Prometheus, 2014
Vol. 32, No. 1, 105–110, http://dx.doi.org/10.1080/08109028.2014.945287

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RESPONSE

Space, innovation and the locus of knowledge: an ontological response to Rutten

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Introduction

Rutten's (2014) analysis of the current state of the art with respect to the spatial dimension of learning and innovation can be considered a useful and valuable contribution to resolving some of the issues with which this stream of literature is currently confronted. Most notably, Rutten addresses a number of key assumptions that underlie the spatiality of the innovation perspective, namely (1) the transfer of tacit knowledge being highly dependent on social context (Morgan, 1997; Lam, 2000), and (2) these social contexts being sensitive to or conflated with space (Sole and Edmondson, 2002). This leads, according to Rutten, to a problem of agency, which can be resolved by viewing the individual as the primary agent of learning. In addition, Rutten's paper argues against equating social context and geographical space. In this response, I will reflect on Rutten's Proposition paper, stressing the underlying, more fundamental problem that, in my view, characterizes much of the literature on space and innovation and relates to the question of what constitutes the locus of knowledge – the individual or the collective (Felin and Hesterly, 2007).

Space and innovation

Although subject to critique, connecting innovation to space is not as far fetched as recent theoretical contributions sometimes seem to suggest (e.g. Oinas, 1999). The prominent positions of leading clusters of innovation in our current global economy – for instance, Silicon Valley in the US (Saxenian, 1990, 2006) and biotechnology in Cambridge, UK (Keeble and Wilkinson, 1999) – have attracted many scholars to spatial perspectives of innovation, learning, and knowing (Amin and Cohendet, 2004). Clusters are considered to aid the learning and innovation process through local institutions, knowledge externalities, networking opportunities, and labor market dynamics, resulting in a situation where 'learning and innovation are cast as

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regional properties' (Amin and Cohendet, 2004, p.90). Indeed, the individual agent is largely absent in this spatial perspective on innovation or, at best, its role in shaping and overcoming space is not explicitly considered.

Although cluster literature is intrinsically inclined to viewing innovation as a local, spatially-sensitive phenomenon, it does not neglect the existence of (tacit) knowledge transfer and learning taking place across cluster boundaries. Bathelt *et al.* (2004), for instance, point out the potential importance of knowledge connections across clusters for local renewal and innovativeness (see also Owen-Smith and Powell, 2004; Saxenian, 2006). Likewise, Visser and Boschma (2004) warn of the potentially eroding effect of regional lock-in on local innovation, while Maskell *et al.* (2006) point out the value of so-called 'temporary clusters' in overcoming the danger of regional lock-in. Contributions like these do not neglect the value of spatial proximity in promoting interactive learning and knowledge exchange. Indeed, clusters play a pivotal role in facilitating the creation of personal ties and social networks, face-to-face interaction, trust, and other ingredients that are required for successful interactive learning (Morgan, 2001; Pitelis, 2012). Rather, such insights call into question the assumed and exclusive dependence of interactive learning on durable co-location of agents (Rychen and Zimmermann, 2008), yet still conflate social context with geographical space. Interestingly, and eloquently analysed by Rutten, the current *status quo* with respect to the spatial dimension of innovation has arrived at a point where theoretical arguments now stem from a range of theoretical backgrounds. The theoretical discourse on interactive learning thus far derives its arguments from literature on social networks, communities of practice, and space (Amin and Roberts, 2008). Rutten suggests adopting a so-called 'individual-first perspective' in order to integrate insights from various streams of literature and to forward literature on learning and innovation. The above leads to a number of considerations that need to be addressed in addition to Rutten's propositions:

(i) What is the locus of knowledge and learning? Is it the individual or the collective? And how does our choice affect what we observe?
(ii) What are the implications of this discussion for the spatial dimension of innovation and learning from an epistemological and ontological perspective?

Locus of knowledge and learning

I would like to extend Rutten's Proposition paper by providing some thoughts on a critical yet implicit debate underlying much knowledge- and learning-based literature, namely whether the individual or the collective is the locus of knowledge and learning (Felin and Hesterly, 2007). Basically, Rutten proposes that we shift our attention to the individual as an agent of learning, thereby joining Grant (1996) and Simon (1991) in their argument for the primacy of the individual as locus of knowledge. Much empirical inquiry, however, tends to focus on the collective as locus of knowledge (e.g. Powell *et al.*, 1996; Spender, 1996; Brown and Duguid, 2001). The implications for our understanding of knowledge, learning, and by extension, innovation, are vast, depending on the epistemological and ontological position that is being adopted.

From a collectivist perspective, knowledge is fundamentally considered a collective, interactive phenomenon that surpasses the individual and, indeed, is more than the mere aggregation of individuals' knowledge (Nelson and Winter, 1982; Nahapiet

and Ghoshal, 1998). Kogut and Zander (1992, p.384), for example, concur with the above by stating that 'firms exist because they provide a social community of voluntaristic action structured by organizing principles that are not reducible to individuals'. The firm, as such, is considered to know independently of the individuals comprising it (Spender, 1996), enticing scholars to allude to the concept of a collective mind or conscience (Durkheim, 1962; Weick and Roberts, 1993; Felin and Hesterly, 2007). The important implication here from an ontological perspective is that the variables applied to explain outcomes should be of a collective nature (Thompson, 2011). Variables that would meet this condition are, for instance, community, organization, cluster, routines and externality (Felin and Hesterly, 2007). Building a theory of knowledge or learning, whether from the perspective of the firm (Spender, 1996), or that of the cluster (Maskell, 2001), requires the use of such supra-individual structures. For example, Maskell (2001, p.927) clearly applies collectivist language when developing a knowledge-based theory of the cluster, meaning that a fit exists between ontology and concepts:

> But what are then the advantages of N co-located firms of size S undertaking related activities that are not transferable to a single firm of size $S \times N$ doing the same?

Adopting the cluster as level of analysis, thus means the adoption of level of analysis-specific language (that is, concepts and variables) while assuming lower-level homogeneity (Beugelsdijk, 2007; Felin and Hesterly, 2007). Cluster-inhabitants (i.e. organizations and individuals) are implicitly assumed to be homogeneous as an inherent result of using a collectivist vocabulary, such as culture, routines, communities, interactive learning, and so on.

This stands in stark contrast to the individual perspective of knowledge, as expressed in the works of Simon and Grant, and advocated by Rutten with respect to the domain of clusters. From this perspective, individuals are the prime holders of knowledge and should therefore be considered the main locus of knowledge and learning (Grant, 1996). Likewise, Simon (1991, p.125) takes the stance that 'all organizational learning takes place inside human heads'. Collectives, such as organizations and clusters, are the result of individual action as collectives are inherently composed of individuals (Felin and Hesterly, 2007). Following Simon (1991), collectives may learn in two distinct yet related ways, namely through the learning activities of individual members, or by the entrance of new knowledgeable members. In any case, the existence of the metaphysical is being denied by adherents of the individual perspective (Felin and Hesterly, 2007). Reasoning from an individualistic perspective, a fundamental critique to any collectivist approach would be that what is being attributed to collectives could very well be accounted for by individual-level heterogeneity. That is to say, excluding individual-level heterogeneity from the analysis in developing a theory of spatial innovation and learning possibly affects what one observes at the level of the collectivistic construct one chooses to adopt (Klein *et al.*, 1994). Indeed, as Rutten proposes, when developing a theory of space and learning while adopting a collectivistic approach one is certain to overlook the notion that individuals might partake in multiple social contexts simultaneously. This notion alone underscores that Rutten's propositions carry important ontological implications, apart from their theoretical relevance. In addition to the problem of assumed homogeneity outlined above, another fundamental problem that arises from choosing a particular level of analysis is related to the issue of interdependence

(Dansereau *et al.*, 1999; Felin and Hesterly, 2007). Specifying the individual as level of analysis carries the implicit assumption that all individuals act independently of any higher-level entity, such as firms and clusters and that no interaction takes place between levels (as depicted in Figure 1).

The issue of interdependence is especially relevant to cluster literature, for it is the core assumption upon which this stream of literature is based. In other words, firm performance in terms of profitability and innovation is assumed to be affected by the higher-level dynamics that pertain to the cluster level. The suggested shift in level of analysis and locus of knowledge runs the risk of being accompanied by ontological drift because of the adoption of different concepts of knowledge and learning (Thompson, 2011). As Rutten concludes,

> Learning in socio-spatial context builds on the CoP notion that learning is a network phenomenon and as such is unconnected to space. It also builds on the TIM argument explaining how social networks (i.e. social contexts) may be spatially sticky. Learning as an interactive process between individuals has been noticed in the TIM and CoP literatures, but neither literature has systematically conceptualized it as such.

The value of communities of practice (CoPs) essentially stems from the logic of legitimate peripheral participation (Lave and Wenger, 1991). This perspective adopts a so-called 'social-anthropology-of-learning' approach (Amin and Cohendet, 2004, p.6) that considers 'the community as an active entity of knowing'. Likewise, adopting the TIM view also implies adopting a collectivist concept of knowledge as the prime focus of academic inquiry inherently involves some spatial entity. The question is whether and how such collectivist perspectives are compatible with individualist notions of knowledge (Grant, 1996). That is to say, the proposed shift in level of analysis is valuable and timely, as it is likely to generate new theory by identifying different aspects of the innovation-and-space phenomenon. However, such attempts should be undertaken with great caution for the shift in level of analysis also implies a different view of the locus of knowledge and associated concept of knowledge. More specifically, the shift in level of analysis is in danger of a disconnection between collectivist theory on the one hand, and individual-level empirical inquiry on the other, both being fundamentally incompatible (Thompson, 2011).

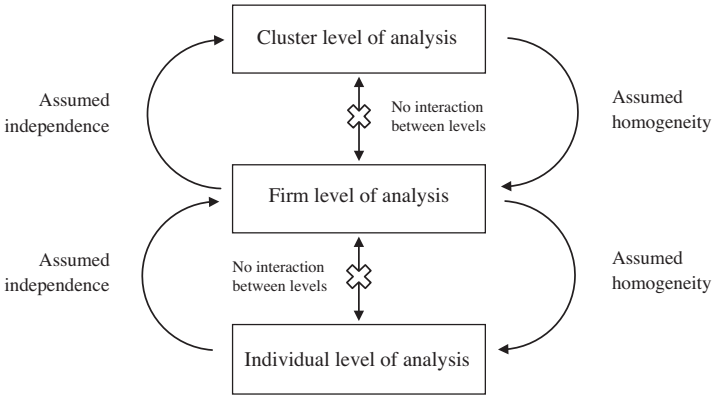

Figure 1. Assumed independence and homogeneity across levels of analysis

Concluding remarks

The above alludes to a future research agenda that incorporates the individual level of inquiry as part of a multi-level research framework (Bathelt and Glückler, 2003). If we are to identify the role of the individual with respect to learning in a socio-spatial context, potential collective effects on innovation and learning must be included in the analysis as well. The multi-level approach is especially important given the issues of homogeneity and interdependence, as briefly outlined above. In addition, the propositions put forward by Rutten require a multi-level approach in order to disentangle individual-level effects from collective ones, and to develop new theoretical insight into the spatiality of knowledge, learning and innovation.

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