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Relational and Dialectical Spaces of Knowing:

Knowledge, Practice, and Work in Economic Geography

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Abstract

Recent work in economic geography suggests the emergence of a distinctive relational and practice-centred set of perspectives on knowledge, based around concepts including communities of practice and relational proximity. This paper will argue that, despite the significant advances in understanding this work contributes, it does not yet provide a complete account of knowing-in-practice, and proposes a stronger focus on work activity as a first step in addressing this gap. The first half critically reviews this economic geography literature, focusing on how it articulates a view of practice in relationship to knowledge, organisation, and space. The second half develops an alternative conceptualisation of knowing as work practice, particularly drawing on cultural-historical activity theory. This is organised around the dual spatially-inflected concepts of situated and distributed knowledge. The paper concludes by arguing that, far from being mutually exclusive, the situated and distributed parts of knowing co-exist in a dialectical relationship, and their interaction in work practice leads to the production of spaces of collective knowing.

1 - Introduction

In a turn of the century commentary on the state of economic geography, Amin and Thrift (2000) argued that a stagnating discipline could be revitalised by turning to sources of theory from outside mainstream economic thought. The example they cited to represent a microeconomic level of analysis was the then newish theory of communities of practice (Wenger, 1998), which they believed in its' sociological explanation of learning through the everyday practices of groups of employees within organisations, offered an alternative to firm-level competence perspectives on knowledge and competitive advantage. In the time since Amin and Thrift's intervention, a body of research and writing by economic geographers (often with collaborators from economics or management studies) has emerged that responds to this appeal by providing new micro-scale perspectives in this field of studying knowledge and innovation. While some have utilised relatively direct adaptations of the communities of practice concept (e.g. Benner, 2003; Coe and Bunnell, 2003; Faulconbridge, 2007a), the common focus of this work has broadened to examine learning or innovation through the agency of relations between people in organisational and trans-organisational networks or communities, particularly following Amin and Cohendet's (2004) *Architectures of Knowledge*. This sub-literature does not comprise a single coherent perspective, but varies along several lines; such as the focus on organisational or trans-organisational settings, and geographical or non-geographical based forms of relational proximity. However, collectively this work has introduced several notable conceptual advances to this field of economic geography that together suggest the possible emergence of a distinctive relational and practice-based understanding of knowledge. For instance, it has promoted more micro-scale accounts of learning as an interactive and socially-

embedded process, challenged the existing dominant concern with 'localised learning' by developing relational views of space produced through social practice, made clearer links between knowledge and different types of network or organisational architecture in the transnational economy, and broken-down previously common dualisms such as local/global or tacit/explicit knowledge.

Notwithstanding the significant contributions of these emerging positions, this paper will argue that economic geography has yet to develop a complete practice-based understanding of knowledge. It will contend that existing approaches are based on a particular view of practice and relationality that does not give sufficient conceptual and methodological attention to a basic sense of 'practice' as "doing in a historical and social context that gives meaning to what we do" (Wenger, 1998, p.47) which remains at the heart of several established approaches to knowing-in-practice in organisational studies (see Nicolini *et al.*, 2003). As an alternative, I will propose focusing conceptualisation more firmly on what, for most people, is probably the main economic-related sphere of their everyday knowing practice, namely their work activity[1]. This corresponds with the definition of practice given by Cook and Brown (1999, p.386-387; emphasis in original) to underlie their outline of an epistemology of practice: as "*the coordinated activities of individuals and groups in doing their "real work" as it is informed by a particular organisational or group context"*. Re-interpretation of practice along these lines, I will show, may also allow economic geographers to develop new conceptions of knowledge and space.

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[1] By work activity here I mean 'work' in a primarily ethnographic sense of what people's jobs actually involve them doing (Barley, 1996; Orr, 1996), rather than the more political-economic ground that is normally covered by the study of work as the labour process and social reproduction in economic geography. This also means that I restrict myself to talking about work in a context of formal paid employment, and do not discuss the overlaps between workplaces and other spheres of everyday life (see Ettlinger, 2003).

This argument is developed over two parts. The first, a critical review of the relevant economic geography literature, concentrates on how this articulates a view of practice in relation to knowledge, organisation, and space. This part has three sub-sections, each discussing a different common element in this sub-literature. These are a privileging of 'community' over organisation as the locus of knowing-in-practice, a focus on the enactment of knowing through forms of social interaction and communication with an ambiguous relationship to practical action, and a relational conception of space that underplays the situatedness of knowing in any particular set of organisational contexts. While these three elements are not present in all the work covered, they do have strong and reinforcing complementarities that link the three sections together. The second part outlines an alternative, culturally-based theorisation of knowing-in-practice as work activity. This draws on a wider inter-disciplinary literature than just that associated with communities of practice; particularly cultural-historical activity theory, a Marxist-influenced school of psychology that has been applied to the study of work and organisational learning (Blackler, 1993; Engeström, 1993; Thompson, 2004). This part consists of sub-sections relating to two core spatially-inflected concepts in the knowing-in-practice literature; situated and distributed knowledge. Far from being mutually exclusive terms, knowing is simultaneously both situated and distributed (Star, 1992; Araujo, 1998), and here I conclude by suggesting that, in contrast to the corresponding view in economic geography that reads (situated) practice mainly in terms of socio-spatially distributed relations, these two elements exist in a dialectical relationship, and their continual interaction as part of work practice produce spaces of collective knowing.

2.1 – Community and Organisation

This section will examine the notions of community that underlie much recent literature on knowledge in economic geography and criticise its representation as abstracted from organisational contexts that are the main settings for everyday work practice. Amin and Cohendet (2004, p.9) identify community "as the all-important site of knowledge formation; the site where hybrid knowledge inputs meaningfully interact". Economic geographers have described different types of group or network as communities, including cluster-based knowledge communities (Saxenian, 1994; Henry and Pinch, 2000), transnational business and migration communities (Coe and Bunnell, 2003) and epistemic communities (Lee, 2001; Ibert, 2007). It is communities of practice, however, that are most commonly referred to as a setting for the social-interactive learning being discussed here. Amin and Cohendet (2004) interpret these (along with epistemic communities) as self-organising groups, which form an intermediate level of competence between the individual and firm, whilst remaining distinct from more formal organisational structures like departments or project teams. This definition shares much with Wenger's later work in the field of knowledge management. Here communities of practice are explicitly demarcated from the organisational subsets of business or functional units, project or operational teams, and informal networks or professional associations (Wenger *et al.*, 2002, p.41-44). In Amin and Cohendet's (2004, p.75-76) view, communities of practice do not form around a specific organisational goal or, as is the case with epistemic communities, the deliberate production of knowledge (regardless of contexts of its use): instead they are sustained by their member's mutual commitment to a shared interest or passion that leads them to regular social interaction. A similar self-organising principle is present in the form of communities of practice identified by

Benner (2003) in the contrasting organisational setting of Silicon Valley. One distinctive feature of this particular industrial environment, well documented in previous studies (e.g. Saxenian, 1994), is that for resident professionals "the pursuit of technological learning itself has become a primary component of their work practices, involving significant levels of social interaction with others around the region", and consequently "shared practices are rooted not in a single firm or workplace, but instead rooted within a broader technical community in the region as a whole" (Benner, 2003, p,1815). Hence, Benner argues that cross-firm communities of practice in Silicon Valley do not just form around 'specific business projects', but also around this common 'occupational enterprise' of continual learning (p.1814), which he illustrates with the example of an online social network for women working in the region's new media industry.

As mentioned above, many references to communities of practice in economic geography are clearly influenced by knowledge management versions of the concept (e.g. Wenger *et al.*, 2002), reflecting development of a wider interest in the strategies and techniques used by large firms to exploit knowledge residing in their different organisational sites (e.g. Amin and Cohendet, 1999; 2004; Beaverstock, 2004; Currah and Wrigley, 2004; Clark and Thrift, 2005; Faulconbridge, 2006; 2008; Jones, 2007a). There is a contradiction implicit to knowledge management readings of communities of practice, however, between these organisational measures, and an understanding of practice-based learning arising from social interaction in self-organising communities. In an early influential paper on communities of practice, Brown and Duguid (1991) emphasised that the informal social interactions from which novel solutions to problems often arise are 'non-canonical'; they do not correspond with formal definitions of employees' roles and

responsibilities and therefore fall outside the confines in which management may even be aware of these work practices, yet alone able to formalise them to be reproduced throughout the firm. This broad line of thinking has been continued by economic geographers. For instance, a similar tension is present in this stark distinction made by Benner (2003, p.1827):

[I]t is the communities of practice themselves, not the organizations, that are critical. Communities of practice are fundamentally informal and self-organizing, and thus do not lend themselves well to formal organizational structures. The very effort to institutionalize communities of practice may constrain their ability to function, grow, and change. Yet communities of practice also require infrastructure to flourish, including the technological and material resources for communication, interaction, and engagement in their social practices.

The common response to this apparent inconsistency, following Wenger *et al.* (2002), is to affirm that the role of management is not to artificially construct or engineer learning communities out of nothing, but to 'cultivate' their development by supporting potential or already fledgling connections between practitioners with similar interests or problems. So Amin and Cohendet (2004) talk of a shift from the rationalist view of 'management by design', which underlies competence and evolutionary economic theories of the firm, to 'management by community' and the development of a 'soft' learning infrastructure that encourages engagement and sociality between employees. This reasoning is extended to the regional-cluster level

by Faulconbridge (2007a) who, in discussing collective learning through professional associations, stresses that this formal institutional architecture does not in itself constitute a community of practice, but only facilitates or 'seeds' the social interaction amongst its members that can lead to communal learning.

Within organisational studies, however, this knowledge management interpretation of communities of practice has been criticised by those that associate it with a view "characterised by increasing references to their performative advantages and manageability" (Swan *et al.*, 2002, p.481). Particularly relevant to this paper are those critiques that show the instrumentalisation of learning-in-practice relies on excluding integral features of work and organisation from analysis. For instance, Contu and Willmott (2003) argue that the 'reification' of communities of practice as managerial tools has been achieved through ignoring their embeddedness in organisational structures and wider capitalist socio-economic power relations. In a nuanced contribution, referring back to Lave's (1988; Lave and Wenger, 1991) earlier work on practice in an educational context, Vann and Bowker (2001) identify a drift in the meaning of social practice with its commodification as an organisational asset. Where in the hands of Lave 'practice' was used as the basis for a normative argument against functionalist accounts of learning, the emphasis on its 'non-canonical' nature by the likes of Brown and Duguid (1991) has led to it becoming represented in the management literature as a natural "already-there thing in the world that is created by the subjects of practice", and is therefore "framed as a kind of autonomous force whose genetic relation to organizational structure is obscured" (Vann and Bowker, 2001, p.256). They argue for a restoration of elements of Lave's original position, concerned with the relation of learning-in-practice to the structural

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educational or work environments that condition access to legitimate participation and situated learning resources:

> The practice trajectory urges us to go beneath the formal representations of work that are often created by managers, accountants and functionaries of the educational assessment regimes … . But interestingly, conventional bureaucratic divisions of labour were precisely the conditions under which 'practices' have always emerged, whether identified or not. For organizational structure … is not just a pre-given, normative apparatus that sets expectations and misrepresents the contours of knowledge as practice … . *It is also an aspect of the very lived social context that the knowledge creating subjects of practice inhabit.*
>
> (Vann and Bowker, 2001, p.259; emphasis added).

So although organisational structures do not determine work practices, they do frame the predominate settings in which they take place, and therefore also in which work-based communities of practice are based. A similar critique, I would suggest, can be levelled against work in economic geography that stresses 'community' over 'organisation' as the key site of knowing. This parallel highlights the problematic nature of the oppositions made when, for instance, Amin and Cohendet (2004, p.10) state "[t]o a large extent, 'organization' can be viewed as the historical locus of managing the division of work, while communities can be seen as the building blocks of the division of knowledge". Even if 'communities' are taken as the social context

for knowing-in-practice, analysis should not elevate them to a separate level of interaction, but address how they develop in (and possibly across) specific organisational sites. In an important departure for this field of economic geography, some studies referred to here have focused on intra-organisational communities or networks (e.g. Amin and Cohendet, 1999; Currah and Wrigley, 2004; Faulconbridge, 2006), alongside mainly trans-organisational settings like inter-personal networks (Grabher and Ibert, 2006; Faulconbridge, 2007b), professional associations (French, 2002; Benner, 2003; Faulconbridge, 2007a), or hybrid ecologies of customers and producers (Grabher *et al.*, 2008). However, my argument is that even with a workplace setting, the way that communities are conceptualised as mainly extra-organisational - i.e. separated from the activity that takes place within formal organisational structures - contributes to accounts of knowing-in-practice not being sufficiently grounded in the situated and pragmatic context that organisations provide. This critique will be further developed over the next two sections.

2.2 – Relationality and Knowledge

This second section is concerned with the content of practices through which knowing is enacted in economic geography accounts. It argues that an emphasis on communal or network-based social interaction and different means of communication as relation-forming practices is too narrow, and consequently the connection with practical action is not strongly expressed. Some proposed general elements of work activity as an alternative basis for conceptualising knowing-in-practice are also introduced.

In addition to the focus on 'community' discussed above, some economic geographers have also engaged more explicitly with the possible meanings of practice-based views of knowledge. In the opening chapter to *Architectures of Knowledge*, Amin and Cohendet (2004) align their approach with an understanding of learning-in-doing that is based on "embodiment, practical action, and social interaction [which] displaces the need to explain the behaviour of individuals as the product of cognition and consciousness" (p.7). A key reference point for them is Cook and Brown's (1999) distinction between an epistemology of knowledge as a possession and as practice. Where conventional approaches in economics and management treat knowledge according to the former, as a static resource held in people's heads or in the collective form of organisational competences, Amin and Cohendet (2004) advocate the latter, with its emphasis on *knowing* as emerging and inseparable from everyday action within a social context. For them this practice-based orientation equates to a firmly relational conception of knowledge as a product of community-based social interaction and connections within hybrid networks of 'transhuman actants'. In this accommodation of social and material elements, Amin and Cohendet (2004) combine the communities of practice literature with the distinctive view of knowledge and space offered by actor-network theory (see Law and Hetherington, 2000). Although other economic geographers have explored the possibilities of this particular relational-practice approach (e.g. French, 2000; 2002; Faulconbridge, 2010), it's arguments about the symmetry of the human and non-human have not, in general, been taken up throughout the discipline, even within the literature I cover here. Instead, for example, Faulconbridge (2006) discusses the 'social production of knowledge' as a distinct epistemology from the organisational transfer of 'best practice' knowledge, involving communication in inter-personal

networks to exchange experiences and form new insights or understanding. In these perspectives, sociality and communication are not just considered as mediums through which knowledge may be shared, but also as forms of action that are themselves generative of knowledge.

An often associated argument is that this interactive learning requires the presence of some form of 'relational proximity'; a common social or cultural connection and basis for shared understanding between the participants (that is not necessarily predicated on everyday physical closeness). In economic geography, the formation of organisational and occupational communities or networks of practice are discussed as a possible means of achieving relational proximity (Gertler, 2003; Amin and Cohendet, 2004; Amin and Roberts, 2008). The common norms and contact that a community of practice engenders are seen by some to ensure the "shared cognitive and interpretive framework" needed for the transfer of specialised (tacit) knowledge (Gertler, 2008, p.209; also Lee 2001; Bathelt *et al.*, 2004; Faulconbridge, 2006; Asheim *et al.*, 2007; cf. Ibert, 2010 on 'relational distance'). This lends emphasis to the social interaction through which relations of proximity may be established; or in a phrase used by Amin and Cohendet (2004, p.114) "the practices of community themselves". So for instance, arising from his research on transnational law firms, Faulconbridge (2007b, p.931) identifies a key line of enquiry to be the relational practices through which "all-important interpersonal networks are formed, embedded, and used so as to create time and space through which knowledge and its production can be stretched". More generally, a common point of discussion in this (and wider economic geography) literature concerns face-to-face contact and virtual communication as forms of social practice through which relational spaces can be constructed and knowledge exchanged (e.g. Faulconbridge,

2006; 2007b; 2010; Jones, 2007a; 2008; Amin and Roberts, 2008). Research on project ecologies has, meanwhile, focused on how different modes of knowledge production that predominate in different industries (advertising and software) require networking practices that create social ties of varying strength and durability (communality, sociality, connectivity) (Grabher, 2004; Grabher and Ibert, 2006).

These arguments echo a core idea about communities of practice, following Lave and Wenger (1991): that communities are formed and reproduced as sites of learning through the socialisation effects of new and established members participating in the group's ongoing practices. However, in these economic geography accounts relation-forming social interaction and communication become the main practices through which knowing is enacted, which is a much narrower understanding than Lave and Wenger's (1991, p.49-50; also Cook and Brown, 1999) corresponding relational notion of practice as "the whole person acting in the world". Inter-personal communication and socialisation are, of course, integral parts of any collective practice including work activity (see Engeström and Middleton, 1998), but should be seen as components of wider systems of activity from which they derive their pragmatic meaning in relation to knowing. The underdeveloped sense of this broader situated context leads to knowing being represented in many economic geography accounts as equivalent to a relational or interactional 'effect' (Law and Hetherington, 2000; Ibert, 2010) of social contact, but one in which, I argue, the relationship to practical action is often obscured or only weakly expressed.

This paper suggests that this limitation could be addressed by a stronger conceptual and methodological focus on practice as work activity. 'Work' clearly encompasses a range of varied types and settings of activity. For all but the most unchanging set of tasks, however, I would propose that a general defining feature of

work activity as knowing practice must be the presence of what Cook and Brown (1999) (drawing on Dewey) call 'productive inquiry' (also Fox, 2006). Practical action is 'inquiring' because it is motivated "in some sense by a query: a problem, a question, a provocative insight, or a troublesome situation", and it is 'productive' because "it aims to produce (to make) an answer, solution, or resolution" (Cook and Brown, 1999, p.388). Productive inquiries are not determined a priori by externally defined ends, but are continually generated by practitioners in midst of their ongoing creative action (also Joas, 1996). Activity theory, which will be discussed in the second half of this paper, embodies this notion of productive inquiry in its central focus on practical actions that are orientated towards a group's collective objects of activity. These pragmatist ideas are perhaps easiest to relate to forms of work activity that broadly involve manipulating or transforming physical materials to make or repair something (e.g. Sennett, 2008), but I would argue that it also applies to those that involve interaction with objects that are more abstract or symbolic in character (see Allen, 2000; 2002). In either case, viewing the subject-object relation as a central feature of work practice should ensure that knowing is recognised as always being at least partly embodied and tacit, drawing on the practitioner's "personal faculties of sensory perception and aesthetic judgement" (Strati, 2003, p.66; also Ewenstein and Whyte, 2007), consistent with a fuller conception of knowing-in-practice.

Some economic geographers are recognise the importance of interaction with non-human objects or artefacts in their accounts of knowing (e.g. French, 2000; Amin and Cohendet, 2004; Faulconbridge, 2010), but the practical dimension of this knowing – how it is integrally connected to solving situated problems or action that is productive of something other than knowledge – often seems secondary in these

analyses to how this interaction with objects is part of wider network or community forming processes (cf. Ibert 2007; 2010; Grabher *et al*. 2008). In some work this could possibly be linked to the abstraction of practice from formal organisational settings (and therefore organisational objects) discussed above. However, it may also be the case even when there is a direct focus on work, such as in Amin and Robert's survey of the literature on communities of practice, where they cite numerous ethnographies of workplace learning to support an argument against uniform prescriptive views of the concept. Here they present a classification of varieties of knowing-in-action into four categories (craft/task-based, professional, epistemic/creative, and virtual) based on the nature of communication and social ties they are seen to involve, along with characteristic forms of knowledge type (e.g. tacit, explicit, specialised, expert, aesthetic), innovation (e.g. incremental/radical), and organisational dynamic (e.g. hierarchical management, management by community, open/closed membership) (p.357). Interaction with the objects of these different categories of work are mainly implicit or incidental to this analysis; only acting as background contextualising detail in some descriptions of the studies reviewed, and not as among the defining features of all these activities.

2.3 - Connectivity and Space

The relational focus of much of the practice-related work in economic geography finds expression in what Amin (2002; Amin and Cohendet, 2004) has called a topological understanding of space. This departs from the dominant territorialised readings of knowledge and innovation in economic geography that are based around concepts that have overwhelmingly emphasised the advantages of local inter-firm

links and regional institutional environments (for review MacKinnon *et al.*, 2002). While some of the literature referred to thus far applies the communities of practice concept at this cluster or regional milieu level, signalling the intensity of social interaction facilitated by geographical proximity, in other work it has been used to elucidate arguments that local links should not be inherently privileged over non-local or global relations (following Amin and Cohendet, 1999; 2004). It is this literature that considers the possibilities of non-local learning that I will concentrate on below, not because my primary concern is with questions of scale, but because this work most clearly illustrates the key argument here: that the spatiality of knowing-in-practice in economic geography is interpreted in terms of distributed relations, and not situated practical action that has a constitutive link to organisational settings.

This continues lines of argument from the previous two sections, and in particular it refers to the conception of practice as agency that, in the words of Vann and Bowker (2001, p.256), is represented as "an already there thing in the world that is created by the subjects of practice" (section 2.1). This is illustrated in the conclusion reached by Amin and Roberts (2008, p.365; emphasis added):

> The spatial variegations highlighted in this paper … force reflection on the very meaning of basic spatial categories such as 'local', 'global', 'proximate', 'distant', 'location' and 'territory' in mapping the geography of knowing in action … . This is an approach that *takes space and spatial boundaries to be traced by the geometries of situated practice rather than expecting such practice to conform to pre-given spatial formations –* offices, regions, corporate structures, virtual architectures – imbued with

distinctive properties. Accordingly, we might conclude that what determines the texture of ties or trust is not spatial proximity, but the nature of contact, intermediation, and communicative complexity involving groups of actors and entities.

This position coincides with recent support for 'non-essentialism' in economic geography (e.g. Ettlinger, 2003; Grabher, 2004). For instance, Jones (2008) outlines a 'relational practice-centred theoretical approach' that recommends focusing on the ways that practices produce economic outcomes, instead of these being conflated through pre-determined economic, social or territorial categories: "Such an approach replaces the static conception of entities (firms, institutions, regional clusters) with concepts generated around the dynamic practices that *constitute* action and *produce* these entities" (p.73; emphasis in original).

The question of what geographical forms these relational spaces take is, therefore, not one that can be answered through reference back to existing concepts in economic geography that have mapped the circulation of different types of knowledge onto a local and non-local scale binary, but is contingent on the particular network or relational practices through which they are produced and shaped (Grabher, 2004; Faulconbridge, 2007c). Amin and Roberts (2008, p.354) reason that these practices will vary with different types of collaborative work activity, depending on the "socialities of knowing in action" and "communicative settings" they involve. However, it is the argument that they see following from this, that "relational proximity is not reducible to co-location", that has attracted most attention in economic geography. The use of the term relational proximity here normally implies

a decoupling from geographical proximity, so that interactive learning does not just occur through relationships based on regular face-to-face contact in a single site, but also through long-distance communication or temporary collaborations (Amin and Cohendet, 2004; also Grabher, 2004). The close association between the concepts of relational proximity and communities of practice in economic geography means that the spatiality of the latter has been reinterpreted along 'topological and relational' lines (Jones, 2008). This is so that "there is no compelling reason to assume that 'community' implies spatially contiguous community … . [M]any communal bonds *may be* localized, as in a community of practice made up of employees in a given workplace, but many other communal bonds – of no less commitment and intensity rely on a spatially 'stretched' connectivity" (Amin and Cohendet, 2004, p.93; emphasis in original).

For Amin and Cohendet (1999; 2004) one of the advantages of the modern corporation as an organisational form is precisely the geographical span it can achieve in bringing dispersed sites together and integrating various local sources of knowledge. Consistent with their argument for management by community, they identify various 'spatial strategies' that corporations can use to encourage the kind of communicative practices that form relational proximity over distance. Many of these strategies rely on the 'mobilisation' or 'displacement' of people and other resources:

> [An] important achievement has been to find ways of 'being there' through regular and frequent contact between distributed communities, the formation of task forces and project teams dislocated from their sites of regular work, the travels of tacit knowledge carried by executives,

scientists and technicians, the movements and transmissions of knowledge embodied in varied technologies, the insights generated during occasional meetings, teleconferences, and telephone conversations, or in email messages sent in transit.

(Amin and Cohendet, 2004, p.96).

Other research in economic geography, particularly on transnational professional-service firms, has similarly emphasised corporate practices such as business travel and expatriation that create an 'ecology of mobility' (Faulconbridge *et al.*, 2009; also Beaverstock, 2004; Jones, 2007a). Amin and Cohendet (2004, pp.102-103) argue that when interactive learning is located in the kind of 'stretched' organisational spaces produced through these practices, what the literature calls situated knowledge should not be seen as territorially fixed-down or locally-bounded. Instead, the widespread use of knowledge management techniques have created a fluid ontology in which firms are transformed into "circulatory networks" (Amin and Thrift, 2002, p.65), and where the task of individual nodal sites becomes one of "making, aligning, and ordering relational networks made up of a multitude of potential knowledge actants" (Amin and Cohendet, 2004, p.103).

In terms that I will employ in the remainder of this paper, this strongly actor-network theory influenced position is a radically 'distributed' view of the spatiality of knowledge and practice: the agency through which knowing is enacted cannot said to be constrained to any particular site because it is also constituted through extra-local relations or mobile 'circulating' objects and artefacts (also Faulconbridge, 2010). This view may help reflect awareness of the increasingly multi-site and

geographically dispersed nature of economic organisation (and work activity (see Jones, 2007b)), but my argument is that the understanding of relational-practice on which it is based, in stressing the regionally or organisationally unbounded nature of 'practice', does not recognise the degree to which knowing is accomplished through practical action that draws on situated contexts of particular objects and instruments. In the next section I will develop this stronger idea of situated knowing, as part of an argument that it exists in a dialectical relationship with the distributed part of knowing. This will follow Blackler (1995) in arguing that knowing-in-practice should be studied by focusing on the 'culturally-located systems' through which it is enacted; which if not reducible to single-site bounded organisations, are certainly congruent with organisational contexts of intermediary technologies and artefacts that enable collective work activity. While some economic geographers have employed notions of organisational culture in their studies of knowledge and learning, this more often seems to be a formalised corporate culture of 'best practices' that are identified and spread by managers to ensure the convergence of cognitive frames or absorptive capacity throughout the firm (e.g. Amin and Cohendet, 2004; Currah and Wrigley, 2004; Faulconbridge, 2006; 2008), and not the situated product of ongoing work practice that I am concerned with here. For the purpose of developing this position, the next part will also focus on this relationship between learning and culture just at the organisational level, and not at the territorial level, as earlier studies in economic geography from an institutional perspective have done (e.g. Gertler, 1995). Although these respective contexts correspond to what, I would maintain, are quite distinct processes, their possible interplay could raise interesting questions for future work.

3.1 Situated Knowing

This section will draw on an inter-disciplinary literature on situated learning to re-establish the connection of knowing with practical action that is, in the basic definition offered by Blackler (1995, p.1039), "located in time and space and specific to particular contexts", and which, as the previous three sections have argued, is underplayed in current conceptions of knowledge and practice in economic geography. This focus on situated knowledge is not proposing a return to local learning and a scalar mode of thinking, but a stronger awareness that in the different register offered by a relational spatiality, the practices that produce spaces are generated out of specific organisational or institutional contexts for work. This comprises the first part of a proposed dialectical framework with distributed knowing that will be outlined in this second-half of the paper. Throughout the work-based approach these two sections outline, the pragmatic or object-orientated basis of knowing and its mediation by cultural and technological artefacts or instruments is emphasised.

In the debates referred to here, this concept of situated knowledge or learning indicates a stance in opposition to the abstract view of knowledge underpinning cognitivist models of learning. Above all, it is perhaps through the work of two scholars that it has come to stand as a term often used for practice-based understandings of knowing more generally. First, Jean Lave's research in educational psychology on learning through 'legitimate' participation in a practice in its real-world context, rather than through the reception of a formal body of knowledge in detached classroom settings (Lave, 1988; 1993; Lave and Wenger, 1991). The notion of 'context' is evoked in this work; not in a Cartesian sense of an external fixed background against which activity takes place, but context emerging

from practice itself (Lave, 1993), in a relational approach where "agent, activity, and the world mutually constitute each other" (Lave and Wenger, 1991, p.33). Second, Lucy Suchman's (1987; also Suchman *et al.*, 1999) study of human-machine interaction, which criticised the dominant belief in cognitive sciences that behaviour is structured by preconceived mental representations of action. Her research showed that the way users learn to operate a new piece of technology does not conform with these 'plans', but emerges in the course of what she calls situated action: "how it is that actors use the resources that a particular occasion provides – including, but crucially not reducible to, formulations such as plans – to construct their action's developing purpose and intelligibility" (p.3). This again points to a position in which context is constitutive of knowing:

> The term [situated action] underscores the view that every course of action depends in essential ways upon its material and social circumstances. Rather than attempting to abstract action away from its circumstances and represent it as a rational plan, the approach is to study how people use their circumstances to achieve intelligent action.
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> (Suchman, 1987, p.50).

This contingency is also recognised in the mainstream organisational studies concept of sensemaking, which describes those occasions of 'shock' when an expected 'flow of actions' is disrupted, forcing participants to reflect on and reconstruct their understanding of that situation (Weick, 1995). An integral

component of sensemaking are actions that transform ambiguous sets of circumstances into pragmatic inquiries: "In real-world practice, problems do not present themselves to the practitioner as givens. They must be constructed from the materials of problematic situations which are puzzling, troubling, and uncertain" (Schön, 1983, p.40; quoted in Weick, 1995, p.9; also Orr, 1996).

Within the different disciplinary strands that have congregated underneath this label of situated learning or cognition theory there are significantly varying perspectives on the degree to which knowing is fully provisional in any situation, or is enacted through existing, more durable cultural systems. Lave (1993) identifies two main positions. The first, which she associates with a phenomenological tradition, "focuses on the construction of the world in social interaction; … [so] that activity is its own context" (p.17). The second, which is exemplified by cultural-historical activity theory, holds that "[a]ny particular action is … given meaning by its location in societally, historically generated systems of activity", whilst still "[emphasising] the non-determinate character of the effects of objective social structures" (p.18). It seems clear that the economic geography interpretation reviewed above, with its view that social practices are generative of relational spaces instead of being placed in 'essentialist' constructs such as organisations, tends more towards the former 'activity is its own context' end of this spectrum.

Here, by contrast, I want to argue that part of developing a work-focused conceptualisation of knowing-in-practice for economic geography will be to reaffirm the meaning of situated knowledge in reference to specific organisational or institutional settings in which work activity takes place. In some research this has been illustrated in a near literal way by showing that the enactment of collective knowledge is mediated by the physical arrangement of the work environment itself

(e.g. Hutchins, 1995; Goodwin and Goodwin, 1995; Suchman, 1995; Beunza and Stark, 2004). More broadly, however, an explanation of how knowing is situated in a context that is more than just performed in that instance requires some consideration of the second of Lave's positions. The key point here is that work-based knowing-in-practice, as part of our 'interaction with the world' (Cook and Brown, 1999), involves the use of various intermediaries that enable individual and group subjects to relate to their circumstances in a practical and intelligent way. These cultural resources, whether conceptual, discursive, social or material in form, are continually reproduced through their use as part of that collective work activity, and therefore maintain some continuity with past practice. In their cultural approach to organisational learning, Cook and Yanow (1996) propose that it is only through intersubjective meanings invested in shared organisational artefacts that a group of people has the 'collective knowledge' to perform complex work tasks in a coordinated way. In the accompanying ethnographic research, carried out in world-class flutemaking workshops, Cook and Yanow (1996, p.449) stress that these intermediaries, unique to the organisational culture of each site, are reproduced through their distinctive work practices:

> These meanings, whether they are acquired by new members or created by existing ones, come about and are maintained through interactions among members of the organization. They need not be face-to-face verbal interactions: meaning-making and meaning sustaining interactions take place just as importantly through the medium of the artifacts of the organization's culture – its symbolic objects, symbolic language, and symbolic acts. Such "artifactual interaction" happens not only in

exceptional circumstances of disruption or change but also routinely as part of "normal" day-to-day work (whether that be production, management, marketing, etc.).

In contrast to Cook and Yanow, who emphasise the effect of organisational artefacts in stabilising meanings and allowing the reproduction of work practices over time, cultural-historical activity theory focuses on how the development of these intermediaries can change practices and hence constitute a form of collective learning. The explanatory potential of this approach relies on a distinction made between the levels of individual or joint goal-directed actions and historically-formed collective activities, so that the analytical task is "to uncover the anatomy of these actions as successive, momentary instantiations of a wider and more stable system of collective activity" (Engeström, 2000, p.961). An activity system is seen to be formed when sets of mediating instruments – including conceptual or symbolic 'tools', and organisational or social rules, conventions, and divisions of labour – are developed in relation to an object of activity (or 'problem space') that is shared by a group of practitioners and gives meaning to their ongoing interaction (Engeström, 1993; 2000). This object of activity is constantly evolving as part of the 'community's' shared practice, reflecting its partly-given and partly-emergent (Blackler and Engestrom, 2005) dual nature as both a material or objective reality with which the practitioner's engage and transform, and the socially-constructed conception of their collective activity and its development over time (Adler, 2005). It is through use of instruments - "an interrelated *bricolage* of material, mental, social and cultural resources for thought and action" (Blackler *et al.*, 2000, p.281; emphasis in original) - that community members are able to 'enact' and 'reconstruct' their object of activity

in "specific forms and contents" as part of everyday practical action (i.e. 'productive inquiries'), which "often takes the form of problem finding and problem definition" (Engeström, 1999, p.381).

In this dialectical theory of learning, contradictions that are seen to be inherent to the collective activity, such as varying perspectives of a shared work object, manifest themselves as 'disturbances' in individual or joint actions that force practitioners to reflect on and change their practices. As Engeström (2000, p.964) explains "while the object and motive give actions coherence and continuity, by virtue of being internally contradictory, they also keep the activity system in constant instability". Changes to a new mode of knowing-in-practice are theorised as an 'expansion' of the object of activity, which is achieved through the development of "novel mediating instrumentalities" that enable participants to understand their shared activity and act in a way that resolves the disturbances or breakdowns previously experienced (Engeström *et al.*, 2003, p.154). Hence, innovation in working practices can be understood in terms of a continual iterative cycle of 'object formation', moving between 'abstract' and 'concrete' stages of questioning the existing activity, entering into dialogue to construct and define the problematic situation, and developing new instruments (including concepts and discourses) that allow the modelling and implementation of a modified set of practices (Engeström, 1999; also Miettinen and Virkkunen, 2005).

The hierarchical distinctions between activities and actions, and between the classes of objects and mediating instruments, that underpin organisational activity theory may be too structured or schematic a view of practice for advocates of 'flatter' ontologies (see Latour, 1996). However, in the context of this argument it does provide a framework in which spatially situated and temporally emergent

understanding can be located in wider systems of meaning that are characteristic of organisational cultures and other relatively stable contexts for collective work activity. Its other notable feature here is that, in its micro-level and dialectical theorisation of collective learning, it offers a way of conceiving innovative-learning through ongoing iterative and reflexive human interaction with objects of work (Vallance, 2009), that is an alternative to emphasis on the generation of innovation through social connectivity and the formation of novel network relations (see Amin and Cohendet, 2004, p.67-68). In activity theory, innovative-learning is a predominately endogenous process of people transforming their context of activity by attending to the tensions and disturbances they encounter in their everyday practice, which I would suggest seems particularly fitting to analysis of the kind of creativity and change that can arise out of ordinary work activity, but which can nevertheless have substantial positive effects on the efficacy of practices, and hence also cumulatively on organisational performance.

3.2 – Distributed Knowing

The first half of this paper argued that economic geographers have read the spatiality of knowing-in-practice more through distributed relations than situated practical action. Having made the case above that the second of these terms should be given more weight by showing the connection between practical action and its context of situation-contingent problem or object and intermediaries in an organisational setting, this section will consider how this is related to distributed knowing. It will discuss this in a socio-spatial sense that does not necessarily

indicate geographical dispersal or distanciated relations, although as the section progresses I will cover literature where these two meanings increasingly coincide.

Practiced knowledge is distributed because, instead of being possessed in the heads of individuals, it is collectively enacted through relations between them, and mediated by the intersubjective meanings that are invested in the artefacts they produce. Lave (1988, p.1; quoted in Star, 1992, p.404) explains the process of distributed cognition thus:

[W]hat we call cognition is in fact a complex social phenomenon. The point is not so much that arrangements of knowledge in the head correspond in a complicated way to the social world outside the head, but they are socially organized in such a fashion as to be indivisible. "Cognition" observed in everyday practice is distributed – stretched over, not divided among – mind, body, activity and culturally organized settings (which include other actors).

So this is not only consistent with knowing also being situated, but the two require each other: if situated knowing is constituted by a context of social and material relations it follows that it must be also socio-spatially distributed across these collective relations. This is so that firms are themselves, inherently, distributed and relational systems (Tsoukas, 1996; Araujo, 1998).

The two terms can, however, be seen as referring to conflicting dynamics within collective knowing. Considering knowing as distributed indicates that, while a

set of practitioners interacting over a joint problem or object may draw on the intermediary resources that a common context for work activity provides, this does not mean that all participants will understand this situation in the same way. A collective practice is not homogeneous or centred around a core identity or competence, but is structured by a division of labour, and involves different forms and levels of 'peripheral' participation in the group's activity (Lave and Wenger, 1991). So we can talk of collective knowledge as an effect of the mediation of organisational artefacts on knowing-in-practice (Cook and Yanow, 1996), but the varied knowledge and participation of individuals in this process will not correspond to that of the group as a whole.

This point is illustrated by the work of cultural psychologist and anthropologist Edwin Hutchins, one of the leading figures in this field of distributed cognition. In his 1995 book *Cognition in the Wild* Hutchins uses an extremely detailed study of navigation on large naval ships to show that, within a team-based work context, knowing is 'twice removed' from individual cognition: first by "the transforming effects of the interactions with the tools of the trade" (in this case navigation instruments and media), and second as "a consequence of the social organization of distributed cognition" (Hutchins, 1995, p.226). In Hutchins' work the division of labour is a central concept that enables the formation of social organisation and distributes the capability for collective knowledge across social space (Hutchins, 1995, p.224). This does not mean that Hutchins views knowledge to be discretely distributed and fixed between team members corresponding to a functional definition of their roles: the highly variable environment with which his navigators are faced means that constant communication is integral to their work practices:

[T]he human component of the system ... act[s] as a malleable and adaptable coordinating tissue, the job of which is to see to it that the proper coordinating activities are carried out. In their communications and in their joint actions, the members of the navigation team ... dynamically reconfigure their activities in response to changes in the task demands ... [which] amounts to a restructuring of functional systems that transcends the individual team members.

(Hutchins, 1995, p.219).

Hence the practiced knowledge of individual team members will vary, but it is inter-subjectively produced and mediated by language, and must overlap to some degree as a functional necessity of their work system (Hutchins, 1995).

An important implication of knowing being distributed is that it challenges any assumption that cognitive proximity is necessarily a precondition for interactive learning. By contrast, I would suggest that in a work-based understanding of knowing it is precisely the everyday encounters between people with different practices and understandings that create opportunities for learning through the 'negotiation of meaning' (Wenger, 1998). Organisational researchers have reflected this by basing their study of 'situated' or 'local' forms of knowledge in groups of co-located individuals with varying roles within or between organisations (as opposed to relatively homogeneous professional networks) (e.g. Sole and Edmondson, 2002; Yanow, 2004). In these settings practitioners from different occupational groups will mutually transform their situated understandings by entering into dialogue over shared problems (Bechky, 2003). Boland and Tenkasi (1995) emphasise this

process, that they call 'perspective taking', never involves a "one-to-one mapping of meanings" (p.362), but the ongoing use of 'language games' and boundary objects such as shared narratives to interpret each other's practices and reach working understandings that are sufficient for the pragmatic purposes of their collaboration.

Many of these elements are also found in activity theory, which presents a view of knowing that is intrinsically distributed as well as situated. For Engeström (1999; p.382) "different perspectives are rooted in different communities and practices that continue to coexist within one and the same activity system". Indeed, activity theory views conflicting perspectives between members of an activity system as a key source of the disturbances that generate collective learning. Organisations are, equally, seen to be "built and maintained around partially shared, partially fragmented and partially disputed objects" (Engeström and Blackler, 2005, p.310), which means they should not be thought of as single, coherent activity systems, but rather complex and distributed "networks of overlapping activity systems" that extend beyond formal organisational boundaries (Blackler *et al.*, 2000, p.282). Engeström's recent writing in this area has shifted from considering models of work based on single organisations to those based on systems of activity that require the involvement of multiple organisational agencies (Engeström, 2000; Engeström *et al.*, 2003; Engeström and Kerosuo, 2007). This reveals a general form of contradiction related to the challenges of coordinating work across the varying organisational procedures and practices of these distributed sites. Returning to the concept of 'expansive learning' introduced above, the resolution of these disturbances occurs through the development of new mediating instrumentalities that enable participating agencies to jointly construct a 'socio-spatially' expanded or reorganised object of activity (Engeström *et al.*, 2003). For example, in his study of children's healthcare,

Engeström (2000) discusses the innovation of a 'care agreement' – a coordinated plan for a patient's ongoing treatment that was introduced in response to persistent communication breakdowns between different medical specialists and centres involved in this process. Engeström explains that "[t]his instrumentality, when shared by practitioners across institutional boundaries, is supposed to expand the object of their work by opening up horizontal, socio-spatial interactions in the patient's evolving network of care, making the parties conceptually aware of and practically responsible for the coordination of multiple parallel medical needs and services in many patient's lives" (p.967). Hence, this particular instrument allowed the medical professionals to change their practices and address the problems of coordination that arose from a contradiction in their activity between the traditional organisational model of patients being the responsibility of a single physician, and the more complex range of care that was required in cases with multiple diagnoses (Engeström, 2000).

The effects of the 'care agreement' instrument described here by Engeström are similar to those attributed in the wider organisational literature to 'boundary objects' - artefacts that are common to the work practice of more than one community and can facilitate interactions between them that jointly transform the knowledge embedded in their respective practices (Carlile, 2002; also Boland and Tenkasi, 1995; Bechky, 2003; Ewenstein and Whyte, 2009). The development of this concept is credited to Star's work in the sociology of science, where the property of being able to move between different worlds of scientific practice marked boundary objects as a 'means of translation' (Star and Griesemer, 1989). Her definition indicates the potential value of these intermediaries in reconciling the socio-spatially distributed and situated aspects of knowing:

Boundary objects are objects which are both plastic enough to adapt to local needs and constraints of the several parties employing them, yet robust enough to maintain a common identity across sites. They are weakly structured in common use, and become strongly structured in individual-site use.

(Star, 1992, p.406).

A concern with the translational effects of artefacts is continued in a strand of the organisational knowing-in-practice literature that draws prominently on actor-network theory (e.g. Araujo, 1998; Gherardi and Nicolini, 2003; Suchman, 2003; Gherardi, 2006). This breaks decisively with any lingering notion of organisations as closed knowledge systems, instead viewing knowing and organising as ongoing accomplishments involving the temporary ordering of heterogeneous technological and social materials into stable arrangements (Suchman, 2003). Gherardi (2006) expresses these ideas through the metaphor of an interwoven 'texture' of different fields of activity seamlessly merging into each other, and proposes that practices should be understood as the actions that hold these interconnections together. Significantly though, even here the agency of these mobile intermediaries is only seen to emerge as part of knowing that is spatially and temporally situated. For instance, Gherardi and Nicolini (2003, p.211) explore the construction of workplace safety knowledge on building sites through the circulation of various intermediaries – formal regulations, pieces of equipment, industry discourses – that embody the practices of other institutional bodies. However, they emphasise that "[t]his body of

knowledge ... does not produce safety by itself, but only when it is put to work by situated actors in situated work practices and in local interpretations of its meaning and constraints" (p.220). So these networks translate, and hence change, knowledge through becoming ordered in indeterminate and contingent situated action, and are not merely means of transmitting and embedding non-local knowledge into different work sites. Similarly, Beunza and Stark (2004, p.381) show that even in an activity like global financial trading, knowing is still realised in a specific situation of practice:

[C]ognition in the trading room is not simply distributed. It is also a situated calculation. A trader needs tools – the financial instruments of derivatives and the material instruments to execute a trade. But in addition to these calculative instruments, the trader also needs a 'sense of the market'. Knowing how to use the tools combines with knowing how to read the situation. This situated awareness is achieved by drawing on the multiple sensors (both human and instrumental) present within the room.

Recognition of the extra-local nature of the relations that may constitute knowing can, however, be seen to deepen the contradiction between its situated and distributed parts. This tension has been expressed in research from organisational studies that examines the challenges faced by practitioners in the work environment of geographically-dispersed organisations (e.g. Schultze and Boland, 2000; Orlikowski, 2002; Sole and Edmondson, 2002). A valuable feature of this research is that distanciated relations and organisational boundaries are not downplayed or treated as insurmountable barriers to interactive learning, but are transformed into an

object of reflexive knowing themselves when the problems they create become part of everyday work practice. For example, in her study of a multinational software firm, Orlikowski (2002) treats the "capability for effective distributed organizing", as "a collective and distributed competence" (p.269), which is produced through the situated practices of team members "recurrently enact[ing] ways of dealing with the temporal, geographic, political, cultural, technical, and social boundaries they routinely encounter in their work" (p.256). So in this work, the transnational organisation of economic activity is not interpreted to mean a sense of space formed just through 'stretched' network relations, but one in which situated and distributed parts of knowing are more in constant tension, and require creation of new forms of work practice and intermediary.

4 – Conclusion

This paper has argued that, despite recent positive movement in this direction, economic geography is yet to develop a complete understanding of knowing-in-practice, and has proposed that focusing more closely on work activity can be a first step in addressing this gap. A critical review of the distinctive practice-based view of knowledge and space that is beginning to emerge in economic geography was outlined from this standpoint. This concentrated on three inter-related features that, despite some notable variations in emphasis and interpretation, are common features of engagements with practice-related theories of knowledge in economic geography: a privileging of 'community' over 'organisation' as the locus of knowing, a focus on the enactment of knowing as a 'relational effect' of sociality and communication which lacks a strong connection to practical action, and a relational

conception of space that underplays the situatedness of knowing in any specific contexts of activity. Accordingly, knowing-in-practice was re-framed around the dual spatially-inflected concepts of situated and distributed knowing, drawing on an inter-disciplinary literature on knowledge and practice. In comparison to economic geography accounts, this interpretation of knowing along the lines of collective work activity concentrates on its situatedness in organisational settings (that do not necessarily correspond with single bounded organisations), its pragmatic or object-orientated but still indeterminate basis, and its mediation by cultural and technological artefacts or instruments.

I have sought to demonstrate that far from being mutually exclusive, the situated and distributed dimensions of knowing co-exist as two parts of a dialectical relationship. So where economic geographers have recognised that situated knowing is constituted through distributed relations, I have argued that in general they do not give enough attention to the other side of this process: how distributed systems of knowing are produced through collective situated action. This tension is present in research from organisational studies discussed above (e.g. Engeström, 2000; 2003; Orlikowski, 2002) that shows these contradictory spatial elements are reconciled in work-based innovative learning and practice. That knowing is partly-determined by the ongoing interaction of its situated and distributed elements indicates a different spatiality to that produced through the communal social practices and corporate knowledge management strategies featured in the current economic geography literature.

These two possible frameworks discussed in the paper are centred on different but not incompatible forms of social and work practice. If viewed as complementary, their combined explanatory potential means that in future work

economic geographers should be able to contribute substantially to the inter-disciplinary literature on knowing-in-practice by bringing its spatial and temporal dimensions to the forefront of analysis. This will however require closer theoretical and empirical attention to the form of situated practices - as emergent products of social interaction and/or culturally-mediated use of objects and instruments (Lave, 1993) - through which relational and dialectical spaces of knowing are produced in different economic settings.

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