitz 1999). Formal networks tend instead to be closed to a small group of trusted collaborators (Giuliani 2007, Marques 2017). This is partly the result of perceived differences in organisational capabilities, a perception which is particularly relevant for the

firms with the highest capabilities, since it limits the number of local partners which they consider as viable to enter formal technological development networks. The literature on trust refers to this selection bias by pointing out that cognitive cues and expectations are important both for the formation of ties and for their endurance (Grillitsch and Nilsson 2019). Due to limited options locally, the most advanced firms will also tend to establish links with organisations located elsewhere in the country or internationally, both through value chains and as collaborators in technological or other projects (Lorentzen 2007, Marques 2017, Murphy 2012, Murphy and Schindler 2011).

This lack of overlap between formal and informal networks is important, because though informal networks can be useful in disseminating some types of information, they do not facilitate the type of interactive learning between firms which allows them to share more advanced knowledge (Lundvall 2010), and in particular the type of tacit knowledge which is essential to develop more complex organisational capabilities (Cimoli et al 2009). This network fragmentation helps to explain why higher capabilities tend to remain concentrated in a small number of firms and do not disseminate more widely. The separation between formal and informal networks is also relevant from the perspective of value chain management at the local level. Value chains have distinct governance modes (Pietrobelli and Rabellotti 2011), whether they are governed by multinational corporations or by domestic firms. In a context of network closure and fragmentation it is more likely that lead firms, even when they are locally-owned organisations subcontracting locally, will manage their value chains through arms-length relationships, thereby limiting opportunities for interactive learning and for the dissemination of complex knowledge (Cimoli et al 2009, Marques 2019, Pietrobelli and Rabellotti 2011).

But the RIS concept is not confined to firms. Though we will not develop these points extensively in this paper, it is necessary to recognise the contribution of higher education institutions and the public sector to the development of innovation capabilities and the characteristics of innovation systems. Equally within these organisations there are usually capability shortcomings in LDRs. As demonstrated by Bonaccorsi (2017), universities in less developed European regions tend to generate lower quality research, when compared to their counterparts in advanced regions. Additionally, when universities in LDRs have high quality departments, they are usually in scientific or technological areas which are not relevant for local economic structures, which further undermines their potential contribution to regional development. These disconnections are furthermore enhanced by the frailties of the innovation eco-system in these contexts, which includes the lack of supporting institutions that can fund the various stages of scientific and technological development, and the financial instruments necessary to finance start-ups and high-risk economic ventures (Huggins and Kitagawa 2012; Marques et al 2019).

In relation to the public sector, recent indexes have shown that there is significant variation in subnational institutional quality across Europe (Charron et al 2018). Using these data, various authors have been able to demonstrate that the sub-national quality of governance has an impact on innovation (measured as patent outputs) (Rodríguez-Pose and Di Cataldo 2015), returns on infrastructure investment (Rodríguez-Pose and Garcilazo 2015) or even the inclusiveness of job growth (Di Cataldo and Rodríguez-Pose 2017). Additionally, a different strand of literature has demonstrated how formal institutions and political processes have a significant impact on the inclusiveness of development (Hickey et al 2014). In turn, this inclusiveness is key to the development of innovation potential, because it means that the highest possible number of people will have access to quality public services, including education and other skills that are essential for the creation of innovation capabilities.

What then are the consequences of identifying weaknesses at the organisational levels (for firms, universities and the public sector) rather than focusing on the system? It is true that in a system the whole is greater than the sum of its parts, and therefore the dynamics that it generates cannot be reduced to the individual characteristics of the organisations that it includes. Nonetheless, the nature and contents of a system cannot be separated from the strategic intent of the organisations that create it and maintain it (Rabellotti and Schmitz 1999). Innovation systems can be used, for instance, to reinforce the power of multinational corporations over their suppliers, or to co-opt universities and other public agencies to support R&D efforts that would otherwise be supported by private entities (Rabellotti and Schmitz 1999, Christopherson and Clark 2007). Even without the presence of large firms, such systems can be highly heterogeneous and dominated by the local firms (or other organisations) with the highest capabilities (Giuliani 2007, Marques 2017). At the extreme, strong local systems, involving thick public-private relationships, can be the bedrock of corrupt or even criminal practices that undermine innovation dynamics and investment practices, not to mention their overall implications for the quality of life of citizens (Farole et al 2011).

4. Dynamic relationship between formal and informal institutions

The second fundamental element that has not been adequately discussed in the regional innovation literature, is the dynamic interaction between formal and informal institutions. RIS research tends to prioritise the study of informal institutions which facilitate the exchange of knowledge. Among others, they refer to the importance of openness to new ideas, an innovation or entrepreneurial culture and, crucially, of interpersonal trust (Moulaert and Sekia 2003). The latter is particularly important because it is seen as the lubricant for social relationships, both formal and informal. We would argue that informal institutions are

given predominance in the RIS concept primarily for three reasons. Firstly, research has indicated that they vary within territories that share the same formal institutions, with significant impacts on innovation outputs (Crescenzi et al 2013, Helliwell and Putnam 1995). This would suggest that informal institutions are indeed the decisive factor in explaining territorial disparities, since they are the changing variable, at least within national contexts, where formal institutions are (in theory and depending on degrees of decentralisation) the same for the whole territory. Secondly, formal institutions are often determined at the national level, albeit with important contributions by subnational levels of government, especially in federal countries such as the USA or Germany. Since the RIS concept tends to be concerned with smaller territorial units it would make sense to focus on informal institutions, which are more likely to be determined by community dynamics (Farole et al 2011) that do not necessarily correspond to administrative units with legal, administrative or financial autonomy.

Thirdly, the bias towards core-centric theoretical models that privilege the experiences of advanced regions in more developed countries. Because these regions are located in national contexts where formal institutions function reasonably well, the concepts do not question their contribution to the emergence of informal settings, because the failures of formal institutions are not as evident. In contrast, in countries where formal institutions are performing worse, their negative impact on innovation dynamics can be made more visible and therefore could lead to different types of research questions.

Echoing other research (Farole et al 2011), we argue that the interaction between formal and informal institutions is important to explain why there are significant subnational variations in the quality of governance. These variations are important, even if national factors explain a significant part of the differences in quality of governance within Europe (Charron 2018).

The key to understanding this interaction is the distinction between *de jure* and *de facto* institutions. The first refers to institutions as they are written in law and the second to how they are applied in practice. According to Farole et al (2011) this can be explained by the interaction between societal rules and community dynamics. Societal rules are, at least in theory, the same for a whole territory, whereas the latter can materialise at the local (or regional) level. As the authors argue, a community is not necessarily local, though in this paper we are primarily concerned with those that are. Community dynamics shape how formal institutions are interpreted and applied, and thereby influence the provision of public services. This can happen for instance through nepotism, which ensures that public jobs or policy instruments are distributed according to family and personal connections and which is likely to have an impact on the quality of public services and their overall impact.

One way to understand why this is relevant in the context of RIS is by re-examining the concept of interpersonal trust. Research on the impact of trust on territorial innovation tends to focus on the enabling factors which sustain high-trust communities (Cooke et al 2004, Grillitsch and Nilsson 2019). In these contexts, repeated positive interactions create further reinforcements and generate a virtuous circle. However, a mostly ignored dimension from the theoretical literature on trust is the dynamic interaction between enabling factors and coercion (Grillitsch and Nilsson 2019). This interaction means that trust relationships are sustained not only by positive previous experiences but also by the knowledge that any opportunistic behaviour can be quickly punished. When this coercive aspect is acknowledged, it is usually in the context of informal rule-enforcement, with the assumption being that a break in trust leads to an agent being shunned by the community. But this of course implies the previous existence of high levels of trust, which would mean that individuals quickly share information about any wrongdoing. In contrast, opportunistic behaviour in low trust environments does not get reported, and there are therefore no informal mechanisms to deal

with it (Marques 2017). It is precisely in these contexts that formal institutions, particularly the justice system, would be necessary to ensure the application of basic rules and standards of behaviour (Farole et al 2011).

The existence of a dynamic relationship between interpersonal trust and well-functioning formal institutions is shown by the strong positive correlation between trust in others (interpersonal trust) and trust in various formal institutions, both at the individual and the country level (Tables 1 and 2). The analysis in both tables does not assume causality. It is merely indicative of how both sets of perceptions are closely linked, which according to our argument is justified by some of the contributions to the study of interpersonal trust. It is true that as argued by Farole et al (2011), informal mechanisms to control opportunistic behaviour are faster and as such more efficient at enforcing high trust levels. In contrast, formal mechanisms tend to be slower and are far more resource intensive. Nevertheless, in a situation where the former are not functioning properly, the latter might be the only solution to break a negative lock-in in matters of interpersonal trust. We are not suggesting that there is a linear or direct relationship between formal and informal institutions or that trust can be legislated. Rather, we are arguing that it is possible to create a formal institutional environment that is more conducive to the emergence of trust-based relationships, and since formal institutions are the only ones that can be changed by public policy, they should be the priority for policymakers.

Table 1 – Correlation between interpersonal trust and trust in several formal institutions at the individual level

		Trust in country's parliament	Trust in the legal system	Trust in the police	Trust in politicians	Trust in political parties
Interpersonal trust	Correlation coefficient	,380**	,376**	,307**	,369**	,366**

	Sig. (bilateral)	0,000	0,000	0,000	0,000	0,000
	N	35064	35237	35655	35208	35099

Data source: ESS Round 9: European Social Survey Round 9 Data (2018)

Table 2 - Correlation between interpersonal trust and trust in several formal institutions at the country level

		Trust in country's parliament	Trust in the legal system	Trust in the police	Trust in politicians	Trust in political parties
Interpersonal trust	Correlation coefficient	,863**	,949**	,868**	,883**	,868**
	Sig. (bilateral)	0,000	0,000	0,000	0,000	0,000
	N	19	19	19	19	19

Data source: ESS Round 9: European Social Survey Round 9 Data (2018)

Another interesting example of the dynamic relationship between formal and informal institutions are the practices in human resource hiring for universities, and in particular the tendency in some contexts for what is sometimes called ‘endogamic hiring’ or inbreeding (Altbach et al 2015). This practice refers to the hiring by universities of their own graduates, and it ranges from the promotion and mentoring of students that are identified as talented, to outright nepotism. This topic is relevant in this context due to the importance of universities for innovation systems and because the processes which regulate hiring are likely to influence academic loyalties (for instance, to hierarchical superiors rather than to disciplinary standards or policy goals), knowledge diversity and openness to external ideas (Altbach et al 2015). This in turn affects the willingness and desire of academics to engage with external partners and to be an active part of a regional innovation system.

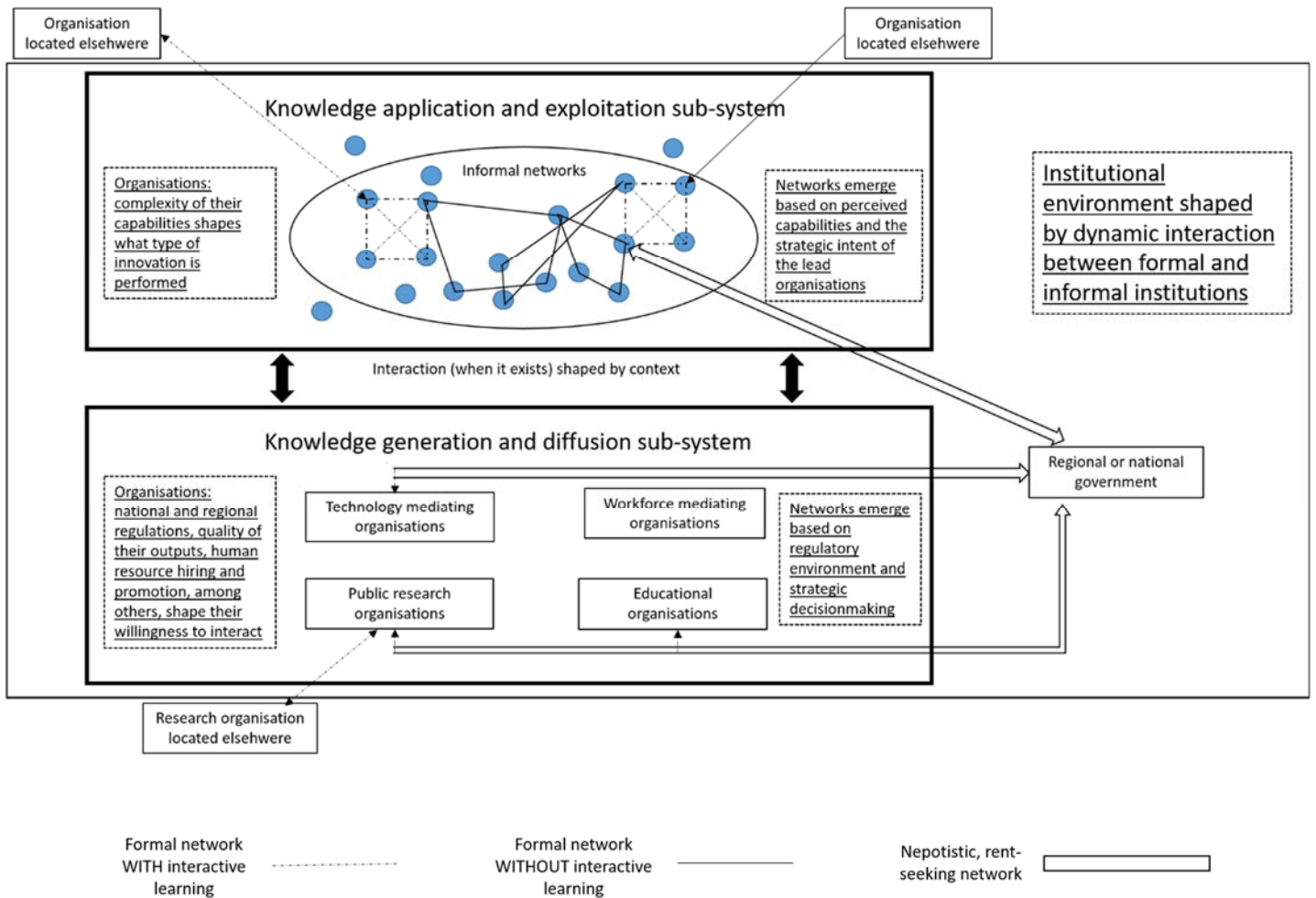
The influence of ‘endogamic hiring’ on university culture is strong and resistant to change (Vaira 2017, Triossi and Romero-Medina 2006). Even when new reforms are introduced by

central governments, the system can adapt and simply shift its practices to maintain similar practices, as demonstrated for the cases of Italy and Spain (Vaira 2017, Triossi and Romero-Medina 2006). Nevertheless, formal changes do open up opportunities for new practices. Analysing the case of Italy, Grilli and Allesina (2017) find that after the introduction of a law in 2010 “preventing departments from hiring relatives of their faculty” (Grilli and Allesina 2017, pp. 7603), nepotism fell in Italian universities. Of course this covers only one aspect of ‘endogamic hiring’, and it does not show that other forms of ‘inbreeding’ have been eliminated. Similarly, in Spain, Pascual-Fuster (2019) demonstrated that when a university department banned the hiring of its own graduates, its recruitment shifted radically. According to this analysis, new recruits are more productive in terms of research outputs, with similar levels of teaching quality. Though this was a decision made at the university level, it was encouraged by formal reforms at the national level and it had an impact on the culture of the university (Pascual-Fuster, 2019).

What both examples show is that legal reforms are not a guarantee that informal cultures change and adapt in the direction intended by the legislators, but that they can nevertheless have some positive incremental effects and even induce behavioural change. Recent research appears to corroborate these claims, by arguing that relative improvements in the quality of government can generate significant dividends in terms of economic growth, even if the region has overall lower quality of governance (Rodríguez-Pose and Ketterer 2019). More importantly, paying attention to the dynamic interaction of formal and informal institutions allow us to avoid culturally deterministic interpretations of innovation performance, which feeds the assumption that some countries or regions are doomed to perform poorly in these matters.

So far this paper has discussed how the characteristics of organisations within a territorial innovation system should receive more attention, and how their shortcomings constrain innovation dynamics in LDRs. The paper has also argued that the institutional dimension of RIS is only partially understood due to the emphasis on informal institutions. These sympathetic critiques are not meant to advocate for the creation of new concepts, but rather to build on existing ones. Taking the standard RIS concept as a guide, they would expand it in significant ways. Figure 1 summarises some of the points made above by providing an example of an idealised RIS. First, it shows that within both sub-systems one must account for the characteristics of the organisations and how they shape the networks which emerge. Second, within the knowledge exploitation sub-system, Figure 1 illustrates the different type of networks that can co-exist with and without overlapping. In this example, there are comprehensive informal networks covering almost all firms (blue circles). Within them, there are several formal networks restricted to a small number of firms, and only some providing opportunities for collaboration and interactive learning. Firms also have relationships with organisations located elsewhere, and these can also be distinguished between those with and without interactive learning.

Figure 1 – Updated regional innovation system model which includes multiple type of possible relationships based on organisational capabilities and types of network



Adapted from: Tödting and Trippel (2005)

Within the knowledge generation sub-system, we mostly emphasise the different types of network with external partners. The authors do not assume the existence of formal collaborative relationships, such as triple-helix interactions, and suggest that these are in fact dependent on various internal (to the organisation) and external factors. We also account for the fact that some of the interactions within the system, and to actors outside the system, may have very little to do with knowledge generation and diffusion and are instead nepotistic and/or rent-seeking (these types of relationships also exist between firms and public policy

organisations). This figure is not intended to be comprehensive, but is merely an illustration of the points raised previously in the paper.

5. Innovation and regional development

Building on these two arguments we now pose a more fundamental question: does innovation necessarily lead to regional development, or do specific regional conditions have to be in place for that to happen? According to the literature there are a number of mechanisms through which innovation within a RIS generates regional development. On an aggregate level, one the most often discussed is the mechanism through which firms become more competitive due to knowledge externalities. This is an argument which runs from Alfred Marshall's industrial district remarks to the variants that have emerged since then. The core argument is that due to the existence of formal or informal networks between co-located firms (and other organisations), investments in knowledge and innovation in one organisation spills over to competitors creating mutually reinforcing systemic effects. (Moulaert and Sekia 2003, Storper 1997). These effects lead to an overall higher degree of competitiveness, which in turn allows a local sector and its value chain to grow and to generate jobs (Saxenian 1994).

This mechanism however depends on the manifestation of a set of conditions. One of these conditions is that networks have to be relatively open and inclusive, which as we have seen, is not always the case in LDRs. If there is network fragmentation, this prevents the emergence of system-wide knowledge externalities. Another condition is that the economic specialisation in the region has to be emergent, particularly if it can generate new products and services with high value-added. This means that it is either a sector of activity which did not exist previously, in the region or worldwide, and therefore has the potential to grow and attract investment; or that it uses an emergent technology, with the potential to generate new specialisations and sectors of activity (Binz and Truffer 2016, Fornahl et al 2012). If in

contrast the economy is specialised in mature economic sectors, then innovation is more likely to be incremental and focused on process or organisational innovation, which can help sustain the competitiveness of firms, though usually at the expense of employing less people (Hassink 2007).

Another important route to regional development happens through a less discussed but very important mechanism: when innovation in one sector leads to growth in related areas of activity, as shown by McMillan et al (2014). Even though the authors are discussing national level processes, we argue that their results can be relevant at the sub-national level. McMillan et al (2014) analysed changes in three sets of countries (in Africa, Latin American and East Asian), according to two variables: productivity growth in core sectors of economic activity within each country, and structural change, which happens when the employment structure shifts towards higher-value added activities. The classic example of the latter is when countries change from being predominantly agricultural to having a larger share of their population employed in manufacturing.

The authors found that in two of the macro regions studied (Latin American and East Asia) the core sectors of economic activity had experienced productivity growth, which in turn had generated a labour surplus. This is because productivity growth happens in part through technological improvements or organisational innovations, which lead to higher outputs at the firm level for the same, or lower, levels of employment. The difference between the two country blocs was that in East Asia this labour surplus had been absorbed by new sectors with similar or higher levels of value added, which led to structural change and higher aggregate growth for the whole economy. In contrast, in Latin American the excess labour was absorbed by sectors with lower productivity levels (such as agriculture) or by the informal economy, which explain why productivity growth in core sectors did not lead to higher

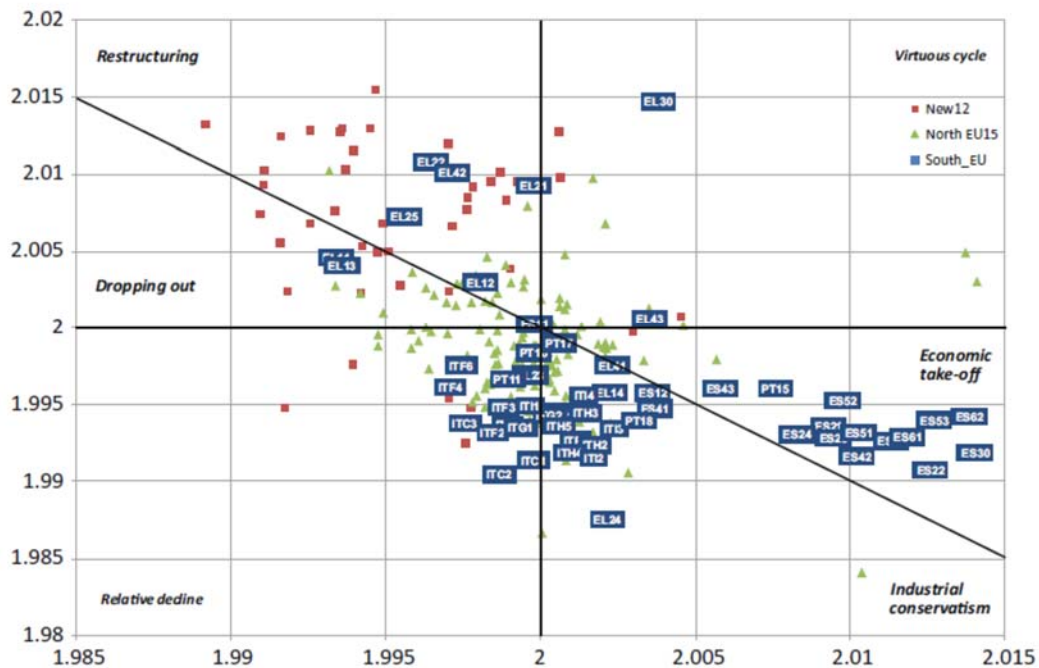
national productivity and growth for this set of countries. Though the relationship between the paths of individual sectors and their regional context has not been widely discussed, the recent contribution by Frangenheim et al (2019) argues precisely that in order to understand the development trajectories of regions, it is necessary to analyse the linkages between different industries.

Our argument in this paper is that similar processes occur in some LDRs, especially when their firms are primarily engaged in technology adoption and process innovation, which leads to productivity growth at the firm level (and potentially at the sectoral level), but does not lead to new specialisations. When this happens, the result is not necessarily higher regional productivity, but rather the release of labour surplus to less productive sectors, or the out-migration of labour, especially of highly skilled labour which moves to core areas where it can access higher paying jobs in more advanced sectors. This has been demonstrated recently by Charlot et al (2015), who argued that innovation in core European regions has a pull effect on resources (including human resources) from the rest of Europe.

The work of Fratesi (2017) provides some evidence that these processes have indeed happened within Europe. As shown in Figure 2, the author analysed the growth patterns of European regions between 1995 and 2006 taking into account productivity growth (vertical axis) and employment growth (horizontal axis). The diagonal line shows average GVA growth for the EU. As the data show, only a small number of regions, mostly in northern Europe and some in the new member states, have witnessed productivity growth, employment growth and above-average GDP growth. If one looks at the European periphery two results stand out: in CEE countries, many regions have been witnessing productivity growth but employment decline, which likely helps to explain why they are categorised as low-income regions (EC 2017). In turn, Southern European regions were overwhelmingly

below average in terms of productivity growth, though a lot of them did witness employment growth in the years measured here. This would explain why they are low-growth regions.

Figure 2 - Growth patterns of European regions 1995–2006 (EU27 $\frac{1}{4}$ 100) (logarithmic scale used to improve readability)



Source: (Fratesi 2017, pp. 64)

In simple terms, regions in CEE states have had productivity growth, but are not generating new sectors of economic activity, whereas Southern European regions generated employment, but mostly in low-productivity sectors. However, as demonstrated by the analysis of Camagni and Capello (2013) this would not be an accurate picture of these regions, since they all in fact exhibit some form of innovation potential. Our hypothesis is that there is no simple connection between innovation and regional development, considering

how many factors mediate this causal effect, from organisational capabilities, network types to the institutional environment. Nonetheless, our goal is not simply to say that the relationship is complex. Rather we want to emphasise that both in research and policy-making, innovation must be understood as one factor (albeit a very important one) among others, which can determine whether a region will experience growth or decline.

6. Conclusions

This paper has argued that in less developed regions innovation has specific characteristics and dynamics that are currently not captured by regional innovation models. First, we argued that *organisational capabilities* are rarely discussed, when in fact they shape the nature and content of networks, and therefore influence the way in which the innovation system functions (Radosevic 2019, Marques 2019). Second, we also argued that the complex dynamic interaction between *formal and informal* institutions must be given more prominence to understand the context in which agents operate (Farole et al 2011). Finally, we argued that *innovation* in firms does not necessarily generate *development* at the aggregate level. This causal effect depends on the type of innovation, but also on the existence of an innovation ecosystem that can nurture and support the translation of ideas into successful economic innovations (Huggins and Kitagawa 2012, Isaksen et al 2018).

Our argument has also been that building concepts of regional innovation based on the examples of successful regions has ontological and epistemological consequences.

Ontologically, it leads to theoretical frameworks that consider as fundamental to the system those institutions and agents that contribute to the successful innovation dynamics in developed regions. In contrast, the agents and/or processes that direct the system towards activities that are antithetical to innovation (such as rent-seeking or the protection of insiders

at the expense of attracting new agents and knowledge, as documented by Christopherson and Clark 2007, for instance) are not considered.

From an epistemological perspective, focusing on success stories, means studying events that produced certain outcomes, and to a certain extent assume that those same events will lead to similar results in other contexts. However, in regions whose economies have been stagnant or in decline, it is necessary to search for dynamics that do not exist: collaborations that are not initiated, engagements that are difficult to produce, policies that do not have the intended results. This presupposes an epistemological effort to find the flaws and fissures in the system to explain the apparent paradox of innovation in the firm without development of the region.

The arguments presented in this paper also have significant policy implications. In particular we would highlight three: First, the improvement of capabilities within private firms would require policy actions towards improving managerial and strategic abilities (Radosevic et al 2017). It would also mean an effort to work with wider networks of firms, aside from those already operating at the technological frontier, and that are likely already to be accessing external knowledge and therefore require less support (Lorentzen 2007, Rodríguez-Pose and Fitjar 2013). Both types of initiatives would represent a shift within innovation policies that aim to transfer advanced knowledge to the most competitive firms, which does not guarantee its dissemination throughout the rest of the economy (Marques 2017). Regarding Universities and the public sector, the issue of capabilities presents a similar challenge in terms of finding solutions to increase the quality of human resources and their capacity to engage in complex policy-making (Radosevic et al 2017), rather than merely trying to improve their connections with external actors.

A second implication is the need to achieve better coordination across territorial scales, a necessary precondition to better align the dynamics of formal and informal institutions. In

contexts where basic (or first order) economic institutions do not function, attempts to improve innovation cultures are unlikely to bear results, due to fears regarding property rights, or other types of opportunistic behaviour (Altenburg 2009, Lundvall 2007). However, regional authorities do not tend to have the capacity to make legal or administrative decisions on such matters, which matters that they require concerted action between sub-national and national entities. A third and final conclusion is the need to think about the connections between different sectors, either in terms of value chain development or interpath evolution (Frangenheim et al 2019, Radošević et al 2017). Investing in individual sectors is unlikely to generate aggregate growth unless there are mechanisms that can ensure that the benefits in a section of the economy spill over to the creation or development of complementary activities (McMillan et al 2014).

References

Aiello, F., & Ricotta, F. (2016). Firm heterogeneity in productivity across Europe: evidence from multilevel models. *Economics of Innovation and New Technology*, 25(1), 57–89.

Altbach, P. G., Yudkevich, M., & Rumbley, L. E. (2015). Academic inbreeding: local challenge, global problem. *Asia Pacific Education Review*, 16(3), 317–330.

Altenburg, T. (2009). Building Inclusive Innovation Systems in Developing Countries: Challenges for IS Research. *Handbook of Innovation Systems and Developing Countries*.

Amsden, A. H. (2001). *The Rise of “The Rest”: Challenges to the West from Late-Industrializing Economies*. Oxford: Oxford University Press.

Asheim, B. T., Boschma, R., & Cooke, P. (2011). Constructing Regional Advantage: Platform Policies Based on Related Variety and Differentiated Knowledge Bases. *Regional Studies*, 45(7), 893–904.

Bell, M. (2009). Innovation Capabilities and Directions of Development. *STEPS Working Paper 33*, 1–69.

Berlingieri, G., Blanchenay, P., Calligaris, S., & Criscuolo, C. (2017). *The Multiprod project: A comprehensive overview* (Vol. 4). Paris: OECD.

Bonaccorsi, A. (2017). Addressing the disenchantment: universities and regional development in peripheral regions. *Journal of Economic Policy Reform*, 20(4), 293–320.

Camagni, R., & Capello, R. (2013). Regional Innovation Patterns and the EU Regional Policy Reform: Toward Smart Innovation Policies. *Growth and Change*, 44(2), 355–389.

Capello, R., & Lenzi, C. (2017). Do Southern European Regions Really Lag Behind in Their Innovation Trends? In M. Fonseca & U. Fratesi (Eds.), *Regional Upgrading in Southern Europe: Spatial Disparities and Human Capital*. Cham, Switzerland: Springer.

Capello, R., & Lenzi (eds.), C. (2015). *Territorial Patterns of Innovation: An Inquiry on the Knowledge Economy in European Regions*. Abingdon, UK: Routledge.

Charron, N., Lapuente, V., & Rothstein, B. (2018). *Mapping the Quality of Government in Europe: an analysis at the national and regional level within the EU member states*. Stockholm: Swedish Institute for European Policy Studies.

Christopherson, S., & Clark, J. (2007). Power in firm networks: What it means for regional innovation systems. *Regional Studies*, 41(9), 1223–1236.

Cimoli, M., Dosi, G., & Stiglitz, J. E. (2009). *Industrial Policy and Development: The Political Economy of Capabilities Accumulation*. Oxford: Oxford Scholarship Online.

Coe, N. M., & Yeung, H. W. (2019). Global production networks: mapping recent conceptual developments. *Journal of Economic Geography*, 19(4), 775–801.

Cooke, P., & Morgan, K. (1998). *The associational economy : firms, regions, and innovation*. Oxford: Oxford University Press.

Crescenzi, R., Gagliardi, L., & Percoco, M. (2013). Social capital and the innovative performance of Italian provinces. *ENVIRONMENT AND PLANNING A*, 45(4), 908–929.

Di Cataldo, M., & Rodríguez-Pose, A. (2017). What drives employment growth and social inclusion in the regions of the European Union? *Regional Studies*, 51(12), 1840–1859.

EC. (2017). Competitiveness in low-income and low-growth regions - The lagging regions report. European Commission report: Brussels.

ESS Round 9: European Social Survey Round 9 Data (2018). Data file edition 1.2. NSD - Norwegian Centre for Research Data, Norway – Data Archive and distributor of ESS data for ESS ERIC. doi:10.21338/NSD-ESS9-2018.

Farole, T., Rodríguez-Pose, A., Storper, M. (2011). Human geography and the institutions that underlie economic growth. *Progress in Human Geography*, 35(1), 58–80.

Frangenheim, A., Trippel, M., & Chlebna, C. (2019). Beyond the Single Path View: Interpath Dynamics in Regional Contexts. *Economic Geography*, 00(00), 1–21.
<https://doi.org/10.1080/00130095.2019.1685378>

Fratesi, U. (2017). The Role of Functions in Economic Underperformance of Southern European Regions. In M. Fonseca & U. Fratesi (Eds.), *Regional Upgrading in Southern Europe: Spatial Disparities and Human Capital* (pp. 55–74). Cham, Switzerland: Springer.

Fonseca, M., Fratesi, U., & (Eds.). (2017). *Regional Upgrading in Southern Europe: Spatial disparities and human capital*. Cham, Switzerland: Springer International Publishing.

Foray, D., Morgan, K., & Radosevic, S. (2017). *From Rivalry To Synergy: R & I Policy and Cohesion Policy*.

Giuliani, E. (2007). The selective nature of knowledge networks in clusters: evidence from the wine industry. *Journal of Economic Geography*, 7(2), 139–168.

Grilli, J., & Allesina, S. (2017). Last name analysis of mobility, gender imbalance, and nepotism across academic systems. *Proceedings of the National Academy of Sciences*, 114(29), 7600–7605.

Grillitsch, M., & Nilsson, M. (2019). *The Role of Trust in Regional Development* (Papers in Innovation Studies No. Paper no. 2019/08). Lund: CIRCLE

Hassink, R., & Marques, P. (2015). The Regional Innovation Paradox Revisited. In U. Hilpert (Ed.), *Routledge Handbook of Politics and Technology* (pp. 120–131). Abingdon: Routledge.

- Hickey, S., Sen, K., & Bukenya, B. (2014). *The Politics of Inclusive Development: Interrogating the Evidence*. Oxford: Oxford University Press.
- Helliwell, J. F., & Putnam, R. D. (1995). Economic growth and social capital in Italy. *Eastern Economic Journal*, 21(3), 295.
- Huggins, R., & Kitagawa, F. (2012). Regional Policy and University Knowledge Transfer: Perspectives from Devolved Regions in the UK. *Regional Studies*, 46(6), 817–832.
- Isaksen, A., & Karlsen, J. (2013). Can small regions construct regional advantages? The case of four Norwegian regions. *European Urban and Regional Studies*, 20(2, SI), 243–257.
- Isaksen, A., Martin, R., & Trippel, M. (Eds.). (2018). *New Avenues for Regional Innovation Systems - Theoretical Advances, Empirical Case Studies and Policy Lessons*. New York: Springer.
- Lipsey, R., Carlaw, K. I., & Bekar, C. T. (2005). *Economic Transformations: General Purpose Technologies and Long Term Economic Growth*. Oxford: Oxford University Press.
- Lorentzen, A. (2007). The geography of knowledge sourcing - A case study of Polish manufacturing enterprises. *European Planning Studies*, 15(4), 467–486.
- Lundvall, B.-Å. (2010). *National systems of innovation: Toward a theory of innovation and interactive learning*. London: Anthem Press.
- Lundvall, B. Å. (2007). National Innovation Systems - Analytical Concept and Development Tool. *Industry & Innovation*, 14(1), 95–119.
- Marques, P. (2019). Intra- and inter-firm dynamics in combinatorial knowledge bases. *European Urban and Regional Studies*, 26(2), 186–204.
- Marques, P., Morgan, K., Healy, A., & Vallance, P. (2019). Spaces of novelty: Can universities play a catalytic role in less developed regions? *Science and Public Policy*, 1–9.
- Marques, P. (2017). From toys to automobiles: foreign investment, firm heterogeneity and intermediaries in a Portuguese industry. *European Planning Studies*, 25(8), 1375–1393.

McMillan, M., Rodrik, D., & Verduzco-Gallo, Í. (2014). Globalization, Structural Change, and Productivity Growth, with an Update on Africa. *World Development*, 63, 11–32.
<https://doi.org/10.1016/j.worlddev.2013.10.012>

Morgan, K. (1997). The Learning Region: Institutions, Innovation and Regional Renewal. *Regional Studies*, 31(5), 491–503.

Moulaert, F., & Sekia, F. (2003). Territorial innovation models: A critical survey. *Regional Studies*, 37(3), 289–302.

Murphy, J. T. (2003). Social space and industrial development in East Africa: deconstructing the logics of industry networks in Mwanza, Tanzania. *Journal of Economic Geography*, 3(2), 173–198.

Murphy, J. T., & Schindler, S. (2011). Globalizing development in Bolivia? Alternative networks and value-capture challenges in the wood products industry. *Journal of Economic Geography*, 11(1), 61–85.

OECD/Eurostat (2018), Oslo Manual 2018: Guidelines for Collecting, Reporting and Using Data on Innovation, 4th Edition, The Measurement of Scientific, Technological and Innovation Activities, OECD Publishing, Paris/Eurostat, Luxembourg.
<https://doi.org/10.1787/9789264304604-en>

Pascual-Fuster, B. (2019). Recruitment policies in Spanish universities, a case study: Teaching and research quality. En HEAD'19. 5th International Conference on Higher Education Advances. Editorial Universitat Politècnica de València. 793-801.

Pike, A., Rodriguez-Pose, A., & Tomaney, J. (2016). *Local and Regional Development* (2nd ed.). Abingdon: Taylor & Francis.

Pietrobelli, C., & Rabellotti, R. (2011). Global Value Chains Meet Innovation Systems: Are There Learning Opportunities for Developing Countries? *World Development*, 39(7), 1261–1269.

Rabellotti, R., & Schmitz, H. (1999). The internal heterogeneity of industrial districts in Italy, Brazil and Mexico. *Regional Studies*, 33(2), 97–108.

Radosevic, S. (2018), “Fostering innovation in less-developed and low institutional capacity regions: Challenges and opportunities”, Background paper for an OECD/EC Workshop on 22 June 2018 within the workshop series “Broadening innovation policy: New insights for regions and cities”, Paris.

Radosevic, S., Curaj, A., Gheorghiu, R., Andreescu, L., & Wade, I. (Eds.). (2017). *Advances in the Theory and Practice of Smart Specialization*. London: Elsevier.

Rodríguez-Pose, A., & Crescenzi, R. (2008). Research and development, spillovers, innovation systems, and the genesis of regional growth in Europe. *Regional Studies*, 42(1), 51–67.

Rodríguez-Pose, A., & Di Cataldo, M. (2015). Quality of government and innovative performance in the regions of Europe. *Journal of Economic Geography*, 15(4), 673–706.

Rodríguez-Pose, A., & Fitjar, R. D. (2013). Buzz, Archipelago Economies and the Future of Intermediate and Peripheral Areas in a Spiky World. *European Planning Studies*, 21(3), 355–372.

Rodríguez-Pose, A., & Garcilazo, E. (2015). Quality of Government and the Returns of Investment: Examining the Impact of Cohesion Expenditure in European Regions. *Regional Studies*, 49(8), 1274–1290.

Rodríguez-Pose, A., & Ketterer, T. (2019). Institutional change and the development of lagging regions in Europe. *Regional Studies*, 0(0), 1–13.
<https://doi.org/10.1080/00343404.2019.1608356>

Tödting, F., & Tripl, M. (2005). One size fits all? Towards a differentiated regional innovation policy approach. *Research Policy*, 34(8), 1203–1219.

Triossi, M., & Romero-Medina, A. (2006). Ramón y Cajal: Mediation and Meritocracy (Collegio Carlo Alberto No. No.22, September 2006). Torino.

Tripl, M., Asheim, B., & Miorner, J. (2016). Identification of regions with less developed research and innovation systems. In M. D. Parrilli, R. D. Fitjar, & A. Rodriguez-Pose (Eds.), *Innovation Drivers and Regional Innovation Strategies*. Abingdon: Routledge.

Vaira, M. (2017). *Between Tradition and Transition: The Academic Career in Italy*. In M. de L. Machado-Taylor, V. M. Soares, & U. Teichler (Eds.), *Challenges and Options: The Academic Profession in Europe* (pp. 193–210). Cham: Springer International Publishing.

Wade, R. (2003). *Governing the Market: Economic Theory and the Role of Government in East Asian Industrialization*. Princeton, N.J.: Princeton University Press.