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Face-to-Face, Buzz and Knowledge Bases: Socio-spatial implications for learning and innovation policy

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BY applying an industrial knowledge base approach the article seeks to reconstruct an alternative framework that allows for a systematic differentiation between the importance of both face-to-face and buzz for different industries. This provides a framework for developing a more nuanced understanding of the spatial implications of face-to face communication and buzz for learning and innovation.

Face-to-Face, Buzz and Knowledge Bases:

Socio-spatial implications for learning and innovation policy

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While concurring with the new streams of literature in geography that highlight the importance of face-to-face and buzz in the globalizing learning economy, the article argues that this literature is misleading on three interrelated accounts. Firstly, it conflates face-to-face and buzz; secondly, it fails to distinguish between the importance of face-to-face and buzz for industries drawing on different knowledge bases, and thirdly, these conceptual inadequacies lead to an exaggeration of the importance of cities as sites for creativity and innovation, and hence regional competitiveness.

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1. Introduction

Face-to-face communication and buzz are two topics that have not been considered central to economic geography for decades. This has changed recently, not the least due to the pioneering works of Storper and Venables who have brought the concepts to the centre of attention in the literature on urban development, competitiveness and innovation (see Storper and Venables, 2004; but see also Maskell et al, 2004; Bathelt et al, 2004; Malmberg, 2003; Grabher, 2002). However, more indirectly these topics have been on the agenda in regional studies for more than hundred years all the way since Marshall's seminal work on industrial districts (Asheim, 2000). The transition of the global economy from Fordism to post-Fordism as a learning economy has intensified this interest. This can be documented by the work of Italian industrial economists such as Beccattini et al. (2003) on local development and Lundvall's work on innovation as interactive learning (Lundvall, 1992). In a learning economy, innovation increasingly depends on complex valuable tacit knowledge that is either embedded in a person, firm, a network or local context (Polanyi, 1966/1997, Lundvall et al, 2002). Tacit knowledge refers to the famous statement by Polanyi (1996/1997, p. 136) that "we can know more than we can tell". This type of knowledge is difficult to articulate or codify since it is 'articulated' through practical skills and cannot be reduced to numbers, graphs, maps, diagrams, texts, formulas, etc. Hence, it is difficult to store and transmit in ICT technologies (Nonaka, 1994; Nonaka and Takeuchi, 1995) and necessitates face-to-face communication and buzz.

However, most of the literature referred to dealing with F2F and buzz is misleading on three interrelated accounts. First, it conflates face-to-face and buzz; secondly it fails to distinguish between the importance of face-to-face and buzz for different industries, and thirdly these conceptual inadequacies lead to exaggerating the importance of cities as sites for creativity and innovation, and hence regional competitiveness. Alternatively we emphasize that face-to-face and buzz refer to two different means of communication. The respective importance of each mode of communication depends on the characteristics of the knowledge bases that the industry in question draws

upon. Alluding to the conclusions, we argue that urban settings or cities are central units for creating innovations, and subsequently competitiveness, in industries drawing on a symbolic knowledge base such as the creative industries. They rely heavily on both buzz and face-to-face communication. However, the same cannot be said for industries drawing on synthetic (engineering) or analytical (scientific) knowledge bases where face-to-face communication - with the aim of, respectively, technical problem-solving and exchange of scientific knowledge - is more important than buzzing.

The aim of the paper is primarily theoretical in nature and strives towards: (a) identifying and specifying the differences between face-to-face and buzz; (b) analysing how the importance of face-to-face and buzz varies for industries with different knowledge bases; and (c) discussing the spatial implications for different industries and talents. These issues are sustained by insights from the most recent developments within the regional innovation systems literature, emphasising the importance of applying a knowledge base approach (Asheim and Gertler, 2005; Moodysson et al, forthcoming), and the literature on organization and locations of creative industries (Florida, 2002).

The structure of the article is as follows. First we give a historical account and introduction to the concepts of face-to-face and buzz. Then we turn to the existing literature and illustrate the role attributed to face-to-face and buzz (including their limitations) as well as its spatial implications. This is followed by a section where we discuss the threefold distinction between analytical, synthetic and symbolic knowledge bases and its relationship to buzz and face-to-face. Drawing on this refinement we subsequently point to more qualified explanations for spatial patterns of learning and innovation for different industries and a more nuanced way of assessing regional competitiveness. Illustrative examples from within Scandinavia will be used to clarify the theoretical arguments. Finally, the article is summed up with the conclusions.

2. Unpacking Face-to-Face and Buzz

It has lately been argued that face-to-face and buzz are becoming increasingly important in the globalising economy (Storper and Venables, 2004; Bathelt et al, 2004). This is caused by structural changes in the globalising economy, where the transition from Fordism to post-Fordism is among the most significant. Thus, a central part of the explanation has to be anchored in the new and broader understanding of innovation as *interactive learning*, which was first and most strongly promoted by Lundvall (1992). Lundvall based his arguments on studies of *user-producer* relationships in Danish manufacturing industry, which is pre-dominantly populated by small and medium-sized enterprises (SMEs) ((Lundvall and Johnson, 1994). The interactive learning perspective emphasizes the importance of *co-operation*, which can be improved and strengthened by the existence and building of *social capital*. Moreover it positions such processes within broader societal and institutional contexts. In addition to nation-based contexts, the contextualisation was later specified to be the regional level, arguing that "the region is increasingly the level at which innovation is produced through regional networks of innovators, local clusters and the cross-fertilising effects of research institutions" (Lundvall and Borrás 1999, p. 39). Thereby the importance of *spatial proximity* is (indirectly) highlighted (Maskell et al, 1998).

Being a forerunner for the contemporary new economic heterodoxy, Marshall (1921) specifies such agglomeration economies by attaching a strong role to the particular *territorial* aspects of a geographical agglomeration of industrial production. Marshall focuses on traditional socio-cultural factors, which concern the quality of the social milieu of industrial districts, and which only indirectly affect the profits of firms. Among such factors Marshall emphasizes in particular the mutual knowledge and trust that reduces transaction cost in the local production system; the industrial atmosphere which facilities the generation and transfer of skills and qualifications of the workforce required by local industry; and the effect of both these aspects in promoting (incremental) innovations and innovation diffusion among small firms in industrial districts (Asheim, 2000). By defining agglomeration economies as socially and

territorially integrated properties of an area, Marshall abandons “the pure logic of economic mechanisms and introduces a sociological approach in his analysis” (Dimou, 1994, p. 27).

What these two theoretical contributions have in common are a focus on the importance of interaction, networking, co-operation, social capital and spatial proximity as constituting elements for *collective* learning processes promoting the innovativeness and competitiveness of firms, regions and nations. Furthermore, they both have manufacturing SMEs as their main empirical objects of study. This also implies that *tacit* knowledge, which according to Marshall was in the air as ‘industrial atmosphere’ in the regions, is an important type of knowledge, and that *incremental* innovations are the dominant form of innovations (Asheim 2000). These theoretical positions have been further developed and elaborated into theories of localised learning and cluster formation in contemporary globalising economies (Maskell and Malmberg, 1999; Malmberg and Maskell, 2006).

The above implies that face-to-face thus refers to the communicative advantages (and in principle, but seldom in reality, to the disadvantages) of physically co-present communication. Face-to-face should be taken literally in the sense that two or more persons are physically co-present in a way that allows for mutual visual and physical contact. Therefore it refers to more than just co-location in the same cluster or city. The literature most often defines face-to-face communication negatively as those aspects of communication that cannot be undertaken electronically. As such it is associated with a multidimensional communication process.

> “...relative to electronically-mediated exchange, the structure of face-to-face interaction offers an unusual capacity for interruption, repair, feedback, and learning. In contrast to interactions that are largely sequential, face-to-face interaction makes it possible for two people to be sending and delivering messages simultaneously. The cycle of interruption, feedback and repair possible in face-to-face interaction is so quick that it is virtually instantaneous.” Nohria and Eccles (1992, p. 292, quoted from Storper and Venables, 2004)

It allows for utilizing several means of communication for the transfer, interpretation and co-development of especially complex tacit knowledge between two or more individuals. The knowledge and/or information transmitted, co-developed or reinterpreted in a face-to-face context can be knowledge that is relevant for the objectives of a particular collaborative arrangement or to knowledge spillovers in a non-collaborative context (for example in a network of peers or professional community).

Thus, a strong argument for clustering of such activities is that they require and benefit from face-to-face contacts. Florida (2002) adds to this that firms cluster in order to draw from concentrations of talented people who promote innovation and economic growth. He argues that constellations of talents and creative people are most commonly found in large city regions where the diversity of urbanisation economies is more abundant. This has led many to talk about an 'urban turn' both theoretically and empirically. While a theoretical turn is observable, both with reference to Florida's work on talent and creative capital and aforementioned Storper and Venables' contribution, the empirical outcome has not been scrutinized closely enough to determine whether the growth of industries favouring an urban location (which most commonly is asserted to be high-tech and creative industries) exceeds other types of industries, and if people – and especially talents and the creative class – prefer urban living. Generally, the increased attention paid to talents, creativity and the creative class both among academics and practitioners is at least partly caused by a stronger focus on (new) knowledge creation and radical innovations (instead of on incremental innovations based on interactive learning), in what is more and more often called the knowledge economy.

Against this 'urban turn' background the buzz concept has gained popularity in economic geography the last couple of years. It does not have a clear definition, however, which might be because it comes from slang and originally alludes to the 'buzzing' sounds of insects. The Storper and Venables (2004) 'definition' illustrates this ambiguity. According to them, buzz is:

> "… a highly efficient technology of communication; a means of overcoming coordination and incentive problems in uncertain

> environments; a key element of the socialisation that in turn allows people to be candidates for membership of 'in-groups' and to stay in such groups; and a direct source of psychological motivation. The combined effects of these features we term 'buzz'" (p. 364-365).

In this conceptualisation it refers to means, sources and effects of communication at one and the same time. The same kind of ambiguity is found in Bathelt et al (2004). They suggest:

> "… Buzz refers to the information and communication ecology created by face-to-face contacts, co-presence and co-location of people and firms within the same industry and place or region. This buzz consists of specific information and continuous updates of this information, intended and unanticipated learning processes in organised and accidental meetings, the application of the same interpretative schemes and mutual understanding of new knowledge and technologies, as well as shared cultural traditions and habits within a particular technology field, which stimulate the establishment of conventions and other institutional arrangements. Actors continuously contributing to and benefiting from the diffusion of information, gossip and news by just 'being there".

To arrive at a more narrow and precise definition we argue that the *noise concept* needs to be stressed (Grabher, 2002). Inspired by Pratt (2002) he argues that

> "actors are not deliberately 'scanning' their environment in search of a specific piece of information but rather are surrounded by a concoction of rumours, impressions, recommendations, trade folklore and strategic information ..." (Grabher, 2002, p. 209).

This covers "the idea that a certain milieu can be vibrant in the sense that there are lots of piquant and useful things going on simultaneously and therefore lots of inspiration and information to receive for the perceptive local actors" (Bathelt et al, 2004). As such buzz refers to *non-deliberate* knowledge and information exchange propensities. But contrary to dominant interpretations, we suggest that: (a) buzz can be transmitted both electronically and face-to-face and (b) therefore can be both local and global.

Thus defined, buzz can avoid being conflated with face-to-face communication as this distinction conceptualizes face-to-face communication as primarily aimed at transmitting complex tacit knowledge, mainly in formal collaboration, and buzzing activities as group-based self-generating exchange of information and knowledge outside formal collaboration. A further elaboration of this basic distinction follows below.

Face-to-Face - Why all the fuzz now?

In the literature a twofold distinction can be made in connection to the (im)possibilities of tacit knowledge transfer (Amin and Cohendet, 2004; Amin and Thrift, 2002; Maskell et al, 2004). The most common position, known as the physical proximity-argument, contends that tacit knowledge can easiest be transmitted in a face-to-face context since this allows for multi-dimensional communication. This multi-dimensionality refers to being able to watch, touch and listen all at the same time, thus being interruptive and non-sequential (Storper and Venables, 2004; Maskell et al, 2004; Bathelt et al, 2004). The other position counter-argues that tacit knowledge can easily be transmitted across large geographical distances. Amin and Cohendet (2003) criticize the first position as it:

> " … sees 'being there' only in terms of spatial proximity. We question a conceptualization of knowledge space based on the distinction between place defined as the realm of near, intimate and bounded relations, and space defined as the realm of far, impersonal and fluid relations. It is just this kind of dualism that has allowed commentators to associate tacit knowledge with spatial proximity, and codified knowledge with ubiquity" (p. 5).

Instead, they argue that relational proximity (e.g. shared values, shared visions, shared vocabulary) between physically distanciated members of communities of practise (Brown and Duguid, 1991; Amin and Cohendet, 2003; 2004) or epistemic communities (Maskell et al, 2004; Cohendet and Llerna, 2001), is sufficient to allow for transmission of tacit knowledge. Having a shared practise experience as agents united in a community of practise or a common goal and framework for knowledge creation in an epistemic

community (Cohendet and Lllerna, 2001), thus serves as the underpinning for relational proximity. It goes beyond doubt that electronic means of communication have profoundly altered human communication patterns. In various circumstances face-to-face communications has been replaced by for example email correspondence[1]. Nonetheless, Amin and Cohendet (2003, 2004) have difficulties explaining that 'over the past quarter century, long-distance business travel has grown faster than output and trade', despite 'the relatively high pecuniary and opportunity cost of business travel' (Storper and Venables, 2004, p. 351). An important shortcoming of the conceptually challenging work on relational proximity is the lack of empirically sustained work on this topic. We argue that an essential explanatory variable for the (un)importance of face-to-face can be found in the particular type of knowledge base that an industry draws on, to which we shall return shortly.

Buzz - Why all the fuzz now?

Buzz has received increased attention due to the general structural transformations of the capitalist economies where creative industries - and creativity in traditional industries - are becoming more important (Florida, 2002; see Caves (2000) for a detailed assessment of the organization of creative industries). Creative industries are the industries involved in the production of symbolic goods (Scott, 1999). They cover film production, theatre, publishing, and so forth. Buzz is considered to be crucial for knowledge exchange in the creative industries as they draw on highly tacit knowledge that is dependent on local context, and is often rooted in the particularities of youth or street cultures (Florida, 2002). Moreover, these industries tend to be strongly based on project-organization (Grabher, 2004, 2002). Projects "constitute a temporary organizational arena in which knowledge is combined from a variety of sources to accomplish a specific task" (Grabher, 2004, p. 104), where emphasis is on the institutionalisation of its termination (Lundin and Söderholm, 1995). This makes access to *know who* highly relevant to find out which actor has the technical skills needed, who is most innovative, whom one can collaborate with, etc. Given the right

[1] The way that many of the discussions underpinning this article have been facilitated provide a case in

competencies and a central position in the network buzzing is an efficient search method for coping with these problems (while a lack of these competencies can lead to disastrous results when relying on buzz). Moreover, buzz is most efficiently transmitted in face-to-face contexts, but can also be transmitted in virtual networks through electronic mailing lists and so forth. Hence, contrary to suggestions by Storper and Venables (2004), face-to-face communication is not a necessary condition for buzz, or an integrated aspect of buzz.

In sum, face-to-face and buzz both play pivotal roles in providing and distributing knowledge and information of importance for firms' innovative performance. From the literature it follows that face-to-face communication has become increasingly important in the learning economy due to the importance of tacit knowledge in innovation understood as interactive learning, while buzz is mainly – though not exclusively - important for creative industries. Building and elaborating on this qualification. the article argues that face-to-face primarily refers to the multidimensional aspects of communications that require physical contact. It covers deliberate knowledge exchange in mainly formal collaborations. Buzz refers to rumours, impressions, recommendations, trade folklore and strategic information. Thus it is predominantly about knowledge spillovers.

3. Knowledge-bases, Face-to-Face, Buzz and Spatial Implications

Face-to-face and buzz are important explanatory factors for the geography of innovative activity. But as they refer to two *distinct* mechanisms for knowledge and information exchange and transfer they are so in different ways. Moreover, the literature remains silent about whether and how face-to-face and buzz mediated interaction varies for different industries. It is assumed to be a basic characteristic of all industries. This section discusses how different industries rely on different knowledge bases, namely analytical, synthetic and symbolic, for activities that are most central to their competitiveness. These knowledge bases rely to various degrees on face-to-face communication and

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point.

buzz, which has important spatial implications for learning and innovation in an industry.

Following Archibugi and Lundvall (2001), we recognise the increased importance of knowledge creation in all segments of society and economy, including traditional industries, services, and emerging sectors such as high-tech (bio- and nanotechnology) and creative industries. But this does not mean that R&D and the level of technological complexity are the only indicators of knowledge intensity and innovativeness. All economic activities are based on knowledge and learning, also the ones commonly referred to as low-tech (Smith, 2005). Despite the generic trend towards increased diversity and interdependence in the knowledge process, we argue that the innovation process of firms and industries differ substantially between various sectors, whose activities require specific 'knowledge bases' (Asheim and Gertler, 2005). A knowledge base refers to the area of knowledge itself as well as its embodiment in techniques and organisations (Brink et al, 2004). In this article we distinguish between three main categories: 'analytical', 'synthetic' and 'symbolic'. These contain different mixes of tacit and codified knowledge, codification possibilities and limits, qualifications and skills required by organisations and institutions involved, as well as specific innovation challenges and pressures. The typology encompasses and acknowledges the diversity of professional and occupational groups and competences involved in the production of various types of knowledge. The analytical knowledge base comprises (predominantly scientific) knowledge that is geared to understanding and explaining features of the (natural) world. The synthetic knowledge base refers to the (predominantly engineering) knowledge involved in the design and construction of solutions to human problems which is often instrumental, context specific and practice related. The symbolic knowledge base deals with the creation of cultural meaning through transmission in an affecting sensuous medium. Figure 1 summarizes the main characteristics.

Analytical	Synthetic	Symbolic
Innovation by creation of new knowledge	Innovation by application or novel combination of existing knowledge	Innovation by recombination of existing knowledge in new ways.
Importance of scientific knowledge often based on deductive processes and formal models	Importance of applied, problem related knowledge (engineering) often through inductive processes	Importance of reusing or challenging existing conventions
Research collaboration between firms (R&D department) and research organisations	Interactive learning with clients and suppliers	Learning through interaction in the professional community, learning from youth/street culture or 'fine' culture and interaction with 'border' professional communities.
Dominance of codified knowledge due to documentation in patents and publications	Dominance of tacit knowledge due to more concrete know-how, craft and practical skill	Reliance on tacit knowledge, craft and practical skills and search skills

Figure 1: knowledge base typology

Analytical knowledge base

This refers to activities where scientific knowledge is highly important, and where knowledge creation is based on cognitive and rational processes (e.g. formal models). Typical examples of this are found in biotechnology and nanotechnology. Companies usually have their own R&D departments but they also rely on the research results of universities and other research organisations in their innovation process (Coenen et al, 2004). University-industry links and respective networks, thus, are important and relatively frequent. Knowledge inputs and outputs are often codified as they often entail know-why: i.e. knowledge about principles and laws of motion in nature, in the human mind and in society (Lundvall et al, 2002; Malerba and Montobbio, 2000). This does not imply that tacit knowledge is irrelevant, since there are always both kinds of knowledge involved and needed in the process of knowledge creation and innovation (Nonaka et al, 2000; Johnson et al, 2002). The fact that codification is frequent is due to several reasons: knowledge inputs are often based on reviews of existing studies, knowledge generation is based on the application of scientific principles and methods, knowledge processes are more formally organised (e.g. in R&D departments) and outcomes tend to be documented in reports, electronic files or patent descriptions. Such activities require specific qualifications and capabilities of the people involved. In particular analytical skills, abstraction, theory building

and testing are often needed. The core of the work-force, as a consequence, needs research experience or university training and is often involved in scientific discoveries. An important route of knowledge application is new firms and spin-off companies which are occasionally formed on the basis of radically new inventions or products.

An important implication of the high degree of codified knowledge is that firms can rely on more formal screening and signalling procedures for acquiring new productive knowledge (know-why) as well as finding collaborative partners (know-who). As scientific knowledge often is abstract and codified in the form of publicly available articles in journals and conference papers, face to face and buzz do not appear to be of major importance for accessing scientific knowledge in itself. However, firms drawing on an analytical knowledge base often compete by accessing and absorbing knowledge before its rivals do. This means that a major source of competitive advantage pertains to the ability to access and absorb scientific knowledge before it is published or made public in other ways. Despite the abstract and formal nature of the knowledge, these absorption processes may be facilitated through the interactive features of face-to-face communication.

Due to the strongly codified means of communication, the importance of buzz, and subsequently face-to-face, should not be overestimated for acquiring knowledge about collaboration partners. Publications, patent rights and web-based information can serve a highly informative role in this. However, face-to-face communication does play a role in building up trust relations and initial idea spawning and brainstorming among fellow researchers (Moodysson et al, 2006). Buzz, on the other hand, can be important to convey information about the reputation of researchers within the scientific community, promising on-going (and thus unpublished) research as well as valuable insights concerning failures in scientific experiments.

In sum it can be argued that industries drawing on an analytical knowledge base rely heavily on codifiable knowledge which facilitates access to distant knowledge and collaboration. Notwithstanding this, these industries tend to

cluster around or rather locate in close proximity to major universities or research institutes carrying out leading research within their field (Cooke, 2005). An important reason for this is (personal) access to world leading researchers and research environments (including the needed research infrastructure) as referred to above. Therefore the location patterns of these industries are heavily determined by the level of research, specialisation and location of relevant universities and research institutes. It goes beyond the scope of this article to engage in a discussion of what determines the location of the most attractive universities as that involves complex political processes and path-dependent evolutionary processes. However, one can still argue that the importance of openness, tolerance and quality of life-dimensions, as Florida (2002) argues, tend to be of minor importance for these industries. Scientists are more motivated by getting access to rare, sophisticated and expensive laboratory equipment and good research conditions in general.

The life-science industry serves as an illustrative example. Here the spatial patterns of innovation display a strong concentration in a handful 'megacentres' (Cooke, 2004) among which the 'Medicon Valley' cluster in the Swedish-Danish Øresund region is generally counted (Coenen et al, 2004). The regional advantage builds on a critical mass of highly specialised and knowledge-intensive dedicated biotech firms (DBFs), life science researchers working in public and private research facilities and large pharmaceutical companies. However, global network connections are at the same time indispensable for knowledge creation and innovative activities. These are shaped through the international intra-corporate networks of large pharmaceutical companies as well as through international collaborative linkages between researchers within similar epistemic communities. Due to the strong growth of possible applications in life science it has been increasingly hard for firms as well as for the region to host all necessary competences within its boundaries. This has resulted in a local node, global network geography (Moodysson et al, 2006; Gertler and Levitte, 2005).

Synthetic knowledge base

This refers to activities where innovation takes place mainly through the application of existing knowledge or through the new combination of knowledge (Asheim and Gertler, 2004; Asheim and Vang, 2004; Laestadius, 1998; Kaufmann and Tödtling, 2000). Often this occurs in response to the need to solve specific problems coming up in the interaction with clients and suppliers (Vang and Overby, forthcoming). Examples include innovation activities in plant engineering, specialised advanced industrial machinery and production systems, and shipbuilding. Products are often 'one-off' or produced in small series. R&D, takes the form of applied research, but more often it is in the form of product or process development. University-industry links are sometimes relevant, but mainly in the field of concrete knowledge application.

Novel knowledge is created less in a deductive process or through abstraction, but in an inductive process of testing, experimentation, computer-based simulation or through practical work (Pavitt 1998, Vincenti 1990). Knowledge embodied in the respective technical solution or engineering work is at least partially codified (e.g. technical blueprints). However, tacit knowledge seems to be more important than in the analytical knowledge base, in particular due to the fact that knowledge often results from experience gained at the workplace, and through learning by doing, using and interacting (Lundvall et al, 2002). There is more concrete know-how, craft and practical skill required in the knowledge production and circulation process. These are often provided by professional and polytechnic schools, or by on-the-job training. The innovation process is often oriented towards the efficiency and reliability of new solutions, or the practical utility and user-friendliness of products from the perspective of the customers (von Hippel, 2005). Overall, this leads to a rather incremental way of innovation, dominated by the modification of existing products and processes. Since these types of innovation are less disruptive to existing routines and organisations, most of them take place in existing firms, whereas spin-offs are relatively less frequent.

Industries drawing on a synthetic knowledge base rely on face-to-face communication due to the importance of customized solutions and the partly tacit nature of the know-how competencies involved. Given that the aim of synthetic knowledge creation is to develop and improve technical systems, the focus of the knowledge creation process can often be boiled down to concrete problem-solving related to the envisaged solution of specific problems presented by users and customers. This is often a trail-and-error process involving success and failure where user-producer interaction is an essential input and selection mechanism for innovation (Thomke, 2003). Face-to-face interaction can be very helpful in this. By allowing for multidimensional and simultaneous information and knowledge exchange it can make it easier to identify the specific problems that have to be solved in a swift and concise manner, the required needs of the solution, and the exchange of partly tacit experience of when and what has been done to solve the problems (what in German is called 'Fingerspitzengefühl' (fingertipfeeling)). Buzz, on the other hand, is only of minor importance in because of the dominance of bilateral knowledge exchange. Of course examples can be found where personal information and gossip is transferred through informal channels but this kind of buzzing does not qualify as crucial in synthetic knowledge creation.

The interaction with important customers often has a duration of several years or even decades. In some cases the suppliers even work at the customers' firm for months. The collaboration is often project-based and the producer needs to be able to allocate different employees to the projects depending on the turn the projects take. The high degree of tailoring solutions to the preferences of customers (users) and the general reliance on incremental innovation means that university links tend to be less relevant. Hence firms do not give a high priority to physical proximity to universities. Instead industries drawing on a synthetic knowledge base agglomerate in traditional clusters to exploit the advantages of being close to suppliers and customers as described in the literature. Increased flexibility, incremental innovations and efficiency improvements (Porter, 2000) are all facilitated by face-to-face communication. The presence of strong heterogeneity, as argued by Florida

(2002), is not of great importance. On the contrary it might result in undermining the shared norms and values that underpin the commonalities and complementarities found in clusters (e.g. the industrial atmosphere).

The study by Lorenzen (1999) on the furniture cluster in Salling, Denmark, serves as an illustrative example. Its competitive success is ascribed to a high degree of flexible specialization within the cluster; a phenomenon typical for industrial districts (Asheim, 2000). Each of the SMEs has developed its own dedicated niche through specialization in specific parts of the value chain in combination with an extensive local network of stable yet flexible embedded inter-firm relationships allowing for economies of scope. This combination allows for sustained gradual innovation often involving horizontal and vertical relations across firm boundaries. To co-ordinate this interaction, managers and technical staff (both within and across firms) often meet face-to-face 'on the workfloor' to discuss problems, suggest solutions and receive feedback.

Symbolic knowledge base

This is related to the aesthetic attributes of products, to the creation of designs and images, and to the economic use of various cultural artefacts. The increasing significance of these types of activities is indicated by the dynamic development of cultural industries such as media (film making, publishing, music etc), advertising, design or fashion (Scott, 1997) and the use of narratives and appeal to imagination as a way of adding value to products. These activities are innovation- and design-intensive since a crucial share of work is dedicated to the 'creation' of new ideas and images and less to their physical production process. Competition thus increasingly shifts from the 'use-value' of products to the 'sign-value' of brands (Lash and Urry, 1994). In industries drawing on a symbolic knowledge base the input tends to be aesthetic rather than cognitive in quality. This demands rather specialised abilities in symbol interpretation rather than mere information processing. Symptomatically, the knowledge involved is incorporated and transmitted in aesthetic symbols, images, (de)signs, artifacts, sounds and narratives. This type of activities is strongly tied to a deep understanding of the habits and norms and 'everyday culture' of specific social groupings. Due to the cultural

embeddedness of interpretations this type of activities is also characterised by a strong tacit component. The acquisition of essential creative, imaginative and interpretive skills is less tied to formal qualifications and university degrees than to practice in various stages of the creative process. The process of socialisation (rather than formal education) in the trade is not only important with regard to training 'know how', but also for acquiring 'know who', e.g. knowledge of potential collaborators with complementary specialisation (Christopherson, 2002). The latter is essential since production quite typically is organised in temporary projects (Grabher, 2002). In fact, cultural industries, like film production, are emblematic project settings (e.g. DeFillippi and Arthur, 1998; Sydow and Staber, 2002). More generally, the project provides an organisational arena in which a diverse spectrum of professional cultures that ranges from the artistic world to the commercial world of business services is brought together for a limited period of time. Projects requiring a symbolic knowledge base, however, are not necessarily aimed at bridging or minimising such diversity in a straightforward fashion. They also are seen as arenas of productive tensions and creative conflicts that trigger innovation

The importance of buzz for symbolic knowledge based industries follows from the one-off project-based character of most collaborations and the heavy reliance on the talent, skills and creativity of individual people involved. This makes knowledge about 'the right people to do the job' extremely important. Since there is limited codified knowledge which firms can draw on for identifying the relevant people for their projects they rely on buzz for *knowing who* is relevant, available and interested in participating in a particular project. Moreover, acquiring the right person involves much subjective, context related knowledge related to taste, trends and the latest gossip. Such *know who* also serves as a way of getting past gatekeepers and scooping the pool of potential talent; these industries tend to suffer from an overload of job-applications of – at least in their own mind – potential stars and talents.

Face-to-face communication is crucial in industries drawing on symbolic knowledge for two reasons. Firstly because buzzing often takes place at large gatherings (e.g. film releases, music festivals) and secondly for the knowledge

exchange in the actual projects. Technical competencies in these industries are essentially a question of craft-production. Scientific principles tend to be of marginal importance. This craft-production – even in the most standardized and commercial versions – cannot rely on purely standardized and codified techniques as each production contains several highly idiosyncratic elements. This can be illustrated with a few examples from the film industry. The lighting, for example, varies depending on the location (inside or outside, in the street or in the park, summer or winter) and the natural light on the particular day. The person in charge of the light draws on tacit knowledge to adjust for all these small differences which requires a large degree of *know how*. Moreover, he or she has to collaborate within the context of large projects which involves different groups of people. This calls for a high degree of *face-to-face negotiation* on how to cope with and reconcile the different views and preferences.

The training in the creative industries differ from country to country but tend to rely on learning by doing in both the more formal training setting as well as in the more informal. Danish film directors, producers, scriptwriters are almost always graduated from the film school in Copenhagen. The film school is, however, based on learning by doing which in turn is largely based on face-to-face communication between the involved persons. This is the case as projects are developed 'along the way' based on formal and informal communication between for example the directors and the instructors. Face-to-face communication is used to explain the tacit components of a creative project which almost per definition is ambiguous. This should, however, not be taken to imply that there is face-to-face communication all the time; nor that all face-to-face communication is equally important for all participants in the projects. To our knowledge there are no studies unpacking these features in any great detail. In the film industry, for example, it is not clear how important it is to be located permanently in or around Hollywood for a career, how it differs as the career progresses, and so forth. Most studies either focus on the cluster advantages without paying any attention to such details (see Scott, 2002, 2004) or they study the face-to-face interaction in particular geographical areas. Grabher's (2001, 2002) seminal studies on the

advertising industry in Soho are examples of the latter. These studies mostly pay attention to the benefits of face-to-face communication and buzz and not to the training and learning that do not depend on face-to-face communication.

It is difficult to generate clear spatial implications for the industries drawing on a symbolic knowledge base compared to the industries relying on analytical and synthetic knowledge bases. On the one hand the creative industries tend to be largely urban industries (for a different perspective, see Vang (2005)). The need for face-to-face communication and buzz plays a crucial role in explaining this locational pattern. However, while face-to-face communication is crucial for collaboration within these industries, it is the vast heterogeneity or variety of competencies in the broad sense of the word (including both technical and artistic) that make cities attractive locations. The supply of 'quality of life' aspects, reflecting the dominant tastes of the employees in the industries with respect to bars, cafés, nightclubs, are crucial in attracting the creative workers.

4. Conclusions and policy implications

Storper and Venables (2004) argue that face-to-face contacts represent the most fundamental aspect of proximity that favours urban concentrations and agglomerations. However, as argued in this article, the 'classical' face-to-face situation is found in 'user-producer' relationships in territorial agglomerations (clusters) of small and medium sized manufacturing firms where tacit knowledge plays an important role. The presence of social capital will promote the frequency and intensity of face-to-face along the vertical dimension of a cluster (i.e. between user-producer or client and subcontractor firms). Of course buzz also exists in such environments as part of the informal interactions on and outside job situations. But in these contexts it is more a mode of information exchange instead of knowledge exchange for learning and innovation. This distinction builds on the recognition that knowledge differs from information because of the cognitive features of the individual as a necessary component for the former to exist (Amin and Cohendet, 2004). The importance of such buzz is however diminishing as a consequence of the

reduced importance of tacit knowledge in industrial districts and cluster due to outsourcing, offshoring and foreign direct investments. Contrasting the more generalizing arguments by Storper and Venables, we have argued that this typical form of face-to-face is determined by the territorial concentration of a certain type of industrial activity building on a synthetic (engineering) knowledge base (e.g. manufacturing industry), which does not favour urban locations and agglomerations per se. On the contrary, concentrations of such industry can be found in agglomerations and clusters irrespective of the urban-rural dimension given that localisation economies can be exploited due to spatial proximity to users and suppliers.

Furthermore we have argued that the importance of face-to-face and buzz differs for industries drawing on an analytical (scientific) knowledge base. It is reasonable to assume that talent working in high-tech industries based on an analytical knowledge base do not exchange knowledge in informal buzz situations. They enjoy face-to-face when taking advantage of (spatial and relational) proximity to the diversity of formal, codified knowledge and expertise of top researchers found in leading universities and research centres. These situations of face-to-face are, thus, different from the one found in for example industrial districts, as they play out along a horizontal dimension among peer researchers. Moreover, this is not necessarily limited to local concentrations, but can also take place in epistemic communities with a global range. Structures of local nodes in global networks characterise, for example, the biotechnology industry, and can in part be an explanation of the continued strong growth in long-distance business travel referred to by Amin and Cohendet (2004) as well as by Storper and Venables (2004).

The typical buzz situation can be found at an informal meeting place (bar, pub, hotel lobby in connection with conferences and fairs etc. (Maskell et al, 2004), where networking activities are ongoing and exchange of (normally) information – not knowledge – takes place. We have argued that the only group that may exchange knowledge in buzz situations (and not only information), are people employed in creative industries (media, film, advertisement, fashion etc.), which draw on a symbolic knowledge base. In

such occupations, as with jobs in research, knowledge is highly individualised, and, thus social capital and collective learning is of less importance.

A set of policy implications can be drawn from this discussion. First, face-to-face and buzz should not be conflated, as they partly have different aims ('face-to-face' the transmission of complex tacit knowledge and 'buzz' the exchange of group-based information) and partly different channels of transmission (formal vs. informal contexts). This implies a more nuanced understanding of their respective potentials and limits. Moreover, the reasons behind the importance of face-to-face need to be substantiated in different ways. While the argument that face-to-face interactions in industries based on a synthetic knowledge base is important for learning and innovation in local clusters, and, thus, based on a learning or innovation theory approach, the argument that face-to-face represent the basic proximity factors behind urban concentration belongs more to a 'geographical' theory of urban development. This has implications for the focus and use of policy analyses and intervention.

Secondly, the differences in importance of face-to-face and buzz between industries and activities belonging to different knowledge bases, have significant spatial implications. In analytical knowledge based industries both face-to-face and buzz have relatively little importance. Nonetheless face-to-face has some role to play as a mean of horizontal communication between peers in communities of practice locally as well as epistemic communities globally. Spatial implications of this concern preferences for locations in spatial proximity to large and leading universities and research organisations. In synthetic knowledge based industries face-to-face is very important for user-producer as well as client-subcontractor (vertical) interactions in the production of customised products and services. However, such activities do not in principle display any clear preferences for a specific type of location as they can be located in regional clusters along the whole urban-rural spectrum. Buzz as a mean of knowledge acquisition is of minor importance in these industries and activities.

In industries and activities based on a symbolic knowledge base, on the contrary, both face-to-face and buzz are of significant importance both for knowledge and information exchange. Face-to-face is important in e.g. the production of films due to the idiosyncracy of the productions, while buzz is valuable for accessing talents needed to carry out the various activities in the creative industries. The need of proximity both to related activities for monitoring and learning as well as to pools of talents both imply a preference for an urban location due to the diversity of urbanisation economies and the knowledge heterogeneity of cities. These insights can also be used to nuance the hypothesis of Florida.

Taken together, this discussion clearly illustrates the impossibility of using face-to-face and buzz to formulate ’one size fits all’ solutions and policy recipes. In contrast a much more open and nuanced understanding of the spatial implications of face-to-face and buzz is provided, which could potentially play an important role in informing policies for regional development. These insights will provide a better basis for – and, thus, improve the capacity of – policy makers on different geographical levels to formulate and implement more dedicated and specific innovation support customised to different regions and sectors, which will be in increasing demand if regions in high-cost countries shall be able to compete and survive in a globalising learning economy.

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