

**THE MICRO-FOUNDATIONS OF CLUSTER STICKINESS –
EXPLORING THE MIND OF THE ENTREPRENEUR**

Ivo Zander

Institute of International Business, Box 6501, 113 83 Stockholm, Sweden.

Tel.: +46-8-736 95 00, e-mail: Ivo.Zander@hbs.se

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Abstract: This paper offers a micro-level explanation to the uneven spatial and sectoral concentration of firms across national boundaries. By focusing on the geographical movements of (prospective) entrepreneurs and the cognitive processes that underlie new business formation, it is suggested that powerful forces work against an active response to entrepreneurial opportunities that present themselves in geographically distant locations. The entrepreneurship perspective offers an explanation to cluster stickiness which in important respects differs from the cost-benefit reasoning that currently dominates the economic geography literature.

Key words: Clusters, stickiness, entrepreneurship.

INTRODUCTION

One of the central issues in economic geography is the spatial and sectoral clustering of economic activity. It involves explaining not only why some geographical locations are more competitive or dynamic than others, but also why these dynamic effects tend to be localized or sticky rather than transferable across geographical distances.

Although the origins of clusters are 'shrouded in the mists of history' and only recently have come under closer scrutiny (Dicken, 1998; Feldman, 2001; Bresnahan *et al.*, 2001), cluster development in the post-formative stages has been identified as path dependent and sticky. It is a cumulative rather than random and disruptive process, involving both widening and deepening of capabilities and business activities among a set of interrelated firms, industries and institutions. Typically, processes of growth or contraction span several decades, if not centuries.

The stickiness of clusters, which implies sustained inter-regional specialization of economic activity, presents somewhat of a paradox in the light of improved communications and increasing mobility of people, products, and ideas. Answers to the paradox have typically been sought in mechanisms at a high level of abstraction, which generally fall back on the notion that operating across geographical distances is still associated with certain disadvantages. Some have suggested that existing cluster boundaries remain stable and distinct because individual activities cannot be separated from their context without losing some of their value (Malmberg *et al.*, 1996), an issue which is closely connected to the proposed difficulties of selectively tapping into geographically distant industrial environments (Porter, 1990; Sölvell *et al.*, 1991).

But clusters are more than a fixed collection of capabilities and firms, sustained by universal cost-benefit principles. They widen and deepen, typically through the establishment of new firms and inter-firm relationships, each new event at least theoretically opening up for new relationships that cut across and weaken established cluster boundaries. Moreover, the widening and deepening of clusters is ultimately dependent on entrepreneurial activity, the anatomy of which has received comparatively little attention in the economic geography literature. Specifically, empirical observations suggest that the logic underlying entrepreneurial behavior may be conceptually different and more complex than suggested by straightforward cost-benefit analyses (Mueller & Morgan, 1962). The present paper thus sets out to explore the stability or stickiness of clusters from an entrepreneurship or micro perspective, which has been identified as a

promising but largely uncharted field of investigation (Porter, 2000). While incorporating some of the basic ideas that have been introduced in the previous literature, in particular within the field of economic geography, it offers an alternative explanation to cluster stickiness and explores a new and different perspective on cluster dynamics.

Specifically, it will be argued that two aspects of the entrepreneurial process, opportunity recognition and the formation of intentions to establish new businesses, are at the heart of cluster growth and sustained inter-regional specialization of innovation and business activity. It is suggested that the typically limited geographical movement of individuals narrows the range of opportunities to be discovered, and that the perceptions of desirability and feasibility which are critical for new business formation create a systematic bias against responding to opportunities that present themselves in distant environments. The conclusions suggest that an entrepreneurship perspective generates a new and relatively unexplored approach to explaining the phenomenon of cluster stickiness. It could provide a useful starting point for policy making aimed at enhancing cluster dynamics and rejuvenation, although the current paper will not address policy issues at any greater length.

The paper is structured into four main sections. The first section reviews some of the existing literature on uneven spatial and sectoral concentration of firms, with a particular focus on the proposed explanations to cluster stickiness. The section that follows presents a conceptual model on the micro-processes that underlie the formation of new firms, and presents how the entrepreneur recognizes opportunities and develops the intentions that lead to the setting up of a new business firm. The third section then introduces the geographical dimension to the conceptual model, and investigates how new firm formation at the micro level is affected by geographical distances. It is suggested that the geographical movements of (potential) entrepreneurs and the micro-processes underlying new firm formation create a systematic bias against responding to opportunities that develop in distant environments. The fourth and concluding section contains a summary and explores a number of issues related to cluster stickiness.

A few remarks should be added already at the outset. The paper intends to delineate the fundamental mechanisms at play under 'normal' rather than formative or disruptive circumstances¹. New firm formation is thus considered to reflect the introduction of new products and services that to a large extent build on established

¹ Although the formation of new firms reflects general features of entrepreneurship, Bresnahan *et al.* (2001: 842) note that: "...founding a new cluster, or the early firms in a new cluster, is a very different entrepreneurial and economic activity than founding a firm in an established cluster."

resources or sizeable and growing demand. The outcome may be the introduction of products and services that involve significant technological breakthroughs but draw upon and target existing firms and industries, implying the deepening of capabilities by means of specialization within a given technological trajectory and customer base (Bhidé, 2000).

Moreover, the paper addresses processes at play in the general population of potential entrepreneurs. The arguments that are put forward do not preclude (possibly numerous) examples of how individual entrepreneurs develop new businesses on the basis of geographically distant influences and contacts, and sometimes set up new ventures that are more or less detached from the local business environment. It will simply be submitted that these individual examples are not necessarily representative of the bulk of entrepreneurs and entrepreneurial processes underlying new business formation. Similarly, the paper does not advocate a uniquely local perspective on entrepreneurship, but outlines a main tendency in a process where the local aspects in many cases are a matter of degree.

The present paper further recognizes that drawing the geographical boundaries of clusters is a judgment call and point of debate (Clark *et al.*, 2000; Rugman, 1993), but in line with much of the empirical illustrations views clusters as a phenomenon that is observable at the country level. The drivers of cluster stickiness should apply equally to any inter-regional setting, an assumption based on the central idea in the economic geography literature that interaction intensity falls off regularly with increasing distances, but the qualitative differences that may be found in an intra-country or neighboring-country setting will not be explored or assessed further.

Finally, the paper focuses on the exploration of new business ideas through new firm creation, and does not address the issue of internal corporate venturing. It is recognized that many new business opportunities are pursued by individuals within established firms, and that the involvement of these organizations in new business development varies across locations and countries. Although internal venturing processes and new firm creation have many characteristics in common, the processes and issues involved are different enough to warrant separate treatment. With exception for a few reflections upon entrepreneurship in large, established multinational firms, the balance between individual and corporate innovation will therefore be left out from the presentation.

THE CLUSTERING OF ECONOMIC ACTIVITY

Clusters have been identified to involve not only a significant number of firms engaged in similar types of business activity, but also a corollary of supplying and related industries, financial institutions, as well as organizations that provide specialized education, training, and research support². In all dimensions, clusters are characterized by specialization and deepening of capabilities, as business and research activities are explored and refined by a number of actors with very similar and sometimes competing agendas³. To illustrate, the Swedish pulp and paper cluster has been shown to involve a large number of distinct firms involved in chainsaws, logging equipment, specialty chemicals, environmental equipment, pulp and paper machinery, consulting services and even specialized shipping services (Sölvell *et al.*, 1991). The Italian ceramic tile industry involves several competing processes for tile manufacturing, and sometimes up to twenty different variations of individual machine types (Russo, 1985).

A number of studies have provided illustrations of the clustering of economic activity, often in the context of unique and larger sets of interconnected firms and educational institutions. Some examples, which are not necessarily concerned with the drivers or effects of the clustering phenomenon as such, include studies of Route 128 in Boston, Massachusetts (Dorfman, 1983), ceramic tile production in Italy (Russo, 1985), iron and steel manufacturing in Sweden (Höglund & Persson, 1987), production networks in Silicon Valley (Saxenian, 1991, 1994), the Southern Californian medical device industry (DeVet & Scott, 1992), the U.S. Capitol region (Feldman, 2001), or the Swedish internet economy (Glimstedt & Zander, 2002).

Additional studies have documented the considerable stability of clusters of economic activity. For example, the concentration of footwear production in the United States has experienced very limited change over the 1940-1989 period (Sorenson & Audia, 2000). At a higher level of aggregation and on the basis of patenting data, it has been shown that countries tend to display unique and stable profiles of business and

² The OECD (1999) defines clusters as networks of strongly interdependent firms, knowledge-producing institutions (universities, research institutes, technology-providing firms, knowledge-intensive business services), bridging institutions (brokers, providers of technical and consultancy services), and customers, linked in a production chain that creates added value. It is noteworthy that clusters as addressed in the present paper incorporate the narrowly defined agglomerations of firms involved in similar or directly competing businesses, which may in fact be subject to particular learning dynamics (Maskell, 2001).

³ For dynamic accounts of the growth and evolution of clusters, see Scott (1995), Pouder & St. John (1996), and Feldman (2001).

technological activity (Pavitt, 1988; Cantwell, 1991; Archibugi & Pianta, 1992). The technological profiles are typically seen as the outcome of cumulative rather than random processes, a phenomenon referred to as locational path dependency or evolutionary trajectories (Scott, 1995; Storper, 2000). Data involving inter-regional and cross-country comparisons suggest that substantial shifts in the focus of business and technological activity occur only over the course of several decades (see e.g. Pavitt, 1988; Cantwell, 1989; Cantwell & Iammarino, 2001).

The determinants of regional agglomerations, both in terms of firms engaged in similar types of activity and the broader clustering of firms in related industries, have been extensively delineated and examined in the economic geography literature. Generally, these explanations emphasize the relative benefits associated with interaction with geographically close counterparts. Agglomerations have been explained on the basis of: (1) 'hard' transactional economies, including scale economies, the ease of interfirm buying and selling, easy access to specialized pools of labor, and the cost advantages from joint marketing and collective reputation, and more recently (2) 'soft' externalities, such as localized knowledge spillovers and unplanned encounters (see e.g. Feldman, 2000; Hanson, 2000; Maskell, 2001). Additional aspects include: (3) idiosyncratic human relationships, based on the formation of a common culture, language, and problem solving capability, which translates into flexibility and speed in addressing and solving complex problems.

These conceptualizations may not directly explain or address the stickiness of clusters, but offer some implicit explanations. One type of explanation focuses on the immobility of certain factors of production or institutions, and in particular the historically determined and often tacit linkages and means of coordination between these factors (Maskell, 2001). Malmberg *et al.* (1996: 92) write:

“Whereas some knowledge embedded in physical and human capital to an increasing extent travels the world through trade, investment, travelling, and migration, knowledge embedded in social capital does not, as it involves a large number of actors within a local milieu and is historically bound to local circumstances, involving unique bonds and accumulated routines.”

In a similar comment on the nature of national innovation systems, Lundvall & Maskell (2000: 364) conclude: “National Innovation Systems are, by definition, localized and immobile and thus able to provide firms with valuable capabilities and framework conditions *not available* to competitors located abroad, even under the most open market conditions imaginable.” However, it has been shown that in particular industrial and cultural settings ‘astronauts’ in closely-knit and homogenous social communities may be able to successfully transfer and leverage knowledge and resources across locations (Saxenian & Hsu, 2001)⁴.

Other work picks up on why the widening and deepening of clusters typically does not come to involve a larger number of locations. One explanation focuses on differential founding rates within individual industries, ultimately claiming the existence of heterogeneity in entrepreneurial opportunities which are not transferable across geographical distances (Sorenson & Audia, 2000). Other explanations emphasize the difficulties in accessing and working with local agglomerations from afar. It has thus been argued that relevant information and knowledge flows may be denied to outsiders or newcomers, and that geographical distances for a number of reasons create difficulties in maintaining effective communication in innovation and problem solving activities (Malmberg *et al.*, 1996). The particular ability of multinational companies to integrate dispersed agglomerations of technological capabilities has been discussed in this context, and answers have been found both in the positive and negative (Hedlund, 1986; Bartlett & Ghoshal, 1989; Sölvell & Zander, 1998).

From the perspective of hard transactional economies and soft externalities in particular, the ‘choice’ of geographical location in new business formation should be based on simple decision-making rules that separate out locations that are particularly conducive to innovation and business activities⁵. Individuals or firms faced with an explicit choice in terms of geographical location would not select a location that is distant

⁴ Following a detailed account of the interconnections between the Silicon Valley and Hsinchu-Taipei IT clusters, the authors conclude: “As engineers travel between the two regions they carry technical knowledge as well as contacts, capital and information about new opportunities and new markets. Moreover, this information moves almost as quickly between these distant regions as it does within Hsinchu and Silicon Valley because of the density of the social networks and the shared identities and trust within the community.” (p. 910)

⁵ Another possibility would be that new business formation is distributed randomly across a number of locations, but that the fate of new businesses is determined by the degree of dynamism in each respective location. Firms that for some reason are established outside the most progressive regions over time will wither away, simply because they cannot keep up with the demands for rapid and continuous development of new knowledge and technology.

from the relevant sources of information and knowledge, which may cause new investments to be made outside the locally established cluster and under certain circumstances could lead to the shifting of operations from one location to another (Cantwell, 1992).

By applying simple cost-benefit principles, established theory represents an abstract and in all probability partial account of the processes at play at the micro level. Somewhat simplified, an individual considering the setting up of a new firm would only be concerned with the trade-off between manufacturing and transportation costs, or the perceived future problems of maintaining sufficiently rapid exchange of information and knowledge with external actors. Yet, entrepreneurship research suggests a multi-faceted and more complex process underlying new firm formation, and Porter (2000: 255-256) in empirical work which is close to individual decision makers finds that: “Managers still rarely see the world in terms of clusters, especially in any conscious way.” Tapping more explicitly into the mind of the entrepreneur, specifically in the context of new firm formation, thus appears to offer important fine-grained insights into the dynamics of cluster evolution and cluster stickiness. How does the entrepreneur identify new business opportunities, and what determines the decision to act upon these new opportunities? How is the process affected by the introduction of geography and geographical distances? These are the issues that will be raised and discussed in the following.

CLUSTERS AND CLUSTER EVOLUTION FROM AN ENTREPRENEURSHIP PERSPECTIVE

The act of entrepreneurship and the traditionally synonymous formation of new business firms is based on two fundamental premises: (1) opportunity recognition, and (2) the formation of intentions to actively respond to those opportunities that are discovered. Both aspects must be present for new business formation to take place (Figure 1). Opportunity recognition in simplified terms may be seen as an event with binary outcome (an opportunity is either recognized or it is not). As will be discussed in more detail below, the process that leads to actual entrepreneurial behavior or the *de facto* establishment of a business firm may be broken up into distinct components related to the perceived desirability and perceived feasibility of a new entrepreneurial undertaking.

Figure 1 about here

Opportunity Recognition

In a strict interpretation, anybody who engages in activities with an uncertain future outcome may be regarded as an entrepreneur, but entrepreneurship is more commonly associated with a person who recognizes and acts upon a business opportunity. The “seeing” entrepreneur thereby establishes a means-ends framework to profit from a subjectively perceived chain of uncertain future events (Kirzner, 1979, 1985). The end result may be the establishment of business firm, which has become the most commonly used definition of entrepreneurship (Gartner, 1988).

Although opportunity recognition has been conceptualized in different ways and is yet to be explored more fully (Gaglio, 1997; Shane & Venkataraman, 2000), attention to or interaction with the external environment emerges as a necessary pre-condition for entrepreneurial processes to take place⁶. Whether it is the outcome of deliberate or non-deliberate search, attention to and interaction with the external environment creates the knowledge and experience necessary to perceive a ‘field’ that underlies the formation of a subjective means-ends framework (Shackle, 1979). Put somewhat differently, it is necessary to somehow be connected to the customers, resources, or building blocks that are creatively recombined in the entrepreneurial process. Interaction with the external environment may generate the distinct impulse or vision that invokes further exploration of a particular idea (Aldrich & Whetten, 1981; Butler & Hansen, 1991; Aldrich, 1999), for example through direct customer requests or propositions from other actors, although it is equally conceivable that such impulses are generated mainly through deduction and personal reflection.

⁶ Theoretically, the global opportunity set is defined by all possible combinations of resources and customer needs. The global opportunity set thereby includes a sub-set of opportunities that only draw upon specific parts of these combinations. In the latter case, opportunities may be thought of as place-bound, because resources and knowledge are unevenly distributed in geographical space. Strictly speaking, opportunities become real in the creative mind of the entrepreneur, as he or she uses the ‘field’ to activate unobserved or latent combinations of customers and factor markets. However, opportunities also present themselves in the form of ideas that have been made more or less explicit or transparent by individual entrepreneurs, and thus open up for processes of more or less precise imitation by others.

As recognized by Kirzner, entrepreneurial behavior requires acting upon the recognition of an opportunity. The decision to act exposes the entrepreneur to the uncertainty that necessarily surrounds the means-ends framework, involving both technical and market aspects of the new idea as well as the unanticipated plans formulated and implemented by other market participants (Hayek, 1948). One important aspect of entrepreneurship is that the entrepreneur perceives the opportunity to act as temporally constrained. The passing of time involves changing perceptions of profit potentials and opens up for pre-emptive actions by other market participants. An early start and relentless pursuit of the entrepreneurial idea is perceived as important to retain most of its economic value. Timmons (1994: 18) notes that: “Recognizing and seizing an opportunity is often a precarious race with an hourglass – when the disappearing sand is the cash running out.”

Whenever the entrepreneur to a more or less satisfactory extent can draw upon existing markets for resources, he or she will do so in order to speed up the implementation of the entrepreneurial idea. Although the functioning of some markets will already meet the exact requirements of the entrepreneur, substantial efforts will be spent on re-designing and coordinating those aspects of the idea that prove particularly difficult to develop and implement. Typically, these aspects challenge conventional beliefs and ways of doing things and require substantial adjustments by other market participants such as suppliers and firms in related and supporting technologies (Zander, 2001).

Acting upon Opportunities – The Intentions-Based Perspective

Intentions-based models provide several variations on how the recognition of opportunities is connected to entrepreneurial behavior in the form of new business formation (Shapiro & Sokol, 1982; Bird, 1988; Krueger & Brazeal, 1994; Krueger, 2000)⁷. Most models converge on the critical role of perceived desirability and perceived

⁷ The relationships between attitudes, intentions, and actual behavior have been explored in the social psychology literature (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980, Kim & Hunter, 1993). According to the theory of planned behavior (Ajzen, 1985, 1987; Ajzen & Madden, 1986), any behavior involves three conceptually distinct determinants of intentions (which represent the behavioral disposition that immediately precedes and is most closely linked to corresponding actions) – attitude, subjective norms, and perceived behavioral control. The stronger a person’s intentions, the more the person is expected to try and to convert intentions into actual behavior. Empirical investigations provide firm evidence on the correlation between the attitude-intention-behavior links (for a review of empirical studies, see Ajzen, 1987). Kim & Hunter (1993),

feasibility in the forming of intentions (and ultimately actual behavior). In the intentions model proposed by Krueger (2000), as in parts of the theoretical antecedents, the central concepts of perceived desirability and perceived feasibility are divided further into perceived personal desirability, perceived social norms, perceived self-efficacy, and perceived collective efficacy (Figure 2). Certain exogenous variables such as individual traits and situational factors may influence intentions indirectly, while other exogenous variables intervene in the intention-behavior relationship and may 'precipitate' the realization of intentions into behavior (Ajzen, 1985). Although the model suggests a decisive link between intentions and behavior, the correlation must be expected to be less than perfect, because individuals may not be perfectly capable of performing a given behavior and a set of mainly external factors may obstruct the intention-behavior relationship (Ajzen, 1987; Kim & Hunter, 1993).

Figure 2 about here

Perceived personal desirability: Perceived personal desirability depends on the expected consequences of a certain behavior, involving all negative and positive consequences and intrinsic as well as extrinsic rewards. It contains the affective component which has been associated with an attitude towards an object or behavior, and broadly translates into the degree to which a person has a favorable or unfavorable evaluation of the behavior in question (Fishbein & Ajzen, 1975). Accordingly, Shackle (1979) maintains that decisions to commit to certain paths of action such as launching a new business venture are very much driven by the way a person *feels* about reaching a possible future state. The decisions involve anticipation, an element of surprise, and imply a good state of mind. Previous experiences may have an important influence on the evaluation of the positives and negatives associated with a behavior and its anticipated consequences.

Perceived social norms: This antecedent to intentions refers to the perceived social pressures to perform or not perform a specific behavior. It involves the normative beliefs of significant others, such as family and friends, and in the organizational context also

applying meta-analyses on attitude-behavioral intentions-behavior research, find consistent support for the view that attitudes influence behavior primarily through the influence of behavioral intentions.

includes professional referent groups such as close colleagues and peer managers⁸. Although a certain behavior may be perceived to be highly desirable from a personal point of view, the effect on intentions and actual behavior may be moderated by conflicting social norms. For example, a hungry person may find it highly desirable to ask for several buns during an in-flight meal, but refrain from doing so in anticipation that it would be seen as a reflection of greediness or represent generally strange behavior.

Similar processes are at play in the entrepreneurship domain. Collectively held values and beliefs as well as the existence of role models have an impact on risk taking and the extent of new business formation (Spilling, 1991). They also influence perceptions of what is to be regarded as respectable or prestigious fields of occupation. For example, Garofoli (1992) finds that new firm formation is enhanced by a high proportion of self-employed over the total active population of an area, as well as by the proportion of strictly 'autonomous' workers. Similarly, Davidsson (1995) provides evidence that high levels of aggregate entrepreneurial values tend to support new business formation and to some extent also the formation of intentions to start new businesses. Overall, support is found for the notion that cultural differences (as part of the overall structural conditions for entrepreneurship) are important for the overall rates of new firm formation.

Perceived self-efficacy: The more competent a person, the more likely he or she is to see a course of behavior as feasible. Ajzen (1985) and Ajzen & Madden (1986), among others, have suggested that taking action involves more than mere desirability or attitude, it also requires a sense of volitional control, feasibility or self-efficacy (Bandura, 1986). Perceived self-efficacy is thus defined as an individual's perceived ability to execute some target behavior, reflecting both past experiences and anticipated impediments or obstacles. Internal factors that affect the degree of perceived self-efficacy involve personal skills, abilities and knowledge. They contribute to the sense of being able to control the course of future events, and reduce the perceived risks associated with certain behaviors.

Perceived collective efficacy: Just as perceived personal desirability finds an external counterpart in the form of social norms, perceived self-efficacy is complemented by the perception of the extent to which surrounding resources can be expected or made to

⁸ Normative beliefs are concerned with the likelihood that important referent individuals or groups would approve or disapprove of performing a certain behavior, and the strength of each normative belief is weighted by the person's motivation to comply with the referent in question (Ajzen, 1987).

cooperate and support an intended behavior. Thus, even if perceived self-efficacy is high, the launching of a new business may be inhibited by the perception that the necessary external support and resources are lacking. Although the effective use of external networks in the entrepreneurial process to some extent appears to be industry dependent (Butler & Hansen, 1991), it has been shown that entrepreneurship typically depends and draws upon specialized labor, equipment, and facilities, as well as financing which may involve private lenders, banks, or venture capital firms (Shapero, 1975; Aldrich, 1999). A substantial body of literature has delineated and investigated how environmental or structural variables affect the level of entrepreneurship (Bruno & Tyebjee, 1982).

THE GEOGRAPHICAL REACH OF ENTREPRENEURSHIP

Because opportunity recognition involves attention to external structures and events and the development of intentions to respond to observed opportunities requires input from external actors, the entrepreneurial process is highly dependent on the geographical movements of the (potential) entrepreneur. In particular, geographical movements determine the content and scope of social networks, which in turn supply new business ideas and provide referent groups and resources to be considered and recombined in the formation of new businesses (Aldrich, 1999). Economic geography has traditionally embraced the idea that the amount of interaction is inversely proportional to the intervening distance (Olsson, 1965: 36-42). As noted by Sorenson & Stuart (2001: 1584): “...people converge in space and time more frequently when they live near one another and have occasion to meet in the course of work and play.”

A separate branch of economic geography has provided detailed insights into the geographical movements of individuals. The overall impression from what is called time-geography is that most individuals move about within a very limited geographical area, and spend a substantial part of the day at their workplace (Hägerstrand, 1985; Ellegård & Nordell, 1997). In view of this, it is perhaps little surprising that many entrepreneurial ideas have their origin within the organization for which the entrepreneur has been working (Aldrich, 1999; Romanelli & Schoonhoven, 2001). In a study of British consultancy firms, Jones-Evans & Kirby (1995) found that most firms were started through work or contacts with previous employers. Sorenson & Audia (2000) present collective evidence that individuals in the U.S. footwear industry worked for one or more shoe companies prior to founding their own firm. In a study of Swedish entrepreneurs,

Johanisson (1988) found that more than half of the recently founded firms were supplying their former employer or the former employer's customers, and according to Timmons (1994) more than half of all new opportunities are discovered through work place experiences.

If individuals move about in limited geographical areas, the potential for opportunity recognition through direct requests from customers, observation and imitation of already existing entrepreneurial ideas, or recombination of resources to fulfill existing or perceived customer needs will be equally confined. The spatial dimension of opportunity recognition, particularly in the international context, however has not received much direct empirical attention. Conceptually, opportunity recognition can be attributed to the size and diversity of existing social networks (Butler & Hansen, 1991; Burt, 1992). It has been found that informal contacts including businesses, family and personal friends are the main sources of information and help in assembling the elements of a new business (Birley, 1985). As a rule of thumb, most of these people tend to reside and work in close geographical proximity to the entrepreneur.

Forming Intentions to Respond to a Distant Opportunity

The previous paragraphs have suggested that the geographical movements of the entrepreneur are likely to bias opportunity recognition towards developments in the local environment. But limited geographical movements also have an effect on the desirability and ability to respond to the comparatively small number of distant opportunities that nevertheless are identified. In some aspects, limited geographical movements have a direct bearing on the perceived desirability and perceived feasibility of starting a new business. In others, much of the effect is mediated by the social network that the entrepreneur develops and sustains over time.

Generally, opportunities that the entrepreneur recognizes in distant locations come up against cognitive and practical barriers that reduce the likelihood of an active response and new business formation. Some of these barriers have previously been identified as important causes of geographical inertia in the choice of location for a new business venture (Sorenson & Audia, 2000), and the following discussion further expands on the various mechanisms at play within the intention-based framework. It is a one-sided and stylized account, intended to reflect a general and systematic tendency at

the micro level, and a more balanced assessment will be presented in the ensuing discussion.

Perceived desirability: Because limited geographical movements do not allow the entrepreneur to become immersed in and continuously observe changes in ‘fields’ developing in distant locations, it is also more difficult to evaluate if the identified structures or events signal the existence of true opportunity. Unless the entrepreneur spends a significant amount of time in a distant location, it is further difficult to initiate follow-up investigations to determine if the opportunity which has been recognized is practically and commercially interesting to pursue further. In the typical case, the recognition of an opportunity in a distant location may be associated with the feeling of ‘being late’, implying the suspicion that locally active entrepreneurs have already preempted some of the entrepreneurial idea’s economic value. This is an important concern, because the temporal constraints of pursuing new ideas are prominent and very important in the mind of the entrepreneur.

Although the entrepreneur in the typical case hopes for a straightforward implementation of his or her subjectively perceived entrepreneurial idea, the need to respond to unforeseen events and moves by others pursuing similar ideas is typically considered a very likely possibility. Against this background, ‘operating at a distance’ will have negative connotations in the mind of the entrepreneur. For example, he or she may anticipate that the implementation of the entrepreneurial idea requires frequent interaction with potential customers – a suspicion most likely to have been confirmed through observations of other entrepreneurs – involving trial installations, unanticipated design changes, and joint problem solving. Feeling unable to respond rapidly and flexibly to these requirements is likely to impede the formation of intentions to pursue distant opportunities. The negative association may be compounded by the anticipation of having to spend a significant amount of time travelling, which comes with opportunity costs and infringes on social and family life.

The example of others, as conveyed through upbringing and observation in the local environment, is a factor that influences what is seen as a socially desirable occupation or line of business. Narratives and examples of successful entrepreneurs and businesspeople in educational materials, biographies, and newspapers in local language create ideas about desirable and respectable occupations sometimes at an early stage in life. Museums and exhibitions often reflect what are considered local historical achievements and what are to be considered as particularly exciting new findings in

industry and business. Similarly, large employers in small towns or the existence of a family business will have a disproportionate influence on what is to be perceived of as an acceptable and realistic occupation. Although opportunities perceived in distant locations may be associated with significant profit potential, the intention to pursue those opportunities can be hampered by the collective opinions of people in the close and extended social network. An British youngster is likely to dream about a career in cricket rather than baseball, just as a French person possessing the physical requirements is likely to enter rugby rather than go into sumo wrestling (and, if confronted with a choice, would probably tend towards a career in haute cuisine rather than the fast-food business).

Perceived feasibility: While the example of others establishes social norms and values concerning what is deemed a respectable and desirable occupation or line of business, education has a significant effect on the skills and capabilities of the individual. Because education in the majority of cases is still a predominantly local affair, the formation of skills and capabilities will reflect historical and idiosyncratic connections between local industry and higher education (as, for example, reflected in the specialization of university curricula in the engineering field). These skills and capabilities may be applicable across a range of occupations, but lose some of their effectiveness when activated in areas that correspond to different technological trajectories and business logics. Moreover, existing regional specialization provides heterogeneous opportunities to acquire knowledge of particular businesses through employment, and the personal skills developed by working for established local firms build confidence in the ability to start new ventures in similar or closely related fields (Cooper, 1985; Sorenson & Audia, 2000; Romanelli & Schoonhoven, 2001).

As a reflection of this, potential entrepreneurs will typically feel confident to enter a narrow and locally tainted selection of industries. Brockhaus (1982) provides summary evidence that 90 per cent or more of founder entrepreneurs start their company in the same marketplace, technology, or industry they have worked in. Cooper & Dunkelberg (1987) note that the degree of relatedness to incubator firms depends on the general area of activity (technical vs. non-technical), but find that among entrepreneurs previously working in businesses 61 percent served the same or similar customer and 66 per cent offered the same or similar products or services. This may not necessarily imply that entrepreneurs have a flawless understanding of the prospects and requirements of a specific new venture. According to Bhidé (2000), and perhaps as a

reflection of sampling that picks up a relatively large proportion of non-technical entrepreneurs, a large proportion of all entrepreneurs lack deep managerial and industry experience in the field of their newly established firm.

Just as personal skills and capabilities cannot be universally applied at the same level of effectiveness across all lines of business, social networks that harbor complementary resources are ductile but cannot be used for all types of business development. Generic skills and resources contained in the close social network may be useful across a wide range of businesses, but the more specialized resources can only be used in certain combinations and for certain purposes (Mathews, 2002). In the baseline case, personal connections to external actors do not permit a successful response to the full range of business opportunities that may be identified at the global level. Indeed, what can and cannot be done on the basis of existing personal networks may play a central role in explaining why new firms tend to form in sectors already found in the local environment (Malecki, 1994).

In the process of acting upon perceived opportunities and establishing new businesses, it has been empirically confirmed that entrepreneurs assimilate knowledge and recruit from their local social networks. Johannisson (1998) found that about three-quarters or more of the people considered part of the entrepreneur's primary network reside within one hour's drive by car, and concludes that: "...traditional and knowledge-based entrepreneurs both appreciate the local arena, not least as a springboard for global business." (p. 306). In a study of two industries in the Research Triangle Area, Baker & Aldrich (1994, as quoted by Aldrich, 1999) found that with only one exception the first employee who was hired by entrepreneurs was someone they or a friend knew personally. After the first hires, the next several employees were also frequently business friends or prior colleagues of the company founders. Indeed, the inclination to draw upon existing local contacts may be extended further into the venture process, as people taken into the Board are often personal acquaintances in the form of lawyers, bankers, accountant or consultants (Timmons, 1994).

In terms of funding, the entrepreneur is dependent upon strong and weak ties in the personal network. Although entrepreneurs have been found to require relatively small amounts of capital in establishing new firms, the necessary external financing is often provided by personal friends or acquaintances (Reynolds & White, 1997; Bhidé, 2000). Institutional investors such as venture capital firms and banks typically enter at a point where the firm already has tested and established an idea and attempts to grow

further (Malecki, 1997; Aldrich, 1999). As for venture capital firms, they have been found to be biased against the funding of distant opportunities, both in geographical and operational or industry terms (Sorenson & Stuart, 2001). From the venture capitalist's perspective, geographical distances involve difficulties in terms of assimilating the referrals that are important for establishing trust in an unknown venture, and it becomes difficult to monitor and provide active input into the development of investments. It is conceivable that entrepreneurs for this reason carry out a more or less explicit pre-venture screening of projects that takes into account the likelihood of being funded by the local venture capital community, and that they are more likely to receive sustained funding for ideas that are in line with local practices and trajectories.

DISCUSSION AND DISCOURSE

Although there is little systematic evidence on how opportunity recognition and new business formation draws upon the local and distant, existing studies suggest that the process of entrepreneurship and new business formation is geographically constrained (Malecki, 1997). Although historical accident seems to drive part of the location decision in new business formation, most entrepreneurs have been found to start businesses where they reside (Cooper, 1985; Cooper & Dunkelberg, 1987; Reynolds & White, 1997). Mueller & Morgan (1962: 210) conclude that: "Often new companies which start on a small scale with limited resources seem to have little real choice in the matter of location... Local business relationships and the attraction of familiar places and friends seem to have a tendency to keep them in these areas." According to Birley (1985), 81 per cent of the customers of entrepreneurial start-ups in St. Joseph County were within a three-hour drive.

The preceding discussion has suggested that the local bias and associated stickiness of clusters finds its explanation in the geographical movements and workings of the mind of the (potential) entrepreneur. However, it would be unrealistic to assume that all new business formation is locally dependent and follows identical paths. For example, the presentation has not considered the effects on new business formation through long-term migration, or the possibly distinct phenomenon by which important breakthrough innovations sometimes migrate very rapidly across country borders. For example, Gustavson (1986) provides several examples of where what were to become leading Swedish multinational corporations found their first major successes in

inventions that were 'borrowed' from abroad. These examples of the international migration of ideas suggest the existence of entrepreneurial ideas which are comparably flexible in their use of underlying resources or where the necessary resource combinations are generally available.

From a micro-perspective, any forces that widen the geographical scope of opportunity recognition and social networks and reduce the lags associated with collecting and acting upon information across geographical space should result in the leveling of economic activity at the international level. For example, increasing penetration of the internet may have a direct and positive effect on knowledge diffusion and opportunity recognition (Feldman, 2000). Yet, it also appears to have a limited or partial impact on the specific determinants that drive the formation of intentions to start new businesses. Specifically, the internet does not supply the strong social ties which are of paramount importance for perceived collective efficacy in the process of founding new ventures. And although it is possible to form personal relationships over the internet, these relationships would tend to be in minority and of weaker trust content than those based on face-to-face interaction. This being said, the use of personal relationships established over the internet and its possible implications for entrepreneurial activity is an interesting area for further investigation. For example, it has been shown that individuals actively using the internet media in their problem-solving activities may prefer outside sources of information to members of their own organization (Teigland, 2000).

Enhanced global mobility of people should imply improved conditions for distant opportunity recognition as well as the development of both strong and weak ties with individuals residing in different geographical locations. One form of exposure to distant opportunities may come about through short-term professional assignments in distant or foreign locations. There is evidence that so called skilled transients, although their absolute number is still rather limited, are becoming increasingly common in the international context⁹. According to Findlay (1995), in the majority of cases short-term professional assignments in foreign locations come about as intra-company transfers, which, depending on the nationality of the parent organization and destination, may

⁹ However, the increasing numbers of skilled transients recorded over the past decade may partially be explained by the rapidly growing IT-related sectors, as well as by regulatory changes regarding visa types and admission ceilings (OECD, 2002).

stretch from one to several years¹⁰. The assignments mostly involve professional and managerial employees who in their careers have developed skills that are specific and of particular value to the transferring organization.

It is difficult to gauge how entrepreneurial processes and new firm formation are influenced by these short-term foreign assignments, particularly as the phenomenon is yet to be researched and understood more fully. It is likely that skilled transients are more prominent in some industry settings than others, and that the influence on opportunity recognition depends on the length and purpose of the assignment. Although skilled transients during their foreign assignments may display significantly enhanced levels of information search and networking activity, the perceived 'fields' and networks can be expected to be comparatively shallow and fleeting. Another consideration is that business managers in established firms do not come across as the most likely group of people to set up new firms. They have been found to be involved in a comparatively narrow search for new opportunities (Kaish & Gilad, 1991; Stewart *et al.*, 1998), and may face particularly high opportunity costs because of their long-term investments in company-specific skills and careers.

There is, however, also the possibility that managers within large and established firms connect distant opportunities with local operations in the intra-organizational context (i.e. new ventures are pursued within the established firm and do not result in the formation of new firms). Empirical studies provide some examples of headquarter units that are responsive to global opportunities and regional headquarters that serve as international opportunity and knowledge brokers (Sölvell *et al.*, 1991; Asakawa & Lehrer, 2000), and it appears that the international representation of the multinational corporation sometimes allows it to relay entrepreneurial ideas between sister units (Behrman & Fisher, 1980). It has also been found that foreign subsidiaries with proven capabilities sometimes react to and take advantage of opportunities that emerge on a global basis (Birkinshaw, 1997). However, the overall occurrence and importance of these phenomena remains to be systematically documented.

Given the existence of what may be termed global entrepreneurship within multinational corporations, it can be asked whether major operations in the long term remain located away from significant customers and other supplying or related firms. For example, Von Rumker (1971) suggests that scientists in one country are not good at

¹⁰ According to Findlay (1995), Japanese companies sent expatriate staff to Hong Kong for four to five years, while in the same location U.S. firms deployed expatriates for one to two years.

answering the specific market needs of another country, and that the best way to overcome the problem is to have subsidiaries in important markets develop their own complete R&D organizations. This would allow them take full advantage of the opportunities peculiar to their environment, and to be full-fledged practicing members of the scientific and technological community in their respective country. In contrast to individual entrepreneurs, multinational corporations possess accumulated funds and slack resources which allow for a long-term view on investments. Multinationals are thus able to respond to opportunities that emerge in distant locations through relocation of people and resources, using their reputation and financial resources to build or acquire positions in various local environments. It is noteworthy that the international operations of the multinational corporation in this case contribute to rather than diminish the distinctiveness of clusters at the international level.

Most likely, the extent to which established firms can identify distant opportunities and develop operations that tap into dispersed resources of related and supporting firms is dependent on the nature of the technology in question and historical growth processes (Gassman, 1997; Zander, 2002). How technology and historical antecedents affect the ability to work across geographical distances is part of a still evolving discussion on the integrating capabilities and nature of the multinational corporation, which has been summarized in other places (for a review of some empirical evidence, see Zander & Sölvell, 2000). Overall, the multinational's ability to integrate knowledge and initiate entrepreneurial activity that cuts across national boundaries remains an important but largely unexplored field of study.

SUMMARY AND CONCLUSIONS

Given what is known about entrepreneurship and the micro-processes underlying new business formation, it should be expected that cluster development is a predominantly local process. The limited geographical movements of (potential) entrepreneurs and the associated bias against recognizing opportunities that emerge in distant locations may in itself be a sufficient explanation to why clusters tend to develop in locally distinct ways. However, the connection between geographical movements, the formation of social networks, and the individual determinants that drive the formation of intentions to set up new businesses, create a second and perhaps equally important barrier to an active response to opportunities that emerge distant locations. There is, in other words, a

multiplicity of factors at the micro level that contribute to local patterns of entrepreneurship and cluster stickiness. These factors are only to a limited extent accounted for by the simple cost-benefit explanations that currently dominate the economic geography literature.

It should be emphasized that the entrepreneurship perspective proposed in the current paper is a first attempt to approach and explain cluster stickiness from a micro-perspective, and that it in all probability disguises important variation across national and cultural contexts. As already noted, opportunity recognition and new business formation rely more heavily on internal corporate venturing in some contexts than others. Additionally, some national and cultural settings may be structurally more conducive to distant opportunity recognition and the co-ordination of geographically dispersed resources, perhaps as a result of social norms and values that encourage assimilation of ideas that emerge in distant locations, a comparatively high degree of international mobility of people, or more internationally dispersed social networks of individual entrepreneurs. More generally, how the integration of world markets and technological advancements affect the local dependency of entrepreneurs and the ultimate limits to entrepreneurship that cuts across country boundaries is an area that awaits more detailed investigation.

As a concluding remark, exploring and understanding the micro-processes of new business formation could prove useful in policy making aimed at promoting cluster growth in general and breaking lock-in within stagnating fields of economic activity. From an intentions-based perspective, policy making should focus on influencing the process of opportunity recognition, for example by enhancing the short- and long-term exposure of individuals to foreign environments, and on the determinants that drive the development of intentions to set up new business firms. In no case does the solution seem to involve direct government involvement in economic affairs (Porter, 1990; Breschi & Malerba, 2001), and expectations with regard to the copying of technological and economic developments taking place elsewhere should probably be modest. Clusters are sticky for a good reason, and the complete leveling of spatial and sectoral concentration of firms across national boundaries from an entrepreneurship perspective would require fundamental and perhaps unrealizable changes to human nature.

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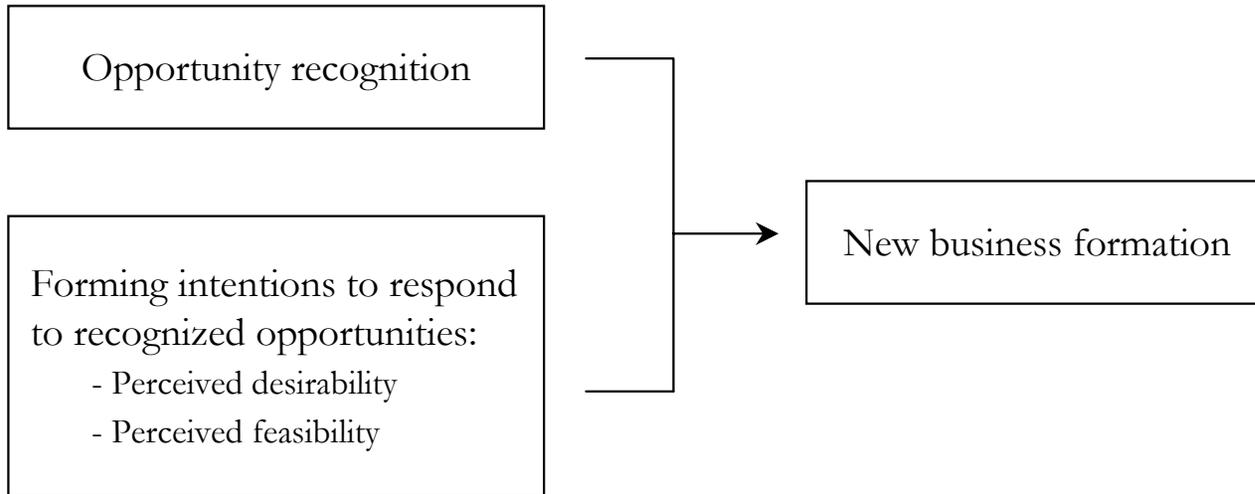


Figure 1: The micro-processes of new business formation

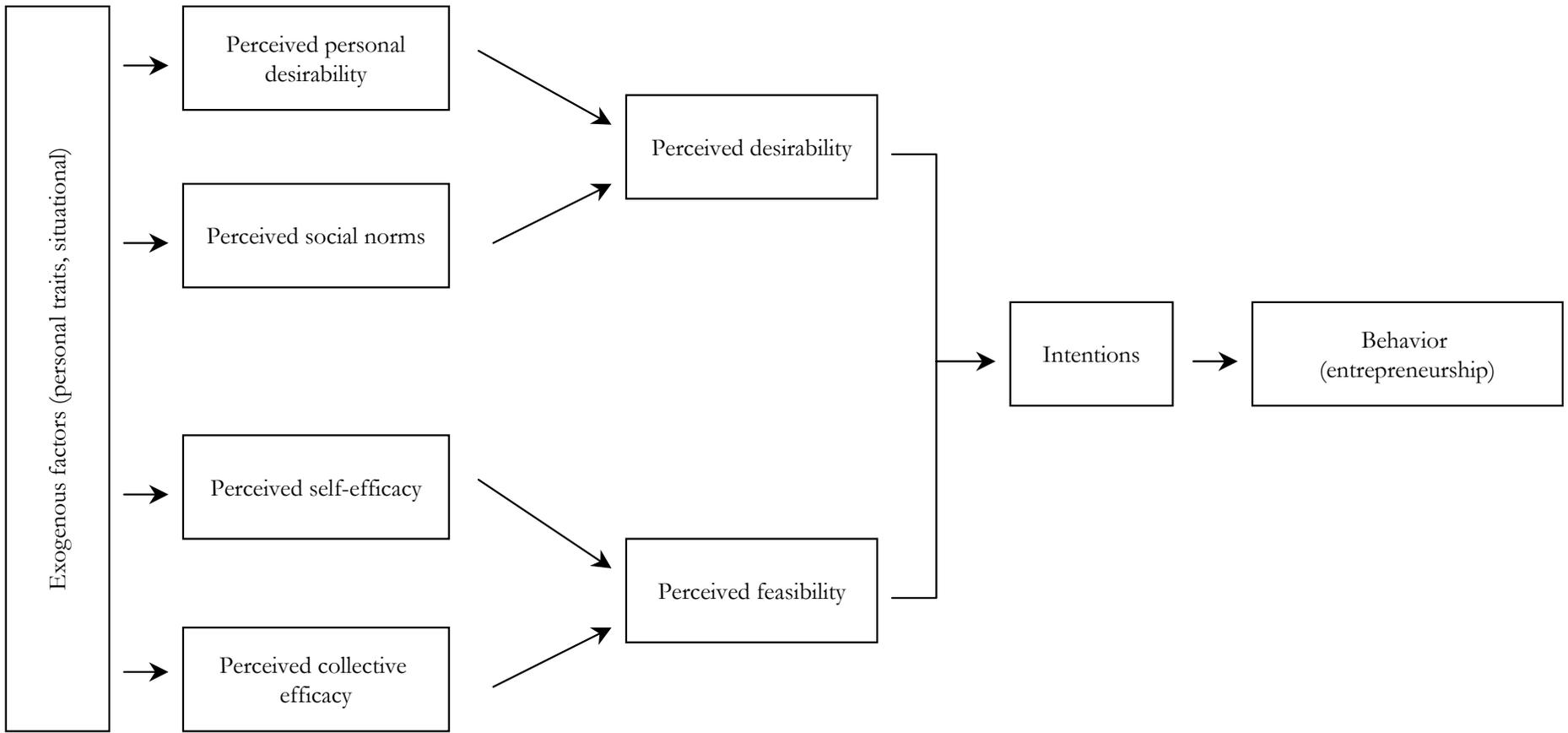


Figure 2: An intentions-based model of entrepreneurship (adapted from Krueger, 2000)