

Contextualizing Research on Social Capital in Regional Clusters

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Abstract

Numerous works in economic geography and regional studies have considered social capital a salient factor in the performance of regional business clusters. Theoretical arguments have focused on those structural, relational and cognitive features of social capital that are expected to facilitate cooperation and innovation as a basis for cluster success. However, the available empirical evidence on the performance implications of social capital is weak and largely inconsistent. I argue that one reason for the observed cross-study inconsistencies is the neglect of the situational context in which social capital evolves. I discuss how acontextual studies can lead to analytical error and flawed conclusions concerning the performance outcomes of social capital. I propose several approaches to contextualizing research and discuss how they would advance our understanding of the performance implications of social capital in a cluster setting.

Introduction

A central argument in the literature on regional business clusters is that spatial proximity alone does not lead to interorganizational coordination and learning if a supportive relational and cognitive framework is lacking. Supportive social structures and processes are commonly referred to as social capital, understood broadly as those structural, relational and cognitive features of social interaction that facilitate coordinated action and collective learning (Coleman, 1988; Portes, 1998). Densely woven social networks are seen as furnishing the necessary structures, and social conventions involving trust and identity are considered the mechanisms driving the networks.

The theoretical interest in the role of social capital in clusters is matched by the growing enthusiasm in public policy circles for those social features of clusters that are believed to make them a viable response to the pressures of globalization. Based on the premise that economic action is overlaid with social content (Granovetter, 1985), policies intended to stimulate regional entrepreneurship and business innovation have increasingly included investments in social capital, such as the formation of discussion roundtables, interest groups, or common projects. However, after a decade of extensive theorizing and empirical research on the topic, there is still little conclusive evidence concerning the conditions under which the social capital existing in the cluster makes a significant difference to the performance of cluster firms, the cluster, or the region in which the cluster is located. A recent OECD summary paper states that 'these conclusions show the complexity of the issue and call for deeper analyses. There is no one model of social capital and no one type of impact on cluster performance' (OECD, 2002: 4). This observation is the point of departure for the present article.

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Much of the ambiguity of empirical evidence on the performance implications of social capital in a cluster setting has to do with methodological issues related to sampling, variable measurement and data structure, and with the methodological inconsistencies across studies. In the present article, I focus on context as a commonly overlooked variable in empirical research. While questions of context keep resurfacing from time to time in the literature on regional clusters (e.g. Sunley, 1996; Bathelt and Glückler, 2003; Gertler, 2003), as in other areas of social science such as management (Blair and Hunt, 1986), organizational behavior (Johns, 2006) and community studies (De Silva, 2005), they have typically not attracted much attention in empirical research on the form and function of social capital in clusters. From previous studies it is often not clear if the insights gained on various aspects of social capital are general or idiosyncratic to the situational context in which a given cluster is embedded. The point I wish to emphasize in this article is that context is not merely a general environment that enables or constrains action but a nested setting of structures and processes through which individuals perceive, interpret and motivate their actions, and in turn shape context (Giddens, 1987). The various structural, relational and cognitive attributes of social capital are inseparable from the setting in which they evolve and acquire meaning and force. Studies of social capital that ignore the setting do not capture the many recursive links that exist between context and action. Context should not be seen as a set of theoretically vague residuals or as statistical noise, but as the foundation for more sophisticated multivariate and multilevel theorizing about the antecedents and consequences of social capital in clusters.

My intention in this article is to enrich our understanding of cluster social capital as an analytical concept, by highlighting the multiple ways in which the context of space, time, and other aspects of the general setting are implicated in social capital, affecting the inferences that may be drawn from the data. For example, the distribution of business and institutional actors in the cluster can be an important contextual factor. Individual and organizational actors operate in different domains, where they face different demands such that separate models may be required to explain network structures and practices. Alternatively, ignoring the temporal context can lead to a distorted view of the conditions under which social capital evolves in one direction or another, with diverse implications for the performance of clusters and cluster firms. At worst, it can lead to the perception of social capital as a fairly fixed ingredient of cluster arrangements that vary with changing circumstances. A systematic concern for context would make the observed diversity of organizing principles and governance modes of clusters not just a by-product of the accumulation of isolated case studies, but a focus in further research. The insights gained from contextual research would not only advance our theoretical understanding of social capital but would also benefit practitioners in business and public policy who care most strongly about the specifics of the setting in which they operate.

I begin the article with a brief overview of the available evidence concerning the performance outcomes of cluster social capital. I then highlight several areas of inconsistency and contingency in the evidence and suggest that context, seen as the 'missing variable', may account for much of the observed cross-study inconsistencies. Following this, I discuss some of the ways in which context mediates the relationship between social capital and cluster performance. I then propose several approaches to contextualizing research and provide examples of research questions that are informed by contextual sensitivity. I conclude with some thoughts on the reasons why most empirical studies do not pay explicit and systematic attention to the influence of context.

Theoretical promises and mixed findings

The dominant approach in the social sciences has been to view social capital as a resource-rich and flexible social arrangement, making possible the achievement of a variety of ends. Many economists have argued that social capital, variably defined as

civic cooperation, trust or social infrastructure, helps to explain variations in regional development after differences in resource endowments, human capital and financial capital are taken into account (Knack and Keefer, 1997). Cluster theorists have generally followed Porter's (2000) lead, viewing the cluster as a self-reinforcing social system, stimulated and held together by social capital. Many researchers have also supported Putnam's (2000) propositions concerning the relationship between high levels of social capital within a region and the success of economic development projects, without clearly distinguishing between social capital as an independent or dependent variable, or as a resource or mechanism for securing that resource (Portes, 1998). One gets the impression from much of this literature that authors believe that it is sufficient to demonstrate the presence of high levels of social capital, if one wants to argue that the cluster is successful. In most cases, however, the actual evidence is far from conclusive.

Given the general view of social capital as a productive asset, one would expect empirical research to be driven by a concern for performance outcomes. But surprisingly few studies have used data that permit a multivariate analysis of the performance implications of social capital. Most studies describe properties of social capital or examine antecedents of social capital, but do not explore directly the consequences of variations in the level of social capital. For example, the existence and influence of social capital are often inferred from the presence of formal institutions, such as technology transfer centers and joint training facilities. Those studies that have performance outcomes of social capital built into the research design tend to employ a variety of disconnected indicators that carry different meanings and are defined at different levels of analysis. Performance indicators are often imported from other research contexts and without explicit concern for their validity and reliability in the present setting. Inconsistencies exist also in the operationalization of the concept. Some investigators have employed a global measure of social capital, calling it 'networking activity' or 'network quality' (e.g. Chell and Baines, 2000), while others have focused on a processual dimension of social capital, such as communication or negotiation (e.g. Stanley and Helper, 2003). Some have equated social capital with network structure, such as relationship density (e.g. Walker *et al.*, 1997), or have taken a cognitive approach, focusing on the creation of shared identity (e.g. Heydebrand and Miron, 2002). Many researchers have worked with proxy measures that more or less closely capture the various meanings of social capital in a local setting (Taylor and Leonard, 2002). Overall, approaches to measurement and sampling have been highly inconsistent, which makes it difficult for the reader to compare the findings from different studies.

The results of studies focusing on different aspects of social capital suggest that the payoffs of social capital are not uniform. Cooke *et al.* (2005), for example, found different effects for regional social capital on small-firm innovation, depending on whether one considers business-related dimensions of social capital, such as trading relationships, or purely social dimensions, such as trust and commitment. Capello and Faggian (2005) showed that the effect of social capital on the innovative performance of small firms in a local cluster differed depending on whether knowledge was diffused through local suppliers or through mobile local labor. Stanley and Helper (2003) distinguished between the extent of communication with stakeholder groups and the value of such communication. They found significant differences in the estimated effects of the extent and value of communication for fending off foreign competition, but not for productivity. Westlund and Nilsson (2005) showed that it made some difference for employment growth, but not for turnover growth, whether firms invested in the development of cooperative links with research and development agents, marketing agents or political bodies. The picture that emerges from studies focusing on different aspects of social capital and performance is that the effects of social capital are highly variable and difficult to predict.

This is most clearly shown in research on the performance implications of spatial proximity, which is often used as a measure of social capital. Some studies support

the theoretical expectation that geographic closeness facilitates cognitive coordination and reduces opportunism (Lorenzen and Foss, 2003). Walker *et al.*'s (1997) study of biotechnology start-ups showed that clusters of densely connected partner firms were stronger sources of new alliances than more sparsely connected clusters. A study of clusters in the Netherlands showed that proximity had a positive impact on a range of firm-level performance measures, although ties with firms outside the cluster were also important (Oerleman and Meeus, 2005). Other studies indicate that spatial proximity can also have negative effects. Research on textile clusters in Germany found that location in congested clusters increases business failure rates even in areas that have a long but uneven tradition of collaboration (Staber, 2001). A study of the Boston biotechnology cluster showed that effective partnerships often span regions and countries (Owen-Smith and Powell, 2004), suggesting that geographic distance is not always an insurmountable obstacle to (tacit) knowledge exchange (Johnson *et al.*, 2006).

A recent review of research on clusters observed in a variety of geographical and industrial contexts suggests that it is not at all clear that interfirm collaboration within a cluster does make a significant and positive difference for performance, or even whether there is more collaboration within a cluster (Malmberg and Power, 2005). Even if it can be shown that knowledge spillovers are 'in the air', this does not necessarily mean that they are caused by local clustering or that social capital is implicated in clustering. A variety of factors are at work and it is difficult to identify any law-like regularities that capture the influence of all relevant variables. It is, therefore, not surprising that arguments about the success of policy initiatives aimed at developing regional social capital are not supported by strong empirical evidence. Policy interventions may help to build social capital only indirectly, for example by stimulating learning processes that are ultimately controlled by firms (Melander and Nordqvist, 2002). Also, interventions may be influential only in the later phases of cluster development, after businesses have already set up the foundation for social capital (Feldman *et al.*, 2005). Institutional forms and mechanisms may vary across regions and clusters in ways that affect the form and influence of social capital in particular settings, but such contextual variations have generally not been the focus of empirical research on social capital. Given the available evidence, it seems premature to derive strong policy recommendations concerning the kinds of initiatives that should be devised, at whom they should be directed, and at what stage of cluster development they should be implemented.

How and why is context consequential?

In social research one normally looks for the causes that account for a given outcome. In most cases there are a number of causes responsible for the outcome, and these are typically explored through multivariate analysis. It is important to distinguish between the consequence of a given cause and the way in which this consequence unfolds in a given setting. For example, it may be generally true, as the theory predicts, that new knowledge can be generated more effectively in the presence of high levels of social capital, but the mechanisms by which social capital leads to new knowledge may be highly variable and specific to the context in which social capital evolves. For example, in one setting it may be mostly institutional organizations that translate social capital into cluster competitiveness, as in several German television and film production clusters (Sydow and Staber, 2002). In another setting, it may be mainly direct personal ties within small epistemic communities that create local 'buzz' for innovation, as in the new-media cluster in New York City (Heydebrand and Miron, 2002). To the extent that unobserved contextual attributes are idiosyncratic, studies trying to discover an underlying causal principle will be disappointing. If researchers find different outcomes in different contexts, they may conclude that there are different causes, when in fact it is context-

specific factors that account for the outcomes. The context itself may have an effect on the inferences one can draw from the observations.

A contextual effect refers to situations where the aggregate setting itself influences the dependent variable (Hauser, 1970). It is observed after all the differences between instances of the subject matter are taken into account through the usual control procedures. One can easily see how close attention to contextual differences would generate new insights in research on social capital in clusters. Business clusters are typically characterized as local systems of production, in which a variety of institutions come together to form a particular social configuration: the internal structure of firms, businesses' direct links with stakeholders, the structure of stakeholder networks, the industrial relations system, the system of labor training, the nature of funding arrangements and government policies, and the local society's system of symbols, norms and moral principles. In some systems, these components are tightly coupled, in others they are very loosely linked. The way in which the institutional logic unfolds in a particular cluster may create a unique social system of production that is difficult to transfer to other regions. Local idiosyncracies in evolutionary patterns and path dependencies may explain, for example, why the structure of knowledge-enhancing systems can vary widely across clusters (Bathelt *et al.*, 2004) and why clusters often have a distinct meaning in different locations (Martin and Sunley, 2003).

Such idiosyncracies have certainly not gone unnoticed in the theoretical literature. Researchers have emphasized the role of distinctive local traditions and social conventions as a source of untraded interdependencies and tacit knowledge (Gertler, 2003). The terms that are often used to describe the local interactional environment, such as buzz, broadcasting, noise, or being there (Bathelt *et al.*, 2004), suggest that the social context is often highly specific to the individuals involved. Viewing firms and clusters as socially constructed networks (Yeung, 2005) demonstrates most clearly that sociospatial particularities can create vastly different relational configurations and interpretations, as evident, for example, in the difficulties experienced when transferring organizational knowledge across national contexts (Bhagat *et al.*, 2002). Thus, the choices with respect to building and maintaining social capital cannot be understood easily outside the local setting in which they are made. This is presumably what Marshall (1925: 271) meant when he discussed the industrial district as a cluster in which 'the mysteries of the trade become no mysteries; but are as it were in the air.' Whether local settings *are* more conducive to the creation and circulation of knowledge than connections to more distant locations needs to be established empirically, and this requires contextualized research.

While the theoretical literature shows some concern for context, *differences* between context are generally not given much weight in the research designs in use. Some studies imply the presence of contextual effects by suggesting that the findings may not replicate in other settings, but they do not provide sufficient data on the specific attributes and meanings of context that would allow the reader to understand all the implications for inference. For example, one study found that regional differences in the influence of social capital on regional competitiveness were moderated by the spatial distribution of knowledge-intensive firms (Cooke *et al.*, 2005). This is an important finding, because it suggests that social capital effects are linked to the particular knowledge requirements in the system of production. It would be interesting to know in what ways knowledge-based firms make more use of or contribute more to the region's social capital than other firms. In another study comparing the attributes of a high-technology and a health care cluster, the authors concluded that social capital effects generalize to all successful high-technology regions (Lawson and Lorenz, 1999). It would be useful to know if low-technology regions have different interactive and learning processes, reflecting different knowledge requirements. It is possible that the specifics of learning in a given setting are related to social capital in ways that have a bearing on cluster performance. Context can affect inferences derived from the observations in a variety of ways, as discussed below and summarized in Table 1.

Table 1 Potential implications of context for observed social capital effects

Context Effects	Examples of Implications for Observed Social Capital Effects
Restricted variability	Limits findings to only a segment of the entire range of an independent and dependent variable, leading to different social capital effects in different settings.
Curvilinear relationship	Effects may differ for different levels and types of social capital, and for nascent and mature clusters.
Changing signs	The meaning of social capital may differ across regional or industrial settings, leading to positive or negative effects of social capital.
Changing causal direction	A variable that stimulated the development of social capital may not lead to a reversal in the level of social capital once it is removed, thus transforming social capital from a dependent to an independent variable.
Crossing levels of analysis	Social capital may not be equally adaptive at all levels; social capital at one level may evolve in interaction with changes at another level.

Restricted variability

Ignoring context may imply restricted variability in the data. This can lead to findings that are limited to only a segment of the entire range of an independent or dependent variable. For example, the concentration of cluster firms around a core industry with unique resource and institutional requirements may imply a significant restriction in the range of variables observed. In one cluster, the critical context variable may be technology and the specific ways in which it is implicated in social capital effects. In another cluster it may be the stage in the product life cycle that determines how producers draw on available social capital and transform it in doing so. One would expect social capital to take a different form in biomedical clusters (Binder, 2005) than in advertising clusters (Grabher, 2002), reflecting differences in production and technology requirements.

Clusters also vary in the time it takes them to develop from the point where a set of firms first establish cooperative relations to the point where these relations can be said to be institutionalized. Studies may capture clusters at different stages in their development, thus missing the full range of their evolution. The observed effects may then depend on the developmental context at the time the cluster is studied. It makes a difference if a cluster is studied in its infancy or in its maturity (Perez-Aleman, 2005). In the former case, social capital may contain a wide range of structural and cognitive configurations. Such variability may be beneficial for early cluster development, by providing the raw material for innovation (Aldrich and Fiol, 1994). In mature clusters, by contrast, social capital may include a much narrower range of structures and interpretations. Structural and cognitive homogeneity of social capital may be more useful for the exploitation of existing resources than the exploration of new opportunities (Staber, 2007). In a study of firms in the Oxford high-tech cluster, for example, Lawton-Smith (2003) found that highly variable endogenous interactive processes were important mostly in the evolution of the nascent cluster, before relationships and practices settled into stable routines. Studies that ignore the temporal context may miss the unique effects of a given level of social capital in different settings.

Curvilinear effects

The influence of context may also be evident in observed curvilinear relationships. For example, research has found a curvilinear relationship between social capital and the performance of work groups (McFadyen and Cannella, 2004). The explanation given is

that an increase in social capital at low levels reduces opportunism and the need for costly monitoring. At high levels of social capital, however, further increases in network density and tightening cognitive frameworks eventually lead to group closure and a general reluctance to seek novel and potentially disconfirming information. It then matters if an organizational system exists in a setting with high levels of social capital or one with low levels.

The matter is further complicated by the possibility that different types of social capital are involved. One may distinguish, for example, between bridging (weak) and bonding (strong) social ties implied in social capital (Burt, 1997). Different types of ties may be suitable for different contexts, such as whether new knowledge is sought or existing knowledge is to be transferred and exploited (Hansen *et al.*, 2001). Observed curvilinear effects of social capital may, therefore, reflect the influence of context on the optimum *mix* of strong and weak ties, in addition to the optimum *level* of social capital of any type.

Curvilinear effects may also be implicated in the relationship between social capital and the size of a cluster. For example, research has shown that the founding rate of firms is generally low in small business populations. As populations expand, additional firms are formed if potential founders interpret population expansion as a sign of market growth (Hannan and Freeman, 1989). When the population reaches the carrying capacity of its environment, resource competition intensifies and the founding rate begins to decline. Social capital may be easier to sustain in a small population of firms, given requirements for face-to-face interaction (Heydebrand and Miron, 2002). Thus, to the extent that social capital development depends on the size of a business population, ignoring differences in population size across clusters can lead to substantially different research conclusions (Staber, 1997). The positive effects of social capital during the early stage of cluster development, when few firms exist, may be replaced by congestion effects in mature clusters that include many firms.

Changing signs

A change in context may also lead to a reversal in the sign of observed effects. It has been shown, for example, that competitive pressures have a positive effect on formal organizational structure in environments perceived as resource scarce and a negative effect in environments perceived as resource munificent (Yasai-Ardekani, 1989). This suggests that external conditions, and the way they are mediated by interorganizational relations, lead to opposite structural responses, depending on whether they imply perceived scarcity or munificence.

Sign reversals in observed effects may occur when clusters are compared in which the actors assign different meanings to the variables of interest. This is likely to be the case with qualitative variables, such as those related to social capital. Even in small countries, central concepts like entrepreneurship and innovation can have vastly different meanings in different locations. In some regions of Denmark, for example, business failure is viewed as a sign of lacking entrepreneurial quality. In other regions, failure is accepted as a normal aspect of entrepreneurship and is seen as an incentive to try again (Kristensen, 1994).

Not only may social capital as a whole have a distinct meaning in different clusters, but the variables underlying social capital may each be distinct in their interpretation. The meaning of any single element of social capital, be it a belief or a relationship, depends to a large degree on the context of other social capital elements around it. One needs to be precise, therefore, when talking about the presumed competitive advantage of social capital. The competitive advantage of a given element of social capital derives from its distinctive value in the current environment, and this environment includes first and foremost the other elements of social capital. There is no guarantee that, if one were to transplant an element of social capital found in one cluster to another cluster, it would have the same effect, given that the other elements may not be present in the other

setting as well. This is often overlooked by policymakers who think of social capital as a coherent package of strategies and practices.

Changing causal direction

It is generally argued that investments in social capital will encourage interfirm cooperation, create new knowledge networks, support innovation, and so forth. The underlying assumption is that causal factors work in both directions equally and with the same force. This implies that something that caused an increase in social capital, such as a program to stimulate information exchange, would lead firms to stop sharing information when the policy is terminated. This seems unrealistic, for in social and policy domains events often take on a life of their own and create consequences for other events which, when the original cause is removed, will not return to the original state. The intention is normally to build social capital so that it is self-sustaining. If successful, social capital may then become the cause, rather than the result of policy initiatives, as in cases where public authorities have backed into cluster initiatives based on network structures that are already in place (Rosenfeld, 2001).

The implication for researchers who assume symmetrical causation is that they might be misled by the observation of a cluster that is declining even in the presence of high levels of social capital. They might conclude falsely that there is no relationship or a negative relationship between social capital and performance. A study of Turkish industrial districts, for example, found that high levels of social capital, though important in the initial stages of district development, could not prevent district decline in a period of economic downturn (Eraydin, 2002). Context unfolds over time, in a way that can lead to social capital becoming disconnected from developments that it may have initiated. For policymakers this means that they need to be cautious in their assumption that manipulating the underlying causes of social capital will affect the dependent variable in the predicted direction and that the intended effect can be achieved regardless of the type of social capital envisioned.

Crossing levels of analysis

A cluster may be thought of as a nested hierarchical system of individuals, organizations and populations of organizations, with nested entities existing both below and above a given unit. Entities at each level may evolve along their own trajectory based on a set of more or less unique properties that are not direct aggregations or disaggregations of lower- and higher-level units. To the extent that changes in social capital are implicated in these trajectories, contextual effects will cut across multiple levels.

The various features of social capital may not be equally adaptive at all levels in the cluster. For example, while norms of interpersonal cooperation may suffice to connect organizational boundary spanners, they may collide with cultural traditions at the regional cluster level. Some argue that the firm's competitive advantage lies outside its boundaries and inside the cluster (Porter, 2000), but it seems unrealistic to assume that cluster-level advantages can be secured by firms with ineffective management styles or decision structures, at least not in the long run. Adaptation may also occur at a different pace at different levels in the cluster hierarchy. In general, lower-level units adapt more quickly than higher-level units (Hawley, 1950). For example, individual boundary spanners may be able to adjust their cognitive interpretations of social capital more quickly than they can change the structural configuration of social capital at the cluster level (Gargiulo and Benassi, 2000).

Even if changes at each level occur simultaneously, they do not occur independently of each other. Successive hierarchical levels interact and produce causation effects at all levels, as when conflicting strategic choices of individual firms impede the governability of the network. Decisions at a given level may have functional or dysfunctional effects at higher levels, and vice versa, as illustrated by the failure to develop a multimedia

cluster in the Stuttgart region in Germany (Fuchs and Wolf, 1997). The organizational decision structure of some of the key companies involved, the variability of economic interests and technologies, and the variety of institutions existing at different levels of public policy, coupled with extreme market uncertainty, proved too complex and multilayered for the project to be able to aggregate decisions effectively. The outcome was a cluster project that experienced a permanent crisis from the beginning and that, following its eventual failure, destabilized the networks that had existed before the project was initiated. Each unit at each level in the cluster attempted to cope with the crisis by optimizing its own fitness, responding to forces in its own context. Studying developments at a given level in isolation would not have revealed the contradictory forces at work.

Approaches to contextualization

The foregoing discussion suggests that the context of time, space and situational factors can be implicated in the performance outcomes of social capital in multiple ways. Given that theoretical arguments concerning the role of social capital draw on findings from many different research sites, it would seem important to give close thought to the particularities of the context in which these sites have meaning. The task for researchers would be to contextualize their study in a way that brings knowledge of the research setting to bear in the research design and the interpretation of findings. Contextualization can be achieved through: (1) thick description of the research setting; (2) a context-sensitive sampling plan; (3) a focus on processes and events; (4) attention to co-evolutionary processes at multiple levels; and (5) attention to the social mechanisms that link actions at multiple levels.

Thick description

While 'knowing your research site' is a basic requirement in science, all too often readers are given only very limited information about the specifics of the site, which makes it difficult to compare research findings. Thick description forces the investigator to pay close attention to those individuals, organizations and events that have a direct impact on the variables under investigation. Detailed description of the setting facilitates better comparisons across studies, for example, by giving substantive meaning to the categorization of particular cases as 'atypical' or 'paradoxical'. Context discussions rich in descriptive detail can also be a useful tool for evaluating causal explanations.

Thick description would prove most insightful in comparative research on the meaning that social capital has for the actors involved. The question of meaning affects the entire substratum of understandings underlying the social and economic 'facts' of social capital concerning the allocation of obligations, the sense of belonging and the formation of trust. Clearly, the conventional strategy of using dummy variables to control for cross-regional differences would not produce the necessary insights, as it would merely wash out those salient contextual effects that should be investigated. These may include all variables for which 'geographic co-location' is often used as a proxy, such as common culture and shared trust (Rosenkopf and Almeida, 2003). Thick description requires analysis of how site details related to these variables are implicated in the development of hypotheses concerning social capital. For some settings, it may be necessary to create unique measures of social capital that reflect the particularities of the cluster under investigation. It may also be necessary to develop measures that take into account the perceptual biases typical for hard-to-verify characteristics of local social capital. Identification of contextual particularities is non-trivial, and it is likely that researchers with different experiences, aims and institutional affiliations will focus

their attention on different areas. Hence, thick description calls for considerable care when trying to separate one researcher's context from another's taken-for-granted assumptions.

Build context into the sampling plan

Contextual sensitivity calls on researchers to give close thought to the sampling frame and to be clear on how the specifics of the case selected explain why relationships would likely be different in different samples. Because many studies provide no, or only limited, explanation of the sampling strategy employed, readers are often left with the impression that the sample studied is one of convenience, selected arbitrarily rather than based on theoretically informed interest.

In many studies, clusters are selected on the basis of their apparent success and then an attempt is made to explain their performance in social capital theoretic terms (Staber, 1996). But if the intention is to identify the conditions that account for the success of a cluster, it is necessary to have in the sample comparison cases of clusters with varying levels of success and social capital, as well as clusters existing in different contexts. Samples of cluster networks should include also the most recently formed networks and those still in the process of formation, because variability tends to be greatest when new networks are being organized, not after they have become established and have successfully built a reputation. Selection pressures due to market competition, institutional demands, and so forth are often strongest when the actors first attempt to set up networks (Aldrich and Fiol, 1994). Feldman *et al's* (2005) study of the development of an ICT cluster in Washington showed that entrepreneurship followed the classic trial-and-error process in the early stages, whereas in later stages new activities benefited from existing organizational models. The evolutionary path taken by the cluster may be most strongly influenced by social capital present in the early stages, when new relationships are being formed and new resources are being developed. The main effects of negative selection may have already occurred by the time most samples of clusters are identified and examined. Studies that are limited to mature clusters most likely do not reflect the actual extent of variability in organizational forms, and thus investigators miss the essence of cluster development and the role of social capital in aiding or hindering change. Contextualization can be achieved by drawing samples with theoretically meaningful variation in the variables under investigation, while accounting for the contextual conditions that constrain variability.

Processes and events

Each cluster is the result of historical developments that may continue to differentiate clusters long after the important original events occurred. History represents an important conditioning feature of context, reflecting the specific events, people, organizations, or special conditions, such as resource endowments, that have shaped cluster development. Understanding the enduring impact of history requires a concern for process, to explain how the actors adapt and innovate within the constraints of past structures. Studying how network relations unfold over time and how clusters reconfigure themselves in response to changing conditions would reveal the many ways in which path dependency is implicated in social capital (Boschma and Frenken, 2006). This may include a variety of constraining processes that ensure the reproduction of the path once selected. For example, although firms in the high-fashion industry have responded similarly to the same global market and technological challenges by seeking greater organizational flexibility, they have differed significantly in their definition of flexibility and the path they traveled to obtain their goal (Djelic and Ainamo, 1999). In some national contexts firms have sought recourse in cluster networks, while in others they have relied more on a go-it-alone strategy.

Attention to process would help to explain, for example, the emergence of new entrepreneurial ideas. A processual perspective would invite investigators to search for relevant events and actors existing also outside of the cluster. Truly innovative ideas often emerge at the margins of a population, and individuals sitting at the edge of different populations tend to have a strategic advantage if they act as information brokers (Burt, 1997). In a study of the early development of the American film industry, Mezias and Kuperman (2000) showed how social capital evolved through the migration and imitation of ideas from different locations and business populations, thus creating opportunities for innovation. But efforts to build social capital through importing ideas from different locations may also have unintended consequences if the knowledge located in a different population is valuable only in that context. In either case, the processes by which new ideas are imported from a different setting tell us something about how social capital may contribute to the creation of new variations. This is particularly relevant in those instances where clusters exist in significantly different contexts and successful knowledge transfer can therefore not be assumed. A concern for process would also inform the debate between those following the integration approach, which views social capital as contributing to cluster stability, and those taking the evolutionary perspective, which sees the significance of social capital more in supporting diversity as the basis of cluster adaptability.

Co-evolutionary processes

Viewing the cluster as a nested hierarchical system of production and exchange calls for research designs that capture cross-level effects. Recent developments in co-evolutionary theory, as applied to interorganizational and knowledge networks (Murmman, 2003), offer useful insights into the advantages of cross-level research for understanding the recursive relationships between action and context. Research might investigate, for example, how learning processes at the cluster level interact with those at lower levels. Each cluster may have its own unique historical profile of adaptation by exploitation and exploration. A full-blown co-evolutionary analysis of cluster and social capital development would reveal how the cluster evolved as a result of network activity and the actions of each participating firm, in concert with the evolution of the constituent industries and institutions. It might show, for example, that the various components of the cluster each follow different trajectories. This is most likely the case in clusters whose members are embedded in international networks and are therefore subject to multiple selection environments (Bathelt *et al.*, 2004).

The properties of social capital and clusters co-evolve in the sense that social capital components define relationships at the cluster level, which in turn affect social capital identities at lower levels. For example, new developments in technology and product markets, or the entry or exit of a major player in the cluster may lead to new cultural identities and the weakening of existing ones (Aldrich and Fiol, 1994). Or, dense social networks may or may not lead to a lock-in, depending on the nature and structure of institutional ties at a more aggregate level (Johannisson *et al.*, 2002). Studying social capital from a co-evolutionary perspective would help to identify those properties of social capital that broaden or restrict the range of variation of specific adaptations at multiple levels in the cluster.

To be sure, a co-evolutionary approach to contextualization involves serious methodological challenges. These include the construction of time series data that permit longitudinal analysis and provide information sufficiently fine-grained to reveal how the dynamic interplay of micro-level adaptation sequences and macro-level events is implicated in social capital. The data requirements are daunting, but the payoffs would be significant, as they would strengthen the inferences about social capital observed at any given level.

Social mechanisms

Studying co-evolutionary processes requires attention to the mechanisms linking actions and events at multiple levels. The tendency in research on social capital in clusters has been to list a set of social capital variables and then to assume that, if these are present in the cluster, cooperation, innovation, or whatever the dependent variable may be, will ensue. But merely listing variables does not constitute a theory, and simply adding new variables in a replication study does not constitute theory building. New theoretical insights come from demonstrating how and why the addition of a new variable changes our understanding of the subject of inquiry by reorganizing causal maps. This requires an explication of the underlying mechanisms at work.

Researchers interested in explaining the creation of social capital have drawn on a variety of theoretical concepts, such as imitation in institutional theory, contagion in economics, and status in sociology, but they have rarely studied these concepts with an explicit concern for the mechanisms involved. For example, institutional theorists view the cluster as a set of taken-for-granted beliefs and widely shared rules (Appold, 2005) that may serve as templates for creating and sustaining social capital. The research task would be to explain how the isomorphism that the theory predicts between the actors and their social environment actually evolves. Similar behavioral and cognitive patterns may emerge as a result of coercive pressures from authoritative actors entrenched in closed networks, as shown in the restructuring of industry groups in post-socialist Eastern Europe (Stark and Bruszt, 1998). Or, firms may copy from existing models, as in the Danish Salling cluster (Lorenzen and Foss, 2003). Institutional mechanisms may differ across clusters, and these differences may be part of the explanation why clusters in the same industry often evolve along different trajectories. For example, one would expect radical industrial innovations to occur more often in clusters located in liberal markets than in coordinated market economies, to the extent that firms align their strategies with the institutional framework in which they are embedded (Hall and Soskice, 2001).

Various perspectives in the social sciences offer insights into different mechanisms by which contextual factors translate into individual behavior, such as perspectives related to normative identification, opportunity structure and social influence. The identification hypothesis focuses on the individual's orientation to local cultural traditions and predicts that cluster activity mirrors social expectations with respect to where to seek advice, how to evaluate business success, and so forth (Kristensen, 1994). The opportunity hypothesis used in ecological reasoning predicts that cluster activity follows the spatial distribution of critical resources (Aldrich and Reiss, 1976). And social influence theory predicts that firms will turn to their social environment for cues that make certain aspects of their involvement in the cluster more salient than others (Zalesny and Ford, 1990). When joining social influence theory with social network theory, one can develop specific hypotheses concerning how the position that individuals occupy in a cluster network affects their perception of opportunities, risk-taking, and other aspects relevant to social capital. Studies have shown that in some settings the most important contacts are with people outside of the cluster (Boschma and Ter Wal, 2007), whereas in other settings endogenous linkages and processes are most critical (Lawton-Smith, 2003). In different contexts, ties to certain individuals and organizations may have value for different reasons, related to information, reputation or power. This implies that the different explanations provided by different mechanisms may not be so much competing as contingent on the salience of relevant others, and this may vary across context. Testing this contingency view would require data on the entire range of contacts as well as their content and purpose, with a specific focus on contextual differences. The research task would be to identify the mechanisms by which individuals form reference groups and perceive reference-group outcomes in their particular setting.

Conclusion

The empirical literature on social capital in regional clusters has grown rapidly in recent years. Still, it would seem premature, based on the available evidence, to conclude that social capital makes a significant difference in the performance of clusters, relative to the influence of other factors. The literature on clusters creates the impression that many theorists see in social capital a catch-all concept for all sorts of social factors presumably relevant for business and regional development, ranging from the configuration of interpersonal and interorganizational cooperation to the normative framework within which relationships are interpreted. At this point in theory development, social capital theory, as used in the literature on clusters, may be no more than a loose collection of plausible statements that are so general that asserting them to be true provides little new information.

To be sure, clusters are a demanding setting for research, one that is filled with multiple and partly competing theoretical perspectives, difficult-to-measure constructs, and unique scenarios. Dissonance in theoretical discourse and construct definition can be very productive, but at some point systematic efforts should be made to consolidate, verify and extend the findings. There is a danger, especially in the early stages of theory development, that investigators become committed to looking for confirmatory evidence, rather than disconfirming observations. This danger may be particularly acute with a broad umbrella concept like social capital, which is difficult to refute because it implies plausible predictions (such as the idea that cooperation facilitates innovation) and has a touch of social legitimacy (such as the idea that cooperation is good). This is not to argue that the concept of social capital offers no new insights for our understanding of clusters (for a discussion of its value in urban studies, see Mayer, 2003). But because the findings of previous studies come from a variety of research sites, reflecting different units of analysis, time periods, industrial sectors and construct measures, it is very difficult to tease out the performance effects of social capital. General statements about social capital as a central ingredient in the performance of clusters, without any reference to context, should therefore be treated with extreme caution.

Given the *theoretical* emphasis on place-specific structures, processes and institutions, it is reasonable to ask why so little empirical attention has been paid to context. Three related tendencies may be at work here. The first is that the analysis of context would pull researchers into an arena that may prove empirically intractable. Bringing history into the picture, exploring long-term changes, and studying co-evolving events at multiple levels makes it very difficult to bound studies in a practical way. To the extent that one needs well-bounded social domains when studying the impact of social capital, the empirical difficulties associated with a contextual perspective at multiple levels may seem insurmountable.

Related to this is the tendency to seek explanations at lower, rather than higher levels of analysis. It is perhaps the impulse of social scientists to follow what is perceived to be the strategy of researchers in the physical sciences and to turn to lower levels of analysis in an attempt to generate a more basic understanding of the phenomenon of interest. By trying to explain the operation of highly complex systems in terms of the properties of their constituent parts they may fall into the trap of 'explanatory reductionism' (Mayr, 1988). The problem is that certain aspects of clusters, such as competitiveness and performance, have a meaning that is distinct from the meaning that these properties have at the lower level of cluster components. Clusters do not compete with one another in the way firms do, interfirm networks do not strategize in the way individual firms do, and firms do not learn in the way individuals do. Aggregate-level phenomena may emerge from their component parts, but they cannot necessarily be explained by them.

A third likely reason why an explicit contextual focus has not been the norm in this area of inquiry is that for some researchers it may call for a randomization sampling strategy. Since clusters are few in number and historical trajectories do not lend

themselves to random sampling, it is difficult for investigators to study context without running into the 'small N problem'. Given the field's campaign for scientific respectability, it is not surprising that many researchers would therefore want to cast their hypotheses at a low level of abstraction and to narrow their focus to more tractable issues. An analytical concern for context might be seen as interfering with the goal of finding statistically significant effects.

It seems clear that research on social capital in clusters needs to advance beyond its use as a metaphor or a magic ingredient. Social capital is all too often discussed, especially in policy circles, as a decontextualized, universalistic and general-purpose recipe for cluster success. Without strong theoretical guidance from the researcher concerning the particularities of context, readers may not know how to interpret inconsistent findings or may not even realize that findings are inconsistent. A likely consequence is that readers will impose their own preferred interpretation of the data, to support their own policy agenda, possibly with adverse results. Contextualizing research on social capital would help to determine the suitability of this concept for specific businesses, institutions and regions. In doing so it would better convey the applications of findings for practitioners who presumably care most strongly about context.

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Résumé

De nombreux travaux de géographie économique et études régionales voient dans le capital social un facteur fondamental de la réussite des pôles d'entreprises régionaux. Les discussions théoriques ont porté sur les caractéristiques structurelles, relationnelles et cognitives du capital social qui sont censées faciliter coopération et innovation, composantes de base de la réussite de ces pôles. Toutefois, les preuves empiriques disponibles des implications du capital social dans cette réussite sont fragiles et peu cohérentes. Cet article affirme que les incohérences des études croisées tiennent, pour une part, à l'ignorance du contexte situationnel dans lequel évolue le capital social. Il expose comment des études hors contexte peuvent conduire à une erreur analytique et à des conclusions incorrectes quant aux résultats générés par le capital social. Il propose plusieurs approches pour placer les recherches en contexte et analyse comment, grâce à elles, nous pourrions mieux comprendre la part de réussite propre au capital social dans le cadre d'un pôle donné.