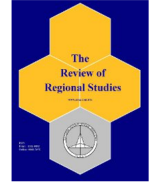




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Territorial Knowledge Dynamics and Governance of Industry Networks: A Systematic Quantitative Review of Empirical Literature*

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Abstract: Despite the impacts of globalization and market liberalization on economic development, factors such as location, space, industrial agglomeration, and local knowledge remain strong determinants of innovation performance and adaptive capacity in regional economies. The role of networks and institutions in knowledge sharing and innovation is therefore of paramount importance in analyzing regional development and has received significant academic attention accordingly. This review discusses trends and developments in a growing body of empirical research investigating these issues. The aim is to highlight some of the gaps between empirical research, policy relevance, and practical impact by focusing on the crucial but underdeveloped theoretical contributions of network governance approaches.

Keywords: regional economic development, territorial innovation models, regional innovation systems, governance, metagovernance

JEL Codes: R11, R12, R58, P48, O17

1. INTRODUCTION

The contemporary experience of globalization has not eliminated the importance of the region in economic development policy and analysis. On the contrary, regional and place-based analytical perspectives on economic development are widely recognized as crucial (Simmie, 2012; Pino and Ortega, 2018). Research into the ways that place-based “soft” infrastructure - including institutions (Rodríguez-Pose, 2013), social capital (Crescenzi et al., 2013), social embeddedness (Granovetter, 1985), institutional thickness (Amin and Thrift, 1995; Zukauskaitė et al., 2017) or untraded interdependencies (Storper, 1997; Storper et al.,

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2015) - conditions economic development outcomes has been influential among policymakers over past decades. From this innovation-directed focus on “endogenous” or “place-based” regional development (Barca et al., 2012; Pugalís and Gray, 2016), a large and diverse interdisciplinary literature has emerged, focusing on how networks and institutions facilitate the spread, spillover, absorption, and development of commercially-valuable knowledge through innovation.

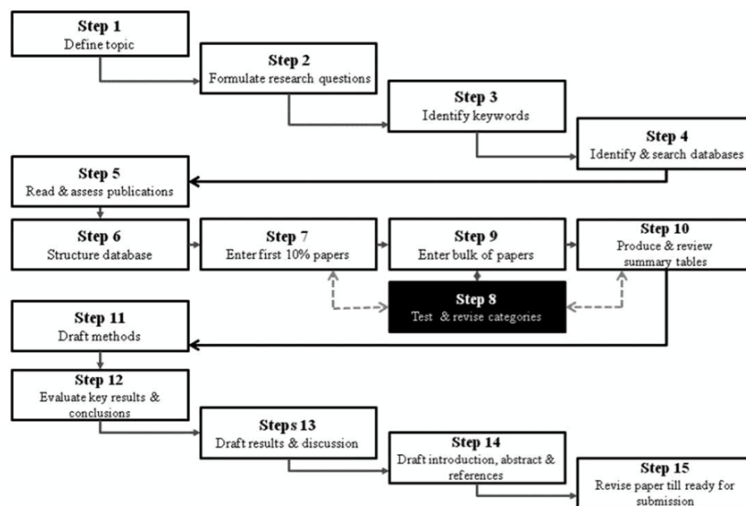
Learning and innovation – propagated and spread via local networks and enabled (or sometimes hindered) by social and cultural institutions – have thus become critical targets for economic development policy. However, given the diversity of both conceptual and empirical research, can explicit regional development strategies be formulated from this body of knowledge and applied in places that are not already successfully exhibiting the desirable characteristics demanded by theory? How can economically or geographically peripheral regions utilize the insights of this literature to bolster the knowledge intensity of emergent industries or ferment efficient, networked institutional learning environments?

Empirical and theoretical research on the operation of “territorial knowledge dynamics” (TKDs) has focused heavily on undeniably important networks, linking knowledge, innovation, and geographical or relational space. However, it has been less successful at addressing these networks’ comparatively under-researched governance and structure. This review looks at empirical research on the governance, configuration, and organization of territorial knowledge dynamics, maps the roles of different actors involved, and compares evidence from the literature over the past two decades regarding their relative influence. It has been conducted according to a method developed by Pickering and Byrne (2014), whereby peer-reviewed papers in an academic field are searched, screened, categorized, and quantitatively analyzed to produce a comprehensive and replicable “geographic, scalar, theoretical, and methodological” map of existing scholarship (Pickering and Byrne, 2014, p. 538).

This approach is well-suited to the topic of the present review for several reasons. First, although only a small amount of it explicitly addresses network governance concerns, a large volume of empirical work has been undertaken in this field over the period surveyed. Moreover, the present review shows this body of scholarship to be highly diverse in its disciplinary foundations, geographic and analytical foci, theoretical underpinnings, and methodological approaches. This combination of quantity and variety makes a traditional “narrative” analysis of this literature impractical and limited in its ability to make robust and substantive claims representative of state-of-the-art regional studies and economic geography scholarship. Second, the body of work explored in this review is highly interdisciplinary. The most valuable research in this topic area represents a wide range of academic fields. The systematic database search method employed by Pickering and Byrne gives the strongest possible chance of capturing insights offered by these diverse perspectives (see (Storper et al., 2015, p. 16-26) for a more detailed overview of the relevant disciplines and their contributions). Finally, a systematic review of this topic is timely because it contradicts a common and longstanding critique that the relevant bodies of theory suffer from “a lack of empirical evidence to support [their] assertions” (Healy and Morgan, 2012, p. 1045).¹ Rather, one key finding of this review is that the size, breadth, and diversity of the assembled database suggests that

¹Further critiques in this vein include, to name only a few examples, Beer et al. (2018, p. 2), Markusen (1999), and Martin (2001, p. 198).

Figure 1: The process of conducting a Systematic Quantitative Literature Review (Pickering and Byrne (2014), p. 539)



this body of work enjoys a rich and compelling grounding in robust empirical evidence. The continued prevalence of critiques alleging the contrary points to a persistent and interesting disjuncture between theoretical and empirical work in this diverse field.

Pickering and Byrne's systematic quantitative review method reveals trends and gaps in scholarship by gathering and screening data from a comprehensive collection of peer-reviewed academic papers. These papers are sorted into categories such as the geographical location of research, author location, subjects, theoretical perspectives, methods, findings, and others more specific to the field at hand (see Appendix 1 for a condensed summary version of this article's database). Having thus arranged the data, cross-tabulation or other quantitative analyses are developed to allow for an authoritative and comprehensive overview of available research on the reviewed topic (see Figure 1). In the database assembled for this review, articles included were reviewed in full text and sorted according to categories covering information about their author and study locations, research and policy contexts, methods and data employed, conceptual or theoretical perspectives, actors and actor roles studied, research findings, journal impact factor and article citations.

2. FINDING AND ASSESSING ARTICLES FOR INCLUSION

The first step in producing this review was to search online databases for peer-reviewed, original empirical research on TKD theories, regional development policy and practice, governance, and industry networks or associations (see Table 1 for a list of search terms and results). Articles were drawn from searches of three academic databases: SCOPUS, Google Scholar, and Web of Science. Due to the significant pace of change not only in this discipline over time but in the technological, structural, and economic organization of work and society (Martin et al., 2018; Dean and Spoehr, 2018), not to mention regional economic agglomerations themselves (Wei et al., 2019), the database has been limited to articles published over the past 20 years.

The review database includes original empirical research conducted within the TKD and territorial innovation models (TIM) theoretical paradigms that investigate how regional industry and knowledge networks perform governance functions, how their constituent actors build or exercise influence within them, and how these functions affect innovation or knowledge exchange outcomes. The process for searching, screening, and assessing articles for inclusion was conducted according to “PRISMA” statement (Preferred Reporting Items for Systematic Reviews and Meta-Analyses)(Ottawa Hospital Research Institute, 2015). The final database contained 34 articles (see table 1, Figure 2 and Appendix 1 below).

Table 1: Search terms and journals used to generate review database

Containing the words	regional economic development network governance	
Containing at least one of the terms	Place-based; territorial innovation model; territorial knowledge dynamics; regional innovation system; learning region; innovative milieu; industrial district; territorial economy; path dependence; embeddedness; institutional thickness; institutional effectiveness; clusters; agglomeration; absorptive capacity	
Databases Searched	Google Scholar, Web of Science, Scopus	
Source of Retrieved Articles	Journals	No. Included
	Cambridge Journal of Regions, Economy and Society	4
	International Journal of Urban and Regional Research	4
	Regional Studies	4
	Transactions of the British Institute of Geographers	3
	European Planning Studies	3
	Environment and Planning C: Government and Policy	3
	Economic Geography	2
	Others	11
Date Range	2000-2020	

Finally, despite offering the potential for a valuable overview of trends and developments within broad, inter-disciplinary bodies of scholarship, the Pickering and Byrne systematic quantitative literature review method also suffers from some limitations.

2.1. Potential Human Error

The first limitation, while common to all review methodologies and arguably less likely in a systematic than a narrative style review, is the risk of overlooked or undiscovered material missed through human error. To mitigate the risk of passing over papers during the search phase, deliberately broad keywords and search terms were employed, casting a sufficiently wide net that all or most relevant research should have been detected. To further improve the robustness of Pickering and Byrne’s search method, however, a concept-mapping and word-frequency analysis was undertaken by inputting the full text of the first ten articles included in the final sample into the qualitative data analysis software NVivo. Extra keywords and search terms generated by this process informed a second search of all three academic databases. Additionally, reference lists of all articles included were checked for further relevant papers. While human error cannot be ruled out, such measures mean it

can safely be assumed that the final database is, at the very least, highly representative of trends and gaps in the body of literature being analyzed.

2.2. Inclusion, Categorization, and Scoping of Study

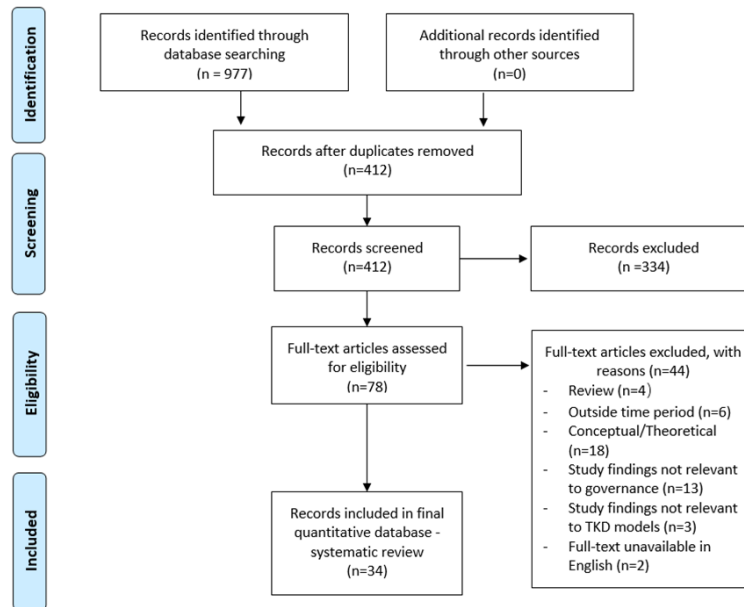
The second potential risk relates to the process for developing search terms, date ranges, criteria for including (or excluding) articles, and the appropriateness of the chosen parameters to answer the review's questions. While this is a risk or limitation for any literature review (and probably a greater risk in non-systematic ones), the emphasis of the SQLR method on a comprehensive survey means that it merits particular attention here. The main reason for this is that the SQLR method makes no distinction (quantitative, subjective, or otherwise) based on found articles' rigor, originality, or theoretical contribution. Although the process of double-blind peer review provides at least a baseline assurance of these things, the SQLR method does not discern between publications on these bases in the same way that other methods might.

Rather than being less discriminating, this simply means that the method is suited to answering different questions in a narrative review. In other words, the aim of a SQLR is to provide a representative overview of trends, methods, geography, theoretical preoccupations, and findings of a field of research as a whole. It is, therefore, a complement to, and not a substitute for, other methods of reviewing academic literature. Finally, while the objective of the search phase of this paper prioritized comprehensiveness, it is nevertheless important and valuable to also subject discovered articles to more substantive interrogation where appropriate. For this reason — in addition to comparative analysis of the literature's high-level geographical, methodological, and theoretical trends — the findings section of this article also provides commentary on notable themes, gaps, omissions, and future research directions based on close and critical reading of articles assembled in the database.

2.3. English Language Bias

Due to the author's monolingualism, only articles written in English have been included here. It was expected at the outset that this would lead to a predominance of articles from English-speaking countries, but this has not been the case. Rather, most articles (some 55 percent) included in the final database contain one or more case study regions in which English is not the predominant local language. The reliance on English-language publications would therefore appear not to have significantly constrained the regional diversity of the review. While this article's geographical sample may be relatively representative, the same is not necessarily true of the researchers themselves. As a result, and while not a viable option for the present author, it remains possible that including research in languages other than English would alter this review's findings. This means that more expansive surveys or comparative reviews in which article language could be included as a variable would be a valuable direction for further research.

**Figure 2: Search and screening “PRISMA” flowchart,
(Ottawa Hospital Research Institute, 2015)**



3. REVIEW FINDINGS

Analysis of the database compiled for this review revealed several trends and gaps in the published literature on the governance of territorial knowledge dynamics. These findings can be grouped into three themes: contrasting roles and influence of actors studied, theoretical or conceptual trends, and methods and data employed. These themes also offer insight into methodological and epistemological issues in this research agenda and related disciplines. Finally, a number of particularly valuable individual articles in this database present evidence on the organization of, and operation of power and influence within, TKD governance networks, drawing attention to noteworthy and under-researched axiological issues. The relative under-representation of these important critical perspectives and debates, as well as the methodological and epistemological implications of this review, present important avenues for future research and are discussed in the paper’s concluding comments.

3.1. Roles and Modes of Influence Wielded by Different Network Actors

With few exceptions, actors studied in the articles forming this review database were governments, firms, universities or other higher education institutions, and civic or non-government actors (see Appendix 1). One paper in the final database (Clapp et al., 2016) also adopted a “socio-ecological” approach, incorporating the interactions of people, politics, and institutions with the natural environment and natural resources, in alignment with the “quintuple helix” framework. This approach theorizes knowledge and innovation relationships between firms, communities, universities, the state, and the environment (Carayannis and Rakhmatullin (2014), p. 236).

Given the important roles ascribed to territory, proximity, and physical space within some theoretical traditions in economic geography (for example, the “territorial economy” paradigm of Crevoisier (2014)), the very small quantity of empirical research devoted to issues of environment, conservation, or resource governance may present an important avenue for future research. In particular, there are numerous parallels between research that explores interconnections between economic development and the built or natural environment and philosophical research on the impacts of “place” (see especially Malpas (2018)). In any case, while papers typically studied only two, or sometimes even just one, of these actors directly, their collected findings offer the possibility – based on the empirical evidence presented – to map the roles, interactions, and determinants of influence associated with different players in real-world TKD frameworks. The roles described for different actors in articles from the database (summarized in Table 2), as well as the combinations, contexts, and theoretical frameworks within which they have been studied, offer some important indications of the functions performed by actors in TKD governance networks and the factors enabling or limiting their influence.

As discussed above, the state was the most influential actor in setting a governance network’s agenda, establishing its membership, marshaling its resources, exerting strategic and policy influence, and bearing the lion’s share of responsibility for outcomes in the greatest number of studies reviewed here. While governments at a variety of spatial or administrative scales have been studied extensively, devolved local/provincial authorities were most prominent (see especially Furmankiewicz et al. (2014)). One issue identified regarding the roles of local government and regional decision-making authorities was that close to half (14 papers in total) of the studies in the database undertook either an ideographic or comparative study of a small slice of northern and northeastern England. This means that the somewhat unique model of localism and devolution associated with New Labour regional governance reforms through the early- to mid-2000s have exerted a disproportionate influence in empirical substantiation of TKD governance concepts. The influence of this context, considering its relevance to most governance settings, is borne out in citations as well: seven of the ten most highly cited² articles in the database conducted research in this corner of the UK. A greater diversity of research from other governance contexts would be valuable, even if only to counterbalance the lopsided influence of these studies and test the relevance of their findings in other places.

The most extensively studied group of actors, and the ones found to exercise the second-highest degree of network influence behind government authorities, are firms. Apart from a handful of articles focused on universities, all research in the database addressed the relationships of firms with another TKD network actor, typically the government. The firms found to be most influential (whether that influence was the product of market power or social capital) were those with prominent formal positions (“active participants”) in their business associations or peak bodies (Ceci and Iubatti (2012); Tomlinson and Branston (2018)). Beyond relationships with other firms, networked interactions between private industry and the next most studied actors – universities – are singled out in several articles as contributing significantly to the innovation performance of individual firms as well as sectors or clusters more broadly. This was especially the case in economically peripheral regions whose

²According to metrics from Web of Science and Google Scholar.

universities were less exposed to competition and hierarchy effects. The higher education institutions (HEIs) in such regions, particularly single-player universities, are best placed to support innovation and exercise policy and strategic impact where they have a demonstrated record of research strength in their regions' industrial specializations.

However, the opportunity costs associated with specialization were found to be less advantageous for technology-oriented universities in regional settings where they face competition from other institutions. While universities were studied extensively in this database, research on other higher education pathways, such as vocational education and training, apprenticeship, or community/technical colleges was under-represented, especially considering these actors' theorized importance to the transfer of "tacit" knowledge in certain areas of older but highly influential theoretical literature (Moulaert and Sekia (2003, p. 291), Crevoisier (2004, p. 374)).

Finally, personal relationships among senior university administrators and between such "place leaders" and government or industry counterparts may be another significant factor determining influence. Evidence presented by Charles et al. (2014, p. 343) suggests that the departure over time of several key senior staff members from Universities in Newcastle and Greater Manchester, and their replacement with leaders who did not enjoy their predecessor's close personal relationships, was a key factor in diminishing the influence of university actors within their regions' collaborative local economic development partnership initiatives. The actors studied least in the research compiled for this review were civic actors and NGOs. Unsurprisingly, the contributions most concerned with the roles of civic actors were those falling broadly within the "institutional thickness" paradigm (most notably Jones and Clark (2000); Gibbs et al. (2001); Coulson and Ferrario (2007); Clapp et al. (2016)). More studies focusing specifically on these actors would be a valuable agenda for future research in light of this finding and their general under-representation in this review database.

3.2. Strong Support for State-Centric Governance Conceptualizations

Theoretical approaches to governance from the mid-1990s and early-2000s, and particularly the networked forms most relevant to TKD research, posited the declining primacy, or hollowing out, of state capacity in complex social or economic policy arenas. In the broadest definition, "governance" in this context entails "the pursuit of collective interests and the steering and coordination of society" (Peters and Pierre, 2006, p. 209): a task that an influential body of political theory argued was no longer a domain within which traditional, hierarchical state control was the preeminent ordering principle. Proponents of this argument asserted that marketization, decentralization, outsourcing, and other governance strategies associated with "New Public Management" had reduced government to just one actor among many in self-organizing, heterarchical policy networks ordered by informal and complex horizontal relations rather than top-down control (Rhodes, 1994; Salamon, 2002). Subsequent "society-centered" governance theorists developed this argument to contend that the variety of new tools utilized by governments to develop and implement policy signaled a shift away from the traditional hierarchical, bureaucratic organization and resulted in a "superseded or ... marginalized" government (Bell and Hindmoor, 2009, p. 4).

The underlying reliance of many TKD theories - especially regional innovation systems,

Table 2: Roles ascribed to actors. See also Appendix 1.

	Universities/Higher Education	Civic & NGO Actors	Firms	States/Governments
<i>Role in network</i>	“Knowledge brokerage”, or “constructing shared knowledge platforms from diverse and disconnected forms of knowledge” is a key role (Eversole and McCall (2014), p. 262). Typically this is a developmental rather than a generative function, and is most strongly associated with capacity building “third mission” outreach activities of single-player universities in peripheral regions (Gumsekara (2006); Boucher et al. (2003), p. 891). Universities also contribute valuable “industry-relevant research” specific to their regions’ industrial specializations shared via formal partnerships, promoting innovation: “novel product and process innovation are positively associated with university cooperation” (Preel and Harrison (2006), p. 300, Jauhainen and Suorsa (2008)).	Unless business associations or peak bodies (where these are composed only of firm representatives) are included under this category, which they are not in this review, the roles of civic actors or NGOs are the least studied in this database. This is an important gap and a major missed opportunity given the important roles identified for communities and civic actors in other policy networks and governance research, notably in securing legitimacy, public buy-in, and social license among other important roles (Bell and Hindmoor, 2009).	Firms were the actors at the center of nearly all research included in this database. A wide range of industries, firm types and modes of interfirm connection are studied in the collected research. Some papers focused on unilateral or dyadic knowledge-sharing connections between firms and their partners (Turner et al., 2009), whereas others studied the aggregation of firm interests within business associations or industrial peak bodies (Tomlinson and Branstion, 2018). One novel approach also investigated connections between firm clusters in different locations (Schiffler et al., 2013). A common theme among many papers that studied firms concerned the impact of different organizational or governance variables on innovation performance.	Despite discussions in governance literature of diminishing state capacity, articles in the database overwhelmingly identified the government as the key actor in TKD governance networks. Functions in which government – often local government (Furmaniewicz et al., 2014) – was found in different studies to have had a lead role included selecting networks’ memberships and establishing their key relationships (Tomlinson and Branstion, 2014), setting networks’ agendas (Coulson and Ferrario (2007), p. 608), exerting supervision/oversight via the control of finance (Guillanne and Doloreux (2011); Furmaniewicz et al. (2014)), legislating and implementing outcomes of network deliberation (Clapp et al., 2016), and ultimately shouldering accountability for policy/strategic outcomes, whether they had control over them or not (Pugalis and Keegan (2017), p. 70).
<i>Factors determining influence in networks</i>	The most influential HEIs are single-player universities in peripheral regions, but funding/endorsement is a key factor in determining translation to policy and strategic impact (Charles et al., 2014). In regions with several universities, influence is undermined by competition and hierarchy effects, and these particularly impact younger, smaller, or technology-oriented institutions (Boucher et al., 2003). Characteristics of regions themselves also impact heavily on the relative influence of regional universities’ roles. Regions’ “size, location, and diversity” are strong determinants of university engagement and influence (Gumsekara (2006), p. 740).	Very little research explicitly addressed factors or variables important to the influence wielded by civic actors or NGOs within their regional industry networks. As noted above, this is an important gap and would appear to present a valuable avenue for future research. Clapp et al., however, find that civic or non-government actors enjoy more influence in highly structured networks than in informal or diffuse ones (Clapp et al. (2016), p. 255-6).	Studies in which only firm data were collected found a strong role for social capital, place leadership, and interpersonal networks (for example Tomlinson and Branstion (2018)). Research investigating broader samples, however, was more likely to interpret these dynamics of influence as manifestations of market or political power (for example Coulson and Ferrario (2007)). In either case, it is important to note that the relationships and networks key to determining influence were found to be different from those associated with strong innovation performance (Ceci and Inbatti, 2012), for which internal resources were a decisive factor (Preel and Harrison, 2006).	The economic context and the structure of the political system within which regional authorities operate is a key factors here. Several studies reviewed investigated TKD governance networks in peripheral regions of the United Kingdom. In this context, the emergence of devolution and “localism” agenda through the 1990s and early 2000s was an important enabling context for local regional development authorities (Tomlinson and Branstion, 2018), but the absence of clear, territorially bounded and financially autonomous regional governing bodies constrained this influence (Preel, 2002) in comparison with similar examples from federal systems including, for instance, Germany (Evenshuts, 2017) or Australia (Eversole and McCall, 2014).

learning regions, or industrial districts - on the idea of territorially bounded and politically autonomous administrative regions makes these debates especially important to research on innovation and “place-based” development (Freel, 2002, p. 650). If endogenous, socially-embedded institutional assets and knowledge bases in local production systems are to be taken seriously as foundations for regional development policy (Barca et al., 2012; Pugalís and Gray, 2016), understanding the actor constellations governing these resources is essential. As a result, the role of regional governments in developing agendas, strategies, and policy responses to their regions’ unique, contingent, and path-dependent development needs in the face of a proliferation of other network actors is a crucial question. As Stoker problematized this issue in his seminal study of the institutional changes associated with local government reform in the United Kingdom through the 1980s and ’90s,

It may be that elected local authorities are the weakest link in the chain of a new string of institutions of local governance and will eventually be asked to exit, or it may be that they will discover a new role as the leading organizations taking on the challenge of steering a complex set of managerial and democratic processes at the local level. (Stoker, 2004, p. 3)

Empirical research from the intervening years assembled in this review consistently finds strong support for the latter proposition.

With a few exceptions, the original empirical research compiled in this database either explicitly or implicitly aligned with state-centric perspectives on the governance of territorial knowledge dynamics. Importantly, evidence supporting the continued pre-eminence of local government within regional TKD governance networks was presented from a variety of regions in different parts of the world and with different economic, political, and social contexts. Gibbs et al. (2001), for example, find that “the argument that we have seen the demise of local government to become ‘strategic enablers’ and one actor amongst many is difficult to reconcile” with their northeastern English case study. Indeed this research even noted “some evidence of centralization of state power” rather than diffusion or “hollowing out” (Gibbs et al., 2001, p. 115). Likewise, Furmankiewicz et al. (2014), in a study of three different rural Polish regions, argue that “the reality remains that network governance institutions as fostered by rural development partnerships often remain as an alternative to, but not a replacement of ... structures of the state, which ... remain largely hierarchical” (Furmankiewicz et al., 2014, p. 359).

One notable paper that did not conform to this trend was Clapp et al. (2016)’s study of institutional thickness in the context of changing industrial, ecological, and land rights governance of forestry in the Canadian Great Bear Rainforest. These authors found that the process of remapping disputed claims, re-evaluating resource allocations, and resolving fraught “forest wars” in this case had evinced “a shift from government to governance, in which the role of the state is diffused and dispersed among multiple stakeholder” (Clapp et al. (2016), p. 255). On the whole, however, the roles described for the state within the body of literature reviewed here support the conclusion that, far from a gradual retreat or a diffusion of responsibilities, regional/state/provincial or local governments perform an essential “metagovernance” or steering and coordination role. Metagovernance sees the state “overseeing ... governance arrangements [by] selecting and supporting the key participants;

mobilizing resources; ensuring that wider systems of governance are operating fairly and efficiently; and taking responsibility for democracy and accountability issue” (Bell and Hindmoor, 2009, p. 11). The idea of metagovernance does not preclude the involvement of a diverse array of actors and associations, community engagement, or marketization. Rather, it describes how public authorities can “govern governance networks without reverting too much to traditional forms of command and control”, and thereby “improve the functioning and capacity of relatively self-governing networks to produce governance solutions that enhance the production of public value” (Sørensen and Torfing, 2017, p. 829).

3.3. TKD Governance Literature Benefits from a Wide Range of Methods and Diverse Data Sources

The final finding of this review is that research on TKD governance has been conducted using a broad range of methodological approaches, research designs, and data sources. In spite of common critiques over many years alleging the underuse or even absence of quantitative methods (Beer et al., 2018, p. 2), the database compiled features a considerable volume and diverse range of quantitative research. While qualitative approaches were most common (used in 58 percent of articles, see Appendix 1), mixed and purely quantitative methods are still well represented. Moreover, within these methodological frameworks, a wide array of methods and data sources were employed, ranging from content or discourse/thematic analysis of interview data, social network analysis, participatory or embedded/action research, bivariate and multivariate regression, policy analysis, large-n regional, national, and international surveys, and various other statistical methods.

A second common critique not supported by the evidence gathered here is that case studies in existing research over-represent “cherry-picked narratives of both exceptional regions and new and emerging technologies rather than the more typical cases of places proceeding along a complex and cumulative industrial path ... and are [focused on] the exception rather than the rule” (Clark, 2013, p. 2). The research compiled here roundly contradicts this assertion, representing a wide range of regions from large and economically influential global cities to less-developed, struggling, or peripheral rural areas. The industries profiled fall upon an equally broad spectrum from cutting-edge, innovative ICT, chemical, and biotech production to traditional artisanal crafts, arts and cultural industries, and agriculture, among many others (see Appendix 1). The emergence of several consistent themes in a body of research conducted using such a broad array of disciplinary and methodological perspectives also offers the ability to “triangulate” findings³, and thereby add confidence to the outcomes of the review process. Importantly, however, this review also found that the methods employed and, especially, the actors studied by different researchers, were strongly associated with particular findings in papers investigating the value of informal personal relationships and social capital. This finding had special relevance for the question of how policy and strategic influence is exerted within TKD governance networks and which actors are best positioned to exercise it.

³Triangulation refers to the use of multiple methods or data sources as a way of adding nuance, context and robustness to research by “[approaching] research questions from different angles, and [exploring] their intellectual puzzles in a rounded and multi-faceted way” (Mason, 2018, p. 190)

The clearest instance of an association between methods or research design and findings was in cross-tabulated comparisons of studies that investigated only firms or firms' relationships with government actors, and studies that investigated a broader range of actors. Studies which — regardless of their theoretical positions on the structure or composition of their studied governance networks — investigated⁴ only firms more often than not found a decisive role for individuals' or businesses' longstanding personal relationships and the trust, reciprocity or social capital invested in such relationships (notable examples include De Propriis and Wei (2007); Ceci and Iubatti (2012); Dawley (2014); Tomlinson and Branston (2018)). When a study's sample includes a broader range of actors, however, and especially civic or NGO actors, strategic influence exerted through close personal relationships among "place leaders" from within the business community was far more likely to be interpreted as a manifestation of economic or political power (notable examples include Coulson and Ferrario (2007); De Muro et al. (2011); Hidle and Normann (2013)).

There are several possible explanations for the emergence of this trend. However, the most likely is that firm managers and businesspeople in positions of economic or political power who have been asked to self-report on the nature of their relationships may be less likely to recognize the considerable value of their own status than actors without access to these kinds of relationships. In TKD governance systems structured in such a way that occupation of a position of power is a pre-requisite to accessing the kinds of fora or personal relationships wherein influence is exerted, more marginal actors who do not enjoy such influence would be justified in reporting that economic, market, or political power is the attribute most determinative of influence. Many of the papers investigating only firm-level actors have done so to ensure the robustness of a quantitative method, typically statistical analysis of survey responses. The presence of this association suggests that the ability of such actors to recognize and distinguish between the various, complex sources of their own network influence in self-reported survey responses is an unacknowledged limitation of that research design.

There are some counterexamples, but many of these still only reinforce this broader argument. For example, Blay-Palmer and Donald study only firm-level actors but compare very small start-ups or new market entrants with more established SMEs and with still older large corporate heavyweights in a Toronto processed food manufacturing cluster. They find strong support for the importance of market power, showing that despite stronger innovation performance, the start-up and SME firms "[are not viewed as] legitimate actors" in their industry's TKD governance networks. "The mainstream agro-industrial branch plants in the region", however, "tend to influence policy because they are ... well-connected to policymakers" (Blay-Palmer and Donald, 2006, p. 393).

On the other hand, Bathelt's study of industrial restructuring of East German chemical plants following re-unification reported interview-based data from a broad range of firms, government, and civic actors, finding an essential role for place leadership exercised through close, longstanding interpersonal relationships of trust and reciprocity, and in which invest-

⁴for example, if surveys or interviews were conducted, the article's sample comprised only firm representatives/businesspeople and did not include participants from HEIs, civic actors, unions, and so on. These studies may have investigated relationships beyond those with other firms, but without using data gathered from those other actors (see Appendix 1 for examples).

ment of social capital over a significant period of time had been critical. Practically all actors identified as enjoying these influential relationships, however, were high-level managers and executives in large and economically-powerful firms (Bathelt, 2013, p. 1478-1480).

Finally, the presence of established firms leveraging their outsize market and political power to influence the strategic and policy/political environments in which they operate is not in itself a negative TKD network attribute. Research conducted in an economically disadvantaged region of Tasmania, for example, found that a predominance of very small firms (and a relative lack of very large firms) was responsible for time and resource constraints that limited the ability of firm-level actors to overcome “structural, relational and cognitive connectivity deficits” within their regional TKD governance network (Eversole and McCall, 2014, p. 255-257). Rather, what is likely to be important is the structure and organization of these networks and whether their institutionalization, culture, and “rules of the game” are conducive to equitable and transparent incorporation of competing interests and outside voices. Under-represented but valuable critical perspectives in this body of empirical research have highlighted how the concentration of influence within networks of informal relationships can exclude already marginalized voices. Forsberg and Lindgren (2013), for instance, show convincingly how informal interpersonal social networks of longstanding business and political leaders can ossify into “clubs” that conceal the location of influence and power centers in regional decision-making, and ultimately reinforce male-dominated or “homo-social” network power structures. Clapp et al. (2016), on the other hand, show how formalizing these relationships within networks whose processes and memberships are transparent and accountable can open the floor to a plurality of interests (previously marginalized indigenous peoples as in their case study example), democratize TKD governance, and enhance networks’ social capital.

4. CONCLUSIONS

This systematic quantitative literature review has analyzed research investigating network governance of territorial knowledge dynamics and suggested a number of gaps, trends, and areas requiring further research or clarification. An important finding of this process has been the identification of trends associated with methodology and research design, which merit further reflection on epistemological issues in this discipline at large. Despite persistent critiques alleging the contrary, the evidence presented in this review supports the value of qualitative methods in both ideographic and comparative case study research. Such approaches are essential to adequately represent nuance and contextual diversity, as well as the influences of culture, history, and path dependence proposed in theoretical accounts of the dynamics under investigation. The finding of this review that different research methods are liable to produce subtly different interpretations of the same phenomena in similar circumstances – in this example, different participants’ perspectives on the degree to which network relationships are structured by the market or political power – is also robust evidence in support of the constructivist epistemological position in economic geography more broadly.

Finally, a small but noteworthy handful of articles in the review database offered valuable and underrepresented critical perspectives on how the kinds of knowledge-intensive

development pathways lionized in this literature can negatively impact already marginalized voices or communities. First, Forsberg and Lindgren (2013) shows convincingly that network structures dominated by informal relationships create high barriers to entry for outsiders and reinforce or reproduce gendered power relations. Their study of TKD governance in rural Sweden is an important and timely reminder that network governance strategies based around informal interpersonal relationships and social capital, especially in traditionally male-dominated industries, may target efficiency and innovation at the cost of equity, inclusion, and transparency. Second, De Muro et al. (2011) discusses how examples of knowledge-intensive regional economic development in practice, where poorly managed or inequitably governed, can exacerbate the marginalization of already-economically peripheral communities. Finally, Clapp et al. (2016) offer important evidence demonstrating how in carefully constructed governance networks with transparently organized roles and channels for elevating previously under-represented concerns (in their case, those of indigenous peoples in Canada), outcomes can sensitively integrate a wide array of formerly competing interests.

In addition to continued and more extensive engagement with the critical perspectives discussed above, this review has identified the roles of civic and non-government actors as a gap in the literature, at least relative to the volume of research investigating other actors. Also, by far the greatest proportion of research in the review database compiled here, as well as in related research, studies regions or industrial clusters either in isolation or in comparison with other regions. While this has been a valuable approach adding significantly to current understanding, far less research has compared different industrial or sectoral agglomerations within the same region. More of this type of research would contribute to a better understanding of a key unresolved question in this area of economic geography, namely, whether such networks are best conceived of as territorial or place-based phenomena or according to more shifting and contingent relational perspectives.

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APPENDIX

Table A1: Summary table of database articles

Author(s)	Location and/or case study	Method and data	Theoretical lens	Actors studied
Bathelt (2013)	Bitterfeld-Wolfen Chemical Production Industry, Germany	Qualitative: semi-structured interviews	Industrial clusters, corporate governance	Firms, business associations, government, unions
Blay-Palmer and Donald (2006)	Food Processing in Toronto, Canada	Mixed method: statistical analysis of firm database (1465 firms) and interviews (65)	Industrial clusters	Not explicitly stated but the article discusses firms, business/industry associations and peak bodies, and government
Boucher et al. (2003)	Universities in London, Shannon & Dublin (UK), North Karelia & Helsinki (Finland), Overijssel & Noord Holland (Netherlands), Ruhr & Aachen (Germany), Andalucía & Madrid (Spain), Crete & Attica (Greece)	Mixed method: policy documents, interviews with higher education policy makers and university administrators	Regional innovation systems, institutional thickness, learning regions	Universities, government
Ceci and Iubatti (2012)	Automotive industry in Abruzzo, Italy	Quantitative (content analysis): interviews, political speeches, legislation, books and newspapers	Industrial districts, social embeddedness	Firms, business associations, government
Charles et al. (2014)	Universities in Newcastle & Greater Manchester, UK	Qualitative: semi-structured interviews with university administrators, higher education policy makers, LED practitioners	Regional innovation systems, social embeddedness	Universities, government
Clapp et al. (2016)	British Columbia (Great Bear Rainforest), Canada	Qualitative: semi-structured interviews with government actors, civic/NGO actors, and firm/industry actors	Institutional thickness	Civic actors/NGOs and green groups, firms, government, traditional owner/indigenous peoples
Clark (2006)	Agricultural industry in the East Midlands, England	Qualitative: semi-structured interviews (68) with firms, civil society/NGOs, government	Regional innovation systems	Civic actors, government actors, industry actors

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Author(s)	Location and/or case study	Method and data	Theoretical lens	Actors studied
Coulson and Ferrario (2007)	Birmingham, UK	Mixed method: structured interviews, economic and statistical data, policy/documentary analysis	Institutional thickness	Government, civic/NGO actors, business associations, universities
Dawley (2014)	North-Eastern wind energy industry, England	Qualitative: interviews (20), government reports/policy analysis and documentary analysis	Clusters, path dependence	Government actors/regional development policy practitioners, firms
De Muro et al. (2011)	Rome, Italy	Mixed method: questionnaire/survey interviews, as well as statistical/economic data	Industrial clusters, industrial districts	N/A
De Propriis and Wei (2007)	Birmingham Jewellery industry, UK	Mixed method: Firm Surveys, follow-up interviews	Industrial districts, institutional thickness	Firms, government
Evenhuis (2017)	Saarland, Germany, and Teesside, UK	Qualitative: policy analysis and interviews (40)	Clusters, path dependence, institutions	Firms, government, NGOs/civic actors, unions, universities
Eversole and McCall (2014)	Tasmania, Australia	Qualitative: action research	Regional innovation systems	Universities, government, firms
Forsberg and Lindgren (2013)	Steel, forestry, and ICT clusters in Värmland, Sweden	Qualitative (situational analysis/grounded theory): interviews (20 – all women)	Clusters, feminist/gender theory	Traditional TKD governance networks and women
Freel (2002)	West Midlands, England	Quantitative: Surveys (228 responses)	Regional innovation systems, industrial districts	Firms, government, universities
Freel and Harrison (2006)	Northern England (SME manufacturing and business services firms)	Quantitative (multi-variate statistical analysis): Surveys (1347 responses)	Industrial districts	Firms, government/public sector, universities
Furmankiewicz et al. (2014)	Odra, Pilica & Strug, Poland	Quantitative (social network analysis): semi-structured interviews (43)	Social capital, clusters	Firms, government, civic/NGO actors
Gibbs et al. (2001)	Humber, England	Qualitative: semi-structured interview (number unclear, but approx. 40)	Institutional thickness	Firms, government (local authorities and EU representatives), NGO/community or civic organisations

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Author(s)	Location and/or case study	Method and data	Theoretical lens	Actors studied
Guillaume and Doloreux (2011)	South-west France (Toulouse/Bordeaux), and Quebec, Canada	Qualitative: interviews and secondary documentary research (no. of interviews not stated)	Localised systems production	Firms, 'organisations supporting economic development' (government and civic bodies)
Gunasekara (2006)	Unnamed peri-urban university, provincial city university, and rural university, Australia	Qualitative: interviews (102)	Triple helix models of university engagement	Universities (managers, academics), government, firms and business associations
Eich-Born and Hassink (2005)	Shipbuilding in Mecklenburg-Vorpommern, Germany, and Textiles industry in Daegu, South Korea	Qualitative: documentary analysis and secondary sources	Learning regions ('learning clusters'), path dependence and lock-in	Firms, government, business associations, unions, universities, civic/NGO actors
Hidle and Normann (2013)	Kritiansand & Stavanger, Norway	Quantitative: web-based surveys/interviews (1670 responses)	Clusters, social capital,	Firms and government
Jauhainen and Suorsa (2008)	Peripheral northern Finland	Quantitative: interviews (217)	Triple helix	Firms, universities, government
Jones and Clark (2000)	Viticulture and wine making in the Languedoc, France	Qualitative: interviews (60)	Institutional thickness	Firms, government, civic/NGO actors
Mah et al. (2014)	Wind energy industries in Xinjiang, Shanghai, & Guangdong provinces, China	Qualitative: interviews (23)	Triple helix	Firms, universities, government
Pugalis and Keegan (2017))	Regional Development Australia Northern Inland Committee, Northern NSW, Australia	Qualitative: policy and documentary analysis	Complex adaptive systems, 'innovation networks'	Government
Sacchetti and Tomlinson (2009)	Ceramics industry in North Staffordshire, England, and Prato textiles cluster, Italy	Qualitative: interviews and secondary sources	Path dependency, industrial districts, clusters	Firms

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Author(s)	Location and/or case study	Method and data	Theoretical lens	Actors studied
Schüßler et al. (2013)	East German automotive manufacturing cluster, German pop music industry clusters (Berlin, Hamburg & Cologne), Berlin/Brandenburg-Tucson-Ottawa photonics clusters, Baltic biotechnology clusters	Qualitative: interviews (29)	Clusters, inter-cluster networks (external linkages)	Government, firms
Tomlinson and Branston (2014)	North Staffordshire ceramics industrial district, England	Qualitative: interviews (25)	Industrial clusters ('cluster life cycle')	Government, universities, firms
Tomlinson and Branston (2018)	North Staffordshire ceramics industry 'Birmingham Jewellery Quarter', England	Quantitative (ordinal regression): surveys (121 responses)	Industrial districts	Individual firms; 'business associations' (peak bodies, chambers of commerce, less formal forums etc); local government
Turner (2010)	Southern English wine industry	Qualitative: interviews (35)	Industrial districts	Firms, government, universities, industry/business associations, civic/NGO actors
Wei et al. (2019)	Gas appliance manufacturing in Zhongshan, China	Quantitative: surveys and interviews (214 surveys, 10 follow-up interviews)	Clusters	Firms/firm clusters