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GUEST EDITORIAL

The Strategic Importance of Location: Location Decisions and the Effects of Firm Location on Innovation and Knowledge Acquisition

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Introduction—What Guides Location Decisions?

Classical and neo-classical location theory prescribes the choice of firm location to be guided by cost factors and infrastructure in the region. These cost reducing factors may lead firms to localize close to main customers or suppliers thus reducing cost of inter-firm transactions by this proximity. Another parameter may be that co-locating firms may benefit from access to shared resources like infrastructure, and a local, specialized labour market. Location of traditional production activities might to a large extent still be determined by cost factors and other traditional location factors, such as mentioned above, as well as in the paper by Doeringer *et al.* in this issue. The recent trend of outsourcing production to low cost Asian countries, especially China, is an indication of this. Additionally, it has been argued that although logistics and transportation technologies have improved immensely, the complexity of logistics has increased, as has the demand for speedy and frequent deliveries (McCann & Sheppard, 2003). Just-in-time manufacturing and distribution accentuates this. There is empirical evidence showing that at the aggregate level transportation costs as a share of total output have truly decreased substantially. But disaggregating the data shows that the fall in costs is accounted for by industries where frequencies of transactions have remained constant over time, typically mature industries like raw materials, agricultural products and some manufacturing products (Hummels, 1999; Glaeser, 1998). This indicates that there is still a role to play for traditional location theory in explaining how firms locate especially in these types of

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industries. Within industries different activities may have different requirements in terms of location—expanding this line of thought, Doeringer *et al.* in this issue break new ground by proposing that different management practices may also lead to different location requirements. The distinction between activities in relation to location can be dated back to Hymer (1979), who stated that the higher one goes in the hierarchy within a corporation, and the less standardized are the operations to be carried out, the greater the need for lateral communication. This implies that whereas activities at the lowest level, concerned with keeping activities going within the established framework, may spread themselves over the globe according to the pull of manpower, markets and raw materials, “[a]t the highest levels, continuous face to face contact and a large measure of common understanding are necessary” (Hymer, 1979, p. 237). Therefore these high-level activities tend to be far more geographically concentrated than lower level activities. Innovative activities, also within traditional industries, can be considered high-level activities, and should therefore, following Hymer, largely remain outside the trend of outsourcing production. Furthermore such activities are often based upon intangibles, therefore not adequately analysed with traditional location theories (see Feldman (1999) for a review of empirical studies of location and innovation).

Location and Access to Knowledge

With respect to innovation much literature emphasizes the fact that capital, production, and information may be very mobile across space. Improvements of information and communication technologies have for example made communication across large distances fast and easy. However, this is but some part of information and communication. As opposed to transfer of information, tacit knowledge is often grounded in the region because it is embedded in people and stimulated by face-to-face interaction. When access to codified knowledge is easy regardless of location, the competitive edge for firms increasingly depends on the access to tacit knowledge and the carriers and transfer mechanisms of this kind of knowledge. One important part of local knowledge acquisition is the prevalence of trust facilitating mutual exchange of knowledge and learning processes. Trust is closely linked to the interaction between people, and as long as mobility of labour remains relatively limited, as seems to be the case (see e.g. chapter 5 in Dahl (2003) for an analysis of regional mobility within Denmark), then there is bound to be an element of grounded knowledge. If acquisition of knowledge requires trust it follows that taking part in local economic (and social) activities is important, which necessitates some degree of local presence, thus supporting Hymer’s proposition. However, growing concerns in e.g. Silicon Valley over the jobless recovery and whether the white collar worker jobs will be the next to move to India or China point in the other direction. US companies are beginning to look to less expensive countries to provide outsourced services, such as IT services, and US imports of IT services have increased—admittedly from a very small starting point—by 25–30% over the past few years (Colliers International, 2004). This challenges the traditional perception of (relatively knowledge intensive) services as being non-tradable over long distances because of a need for a close interaction between buyer and seller; and accordingly it also challenges the perception of where such activities should be located. Hence, as Doeringer *et al.* argue in this issue, empirical accounts of standard business location parameters show that location decisions are much more complex today than prescribed by traditional models of business

location. However, one should not completely disregard the role of these traditional cost elements for certain types of activities.

Access to Codified and Tacit Knowledge

Whereas, despite the recent tendencies discussed earlier, there is some logic to the argument that a competitive edge requires access to locally available tacit knowledge (Maskell & Malmberg, 1999), some authors do argue that at the same time as local interaction is important it is likewise important and common that knowledge sourcing for innovation processes extend beyond the level of the region (Doloreux, 2004; Bathelt *et al.*, 2004; Fontes, this issue). One prerequisite for being able to acquire knowledge from outside the local region is internal knowledge, usually embedded in the labour force. The importance of local factors shaping a firms' knowledge base, and thereby the firms' capacity to absorb and use new knowledge (Cohen & Levinthal, 1990) developed outside the region, is discussed in the contribution by Fontes in this issue. Many recent agglomeration studies see knowledge acquisition/sourcing as a primary explanation for the existence of clusters, and this is also central to the papers by Fontes and Brenner in this issue. In particular, studies of high-tech industries, where important inputs like knowledge and financial capital at first sight should move quickly and costless through space, emphasize the knowledge component.

The Importance of Social Networks

Following the earlier mentioned work, different types of theories other than pure economic ones explain complementary, spatial concentration of firms. One of these is social network theory, which has been used to explain geographically localized clusters. One example is the study by Stuart and Sorenson (2003), who find that social relationships play a key role in mobilizing resources necessary for the process of creating firms and discovering new opportunities. The authors contend that these relationships are heavily anchored in space. Several of the papers in this issue (Sapsed *et al.*; Drejer & Vinding; Fontes) touch upon these types of explanations but do not fully integrate them. The importance of human resources and social capital and the fact that these are often residing in geographical locations is emphasized by recent discussions on the importance of 'Buzz in the city' (Storper & Venables, 2003) notably expressed in writings by Florida (2002). Among the implications for local policy-makers is a re-orientation of efforts to attract production to the region. Whereas these efforts earlier were directed towards firms and the parameters were the availability of cheap production factors and hard infrastructure, a shift towards campaigns targeted towards people is now seen: the region is branded as a nice place to live (see e.g. Hospers, 2004). The idea behind these efforts relates to the basic causality in much thinking about location. Whereas location of firms and jobs previously was thought to attract people and skilled labour, the logic behind much branding of regions is now that attracting people will evidently in turn attract firms because they are increasingly dependent upon the creativity of their employees. As discussed by Sorenson and Stuart (2001) the knowledge and creativity embedded in people, who in turn are tied up to the region and their local networks, may evidently render more start-ups in the region.

The argument in social network theory that trust is embedded in inter-personal relationships, and that these in turn are bound to be geographically restricted is questioned by Breschi and Lissoni (2003). They point to the fact that scientists and practitioners exchange knowledge across long spatial distances and that this knowledge is often tacit. They compare this kind of knowledge to a club good and claim that spatial closeness is not required for setting up a club (they do, though, find evidence for active involvement in networks of knowledge exchange as a precondition for access to a local knowledge pool).

Social network theory thus both contrasts and complements traditional location theory. McCann and Sheppard (2003) contend that agglomeration theories, the industrial complex model, and social network theories truly have rather different micro-economic foundations. But industrial concentrations will in reality contain features of one or more of these models even if some clusters may be dominated by one of them. They are therefore not mutually exclusive.

The Implications of Firm Location—The Contributions of this Special Issue

The earlier section has suggested that location matters for the possibility to tap into a local pool of knowledge because such knowledge is often ‘sticky’ in the sense that it is embedded in the region. One form of sticky knowledge is that which is stored in the people who in turn are relatively immobile, as discussed earlier. Another form is knowledge stored in the region through institutionalization of learning processes over time (Gertler *et al.*, 2000). This type of regionally embedded knowledge may be interpreted as a common culture and is similar to the Marshallian notion of “as if it were in the air” (Marshall, 1920, p. 225). This implies that regions may possess social capital in the form of knowledge derived from (and about) the interaction among firms and other organizations in the region. Such social capital is part of what makes a region attractive but it follows that local presence is an important means of acquiring this knowledge and making such social capital productive.

The papers presented in this issue deal with two related issues in relation to firm location: (i) why do firms choose to locate where they do, and (ii) what are the effects of firms’ location in terms of innovation strategies and the acquisition and sharing of knowledge? These two questions thus bind together the—in many senses very different—papers. Differences among the papers are for example a classical difference in their emphasis on either localization economies or urbanization economies in explaining the effect of location on economic activity (Lösch, 1954; Feldman, 1999). The former may provide knowledge spillovers and increase specialization by virtue of the benefits of co-localization of firms belonging to the same industry. The issues addressed in Brenner and Fontes’ papers add to this. The urbanization economies are scale effects of locating in specific areas or cities. Therrien as well as Drejer and Vinding take this approach.

Among the papers in this issue, the paper by Doeringer, Evans-Klock and Terkla is the only one to address a traditional location model explicitly. This paper is also the only contribution that does not relate directly location to innovation. It does however discuss how ‘soft’ factors influence firms’ location choices, e.g. factors supporting problem solving capabilities, and is as such an important contribution to the location debate. In the paper, traditional location decisions are confronted with a ‘high performance management’ model, which has different implications for location decisions. The main

argument proposed by the authors is that different types of firms apply different criteria for making location decisions. The authors focus on differences in management cultures, distinguishing between firms applying so-called 'J-mode' management practices ('J' refers to 'Japanese') and firms applying more traditional or 'old-fashioned' management practices. Whereas J-mode management practices, which are generally associated with relatively higher performance in terms of firm productivity than traditional management practices, involve intensive training, teamwork, workforce autonomy, and mechanisms for promoting employee participation in problem solving, traditional management practices involve job simplification and specialization, minimal training and the use of hierarchy and authority. Based on data on the establishment of manufacturing plants in the US, Doeringer, Evans-Klock and Terkla find that J-mode firms seek to locate in areas where the workforce has a positive attitude towards cooperation and commitment to the firm and a skill basis for participating in teamwork and problem solving. These types of factors are much more important for J-mode firms than standard location factors such as access to interstate highways and access to markets, which on the other hand are significant location factors for firms applying traditional (American) management practices.

The paper by Doeringer *et al.* thus illustrates that firm location is not randomly determined, nor is it based on simple economic calculations of direct costs. Moreover, it demonstrates that what was hitherto regarded as 'traditional' location factors now seem inadequate to explain the location choice of firms, especially firms applying J-mode management practises, which are usually regarded as more conducive for innovation (see Gjerding, 1992; Tomlinson, 2004). Apparently there are other, 'softer' factors that may be even more important than hard infrastructure, as also noted by McCann and Sheppard (2003) in their review of the development of location theory. But how does the location influence the actions and possibilities of firms once they are placed in a particular type of region? This is the common topic for the remaining papers.

Like Doeringer *et al.*, also Sapsed *et al.* discuss intra-firm decisions. Sapsed and his co-authors demonstrate that the transfer of knowledge between different locations does not only involve costs in inter-firm relations, but also internally in organizations. The paper analyses knowledge transfer practices in dispersed teamworking in five different UK organizations. The analysis confirms that face-to-face interaction, even though it can be successfully supplemented with other media of communication, is central for transferring knowledge, also within dispersed teams belonging to the same organization, implying that if an organization for some reasons chooses to locate in dispersed locations, there are costs associated with this choice.

Therrien uses Canadian innovation survey data to analyse innovation performance and strategy according to location (city size) and industry type. Therrien finds that although the size of a city in which a firm is located does not matter for the estimated probability of introducing a product or process new to the firm, city size does matter for the firm's innovation strategy. One primary finding is that firms located in smaller cities (with less than 50,000 inhabitants) are less likely to be associated with a world-first innovation than firms located in larger cities. Furthermore, firms located in smaller cities do not use the public science base as much as firms in larger cities, which can be a consequence of a lacking availability and poorer quality of the knowledge infrastructure in those smaller cities. With regard to the use of R&D inputs in general there are no differences related to city size, but the associated increase in the predicted probability of a world-first innovation is not as high for firms located in smaller cities as for firms located in larger

cities. Therrien suggests that firms located in smaller cities, because of the lack of support for their R&D effort, might choose to concentrate their R&D activities on monitoring and increasing their capacity to assimilate and exploit externally available information. That might also explain why a collaboration strategy has a greater impact on the predicted probability of a world-first innovation than an R&D strategy for these firms.

Drejer and Vinding also look at the importance of firm location for innovation strategy. The paper divides Denmark into two types of regions: major urban areas and peripheral areas. The focus is on collaboration patterns in relation to product innovation, with a particular emphasis on collaboration with private service providers and public knowledge institutions. Despite the very limited size of the country the paper finds that location makes a significant difference for firms' choice of collaboration patterns. Firms located in major urban areas are thus much more likely to collaborate with a wide range of public and private service providers. However, supplementary to the findings by Therrien with reference to Canadian firms, the analysis indicates that firms located in the periphery are more likely to gain a positive outcome of a diverse collaboration strategy compared to firms located in major urban areas.

Much has been said in the literature about the knowledge dissemination within clusters of firms. It may occasionally be fruitful to go beyond the usual focus of studies and see what the features of firms located outside clusters are. Fontes looks at the knowledge acquisition strategies of non-centrally located firms in a particular industry. Drawing on a survey of six Portuguese relatively newly established biotechnology firms the paper explores how biotech firms located outside biotech clusters manage to acquire knowledge, which is not necessarily available in the local environment. The paper finds, in accordance with the paper by Sapsed *et al.*, that face-to-face contact is critical for the knowledge acquisition process, thus requiring temporary co-location, which has high financial as well as personal costs. Further problems include coordination difficulties and cultural differences (the relevant knowledge sources are most often located abroad), which might influence the smoothness of negotiation processes and the development of trust.

Firm location might not at a first glance be a central topic in Brenner's analysis of the role of innovation and cooperation during the emergence of local clusters. Based on German innovation survey data Brenner empirically tests properties of cluster dynamics based on predictions deduced from theoretical modelling. The analysis confirms the role of process innovation (indicating the growth stage of a product life cycle) and local collaboration with suppliers and universities for cluster emergence. Location is, though, an important element in the analysis, because the author demonstrates the importance of the availability of local suppliers and knowledge institutions/universities for cluster emergence. The paper thus supplements the other contributions, especially that of Drejer and Vinding, with an additional angle on the importance of which type of area a firm is located in, more specifically which kinds of collaboration partners are locally available.

Finally, the paper by Amara *et al.* empirically tests factors that influence firms' evolution from one type of innovative environment to another. The analysis is carried out on the same Canadian innovation survey data as applied by Therrien in this issue. The innovative environments (also labelled innovative milieux by the authors) are defined relative to two structural characteristics: learning and interactions. The paper illustrates that alongside a wide range of sector specific and strategic factors, geographic location (in the present case in relation to Canadian provinces) matters for firms'

probability of operating in an environment characterized by strong learning as well as strong interactions (a so-called milieu innovateur or cluster). The factors most frequently explaining the probability that a firm operates in a more rather than a less favourable innovative environment in terms of learning and interaction are: use of government support, collaborative arrangements, R&D activities, and being located in the Quebec province. In terms of location the results suggest, in line with the findings by Therrien, that an innovative milieu is most likely to be found in a more densely populated area. Thus, even when a wide range of explanatory factors is included in the analysis, the importance of pure geography still remains. This underlines the importance of the location decision by firms discussed in the papers by Doeringer *et al.*, Therrien as well as Drejer and Vinding.

The discussion in this introductory paper may be seen as reflecting the theoretical development of the field where explanations emphasizing knowledge spillovers, learning and innovation have been dominating after a period of inter-firm transactions being the primary explanation of firms' location choices. As this explanation has proven difficult to uphold when confronted with empirical evidence the knowledge spillover alternative explanation has been ready at hand (Malmberg & Maskell, 2002).

The Contribution of Innovation Studies to Understanding Firm Location

In addition to dealing with the factors determining or the implications following firms' location choices, the papers in this issue share one common feature, which is related to a famous and intense debate that spun out of the Markusen-critique of recent contributions to the new economic geography (Markusen, 1999, and subsequent responses). Markusen maintained that the bulk of these contributions were based upon scanty empirical foundations and loosely formulated theory and implications. The papers in this issue share the feature of having a solid qualitative or quantitative data set as the base for drawing conclusions. The Brenner paper explicitly makes the point that this is the first study using a large data set to statistically explore the issue discussed here (cluster dynamics). Following the increased attention on regional aspects of economic development, an expansion of our empirical knowledge beyond the purely anecdotal level is necessary in order to guide the direction of academic (theoretical) as well as policy-oriented work.

In her review of the literature on location and innovation, Feldman (1999) concludes by stating that there is now emerging a substantial literature on the effect of location on innovation, but that effect may depend "upon the type of activity, the stage of the industry life cycle and the composition of activity within a location" (p. 21). Location is one of the factors that must enter our general explanations of innovation. However, it should be noted that cause and effect are not all that clear. In other words, there are indications that in some cases location decisions may be influenced by the innovativeness of a region or city. Therefore, innovation studies may vice versa contribute to our general understanding of location.

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