Clusters as vehicles for entrepreneurial innovation and new idea generation – a critical assessment [1]

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Research Memorandum 2008-13

Abstract

Recent theorizing in cluster literature emphasizes the importance of inter-cluster knowledge linkages in addition to local knowledge dynamics, enabling new and innovative ideas to flow from one cluster to the other. This paper contributes to this topic by studying inter-cluster knowledge linkages at an individual level of analysis, making use of qualitative social network measures. Central to this case is the Amsterdam New Media-cluster, with a special focus on entrepreneurs engaging in lively inter-cluster exchange of knowledge and debate, resulting in the exchange of new visions and ideas across cluster boundaries. The results reported in this paper provide us with an opportunity to discuss cluster boundaries as a social construction, especially in relation to the knowledge-based view of clusters.

Key words: inter-cluster knowledge linkages, entrepreneurship, Amsterdam New Media-cluster, Social networks

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[1] A previous version of this paper was presented at both the 24th EGOS Colloquium 'Upsetting Organizations', 10th – 12th July 2008, Amsterdam, and at 'Dynamics of Institutions and Markets in Europe' (DIME), 4th – 5th September 2008, Newcastle University, UK.

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INTRODUCTION

In the past fifteen years or so, clusters rich in entrepreneurial activity like Silicon Valley (USA), the Emilia-Romagna region (Italy), and the Amsterdam New Media-cluster, have increasingly been approached from a knowledge-based perspective (Bahlmann & Huysman, 2008; Rocha, 2004; Feldman & Francis, 2004; McEvily & Zaheer, 1999; Kumar *et al.*, 1998), invoking both scholars and policy makers to perceive clusters as *repositories of knowledge* (Florida, 1995). In this perspective, geographical agglomerations are considered ideal 'platforms' for the transmission of tacit forms of knowledge and learning among firms and entrepreneurs (Bathelt *et al*., 2004; Thornton & Flynn, 2003), enabling cluster inhabitants (that is, firms and entrepreneurs) to enhance their innovative and competitive strength.

Intra-cluster knowledge dynamics are considered pivotal to the establishment of new and innovative entrepreneurial ventures. The central idea is that no single firm or entrepreneur is capable of developing all knowledge required to be successful. External sources of knowledge are considered necessary in order to overcome "internal competence deficits" (Rutten, 2003: 77; citing Oerlemans *et al*., 1998). In the pursuit of new and creative ideas (i.e. opportunities), local knowledge networks are considered of central importance. Sorenson, for instance, argues that "industries cluster because entrepreneurs find it difficult to access the information and resources they require when they reside far from the sources of these valuable inputs" (2003: 513).

However, the notion that entrepreneurs are dependent on their local knowledge network solely for their creative input (that is, new and innovative ideas) is highly arbitrary. In fact, creative knowing, and the exchange thereof, can be considered (in potential) the least spatially bound when contrasted to other forms of knowing like craft/ task-based knowledge exchange (Amin & Roberts, 2008). This paper will provide empirical accounts generated through qualitative social network measures. The findings confirm that cluster boundaries do not seem to matter in the exchange of creative knowledge and new ideas among entrepreneurs, thus suggesting that the line of thinking sketched above provides at the very least an incomplete picture of knowledge dynamics at cluster level.

In addressing this issue, this paper doesn't stand alone. Recent contributions have questioned the dependence of tacit knowledge transfer on geographical proximity (e.g. Amin & Roberts, 2008; Saxenian, 2006; Boschma, 2005; Bathelt *et al*., 2004; Gertler, 2003), arguing that successful clusters distinguish themselves through building and maintaining "a variety of channels for low-cost exchange of knowledge with relevant hotspots around the globe" (Bathelt *et al*., 2004: 33). The importance of these inter-cluster knowledge linkages, also referred to as

'pipelines' (Bathelt *et al*., 2004), is for instance briefly reported in Grabher's (2002) study of Soho (London, UK) and Scott's (2002) analysis of the motion picture and entertainment cluster in Hollywood (USA). What was once considered a local phenomenon primarily, that is, tacit knowledge exchange among local entrepreneurs, now seems to be accompanied by an inter-cluster (or inter-local) counterpart. The added value of this paper lies in the recognition of the apparently ambiguous nature of inter-cluster knowledge linkages, forcing us to critically reflect on the very concept of clusters and cluster boundaries. Especially, the empirical findings with respect to the qualities of the ties involved and the content flows they facilitate, require us to critically reflect on the knowledge based perspective of clusters.

Central to this case is the Amsterdam New Media-cluster, with a special focus on entrepreneurs engaging in lively inter-cluster exchange of knowledge and debate, resulting in the exchange of new visions and ideas across cluster boundaries. So doing, this paper addresses recent theorizing and debate on the extent to which tacit knowledge flows are either confined to or unobstructed by cluster boundaries. Studying local entrepreneurs engaging in inter-cluster knowledge exchange provides an unique opportunity to gain a better understanding of inter-cluster as well as intra-cluster knowledge processes taking place at a micro-level. In addition, the results reported in this paper provide us with an opportunity to discuss *cluster boundaries as a social construction*, especially in relation to the knowledge-based view of clusters.

This paper is structured as follows: the first section involves an outline of the theoretical debate leading up to this paper. This section will culminate in a set of research questions that lie at the hart of the present paper. Section two involves a brief description of the methods applied in this study. Section three provides an account of the Amsterdam New Media-cluster and the inter-cluster knowledge linkages that originate from this cluster. This cluster, which gives presence to a number of sub-sectors that all revolve around (digital interactive) new media, serves as the context in which the research questions are discussed. Finally, section four involves the conclusion and discussion.

THEORETICAL FRAMEWORK

The "regional" dimension of knowledge

The regional dimension of innovation, entrepreneurship, and knowledge is a much debated issue in the realm of spatial agglomeration literature (Marshall, 1920; Thornton & Flynn, 2003; Malecki, 1997; Sorenson, 2003; Morgan, 1997; 2001; McEvily & Zaheer, 1999; Brown & Duguid, 2000; to name but a few). Although the interrelationship among spatial agglomeration, entrepreneurship, and knowledge is well established from a theoretical point of view (e.g. Thornton & Flynn, 2003), empirically speaking the evidence is just beginning to emerge. An interesting contribution can be found in the work of Grabher (2002), and in particular in his study of project ecologies in the advertising industry localized in Soho, London (UK). As Grabher asserts, "particularly in the creative realm in which the artistic ethos prevails, personal networks seem strongly, though *not exclusively*, rooted in a particular locality" (2002: 257, emphasis added). Indeed, "projects in the advertising industry increasingly are embedded in the context of international networks and global communication groups (…)" (*ibid*.: 258). An interesting finding, although not totally surprising given the increased ease with which global communication nowadays takes place from a technological point of view.

In studying transnational entrepreneurship in relation to Silicon Valley, Saxenian (2006) notices what she has termed the *new argonauts*: "U.S. educated immigrant engineers" (*ibid*.: 4) who successfully establish themselves as entrepreneurs in their home countries, thus contributing significantly to realizing new economic and innovative dynamics, resulting in prosperous regions around the world. Interestingly, these immigrant entrepreneurs benefit greatly from their contacts in the U.S. (most notably Silicon Valley), enabling them to "quickly identify new market opportunities (…)" (*ibid*.: 5).

Although the importance of local knowledge linkages is not contested, their role with respect to the creation and discovery of new and innovative opportunities and ideas by entrepreneurs should be considered in the light of their global, or rather inter-local, counterparts. Especially since the hypothesis has been put forward that exactly these entrepreneurial inter-cluster linkages have contributed significantly to the development of former peripheral economies into vibrant knowledge economies such as to be found in Taiwan, China, India, and Israel (Saxenian, 2006), and consequently to the successfulness of individual entrepreneurs in terms of business performance and innovativeness.

More fundamentally speaking, the very notion of new and innovative ideas traveling across cluster boundaries, requires us to reassess the significance of cluster boundaries when studying

clusters from a knowledge-based perspective (Bahlmann & Huysman, 2008). More specifically, it requires us to re-evaluate to what extent cluster boundaries, often determined using macro-level (i.e. macro-economic) criteria, matter when studying a micro-level (i.e. sociological) phenomenon such as knowledge exchange among cluster-based entrepreneurs.

The geography of knowledge exchange

The phenomenon of clusters, here defined as a geographically concentrated group of firms and entrepreneurs linked through both vertical and horizontal relationships (Porter, 1990), has been linked to knowledge dynamics from its very first appearance in mainstream economic literature (Marshall, 1920) and ultimately has resulted in a knowledge-based perspective of clusters. In discussing this perspective, we limit ourselves to the "social and cultural dimensions of co-location" (Amin & Cohendet, 2004: 88). This stream of literature mainly focuses on micro processes taking place within industrial districts, cities, or regions (*ibid*.). An important line of argument within this stream of literature focuses on the role of tacit and explicit knowledge with respect to the emergence and growth of clusters. Given the specific interest of this paper, i.e. tacit knowledge flows in the form of new and innovative ideas among geographically dispersed entrepreneurs, the micro-perspective on co-location serves as a useful and logical starting point for discussing related issues.

Basically, tacit knowledge is considered to be a key determinant of "the *geography* of innovative activity" (Gertler, 2003: 79, emphasis in original). From this perspective, tacit knowledge is considered to defy easy codification and, thus, is hard to share across long distances. More importantly, tacit knowledge is assumed to be spatially sticky due to its context specific nature, implying that actors can only share tacit knowledge effectively when sharing a similar social context. This social context is, to a large extent, assumed to be defined locally. Finally, the process of innovation is increasingly based on tacit interactions between actors, meaning that the process is characterized by interactive, social learning (Gertler, 2003). As such, local knowledge networks in the form of clusters are considered important to economic revitalization and intensified innovation.

Recent theorizing on knowledge dynamics and cluster competitiveness (Bathelt *et* al., 2004), however, stresses the possible benefits that can be realized from having access to both local *and* global sources of knowledge.[2] However, inter-cluster knowledge dynamics, meaning knowledge

[2] This new theorizing on geographic proximity and knowledge is not to be confused with the "death-of-distance" thesis, for it does not dismiss the relevance of local knowledge networks.

linkages spanning cluster boundaries, are far less established and accepted from both a theoretical and empirical point of view.

The main argument with respect to the value of inter-cluster knowledge linkages to the development of an economic cluster involves the entrance of new knowledge developed elsewhere (i.e. linkages to another knowledge hotspot). Firstly, entrepreneurs with ties to actors located in other clusters benefit directly from the knowledge obtained through these inter-cluster knowledge linkages. Secondly, the knowledge that enters the cluster via these inter-cluster knowledge linkages is likely to "spill over" to other actors located in the cluster through the entrepreneur's local knowledge network (Bathelt *et al*., 2004). As Saxenian notes, "as lawyers, venture capitalists, investment bankers, entrepreneurs, managers, and other professionals travel between regions, they transfer technical and institutional knowledge as well as contacts, capital, and information about business opportunities and markets" (2006: 95). The flow of information across distant regions is facilitated by the social fabric spanning these regions.

A recent theoretical contribution by Maskell, Bathelt & Malmberg (2005; 2004) provides a somewhat different angle to the phenomenon of inter-cluster knowledge flows. Basically, Maskell *et al*. (*ibid*.) propose international events such as conferences, trade fairs, congresses, and the like, as vehicles for inter-cluster interaction among entrepreneurs and firms to take place, thus providing in a temporal context for intensified knowledge exchange and social interaction. This perspective is different, for it highlights the relevance (and necessity) of temporal contextual space to facilitate the social interaction required for the exchange of visions, opinions, and ideas across clusters.

Accounts of inter-cluster knowledge linkages are at hand (Tallman & Phene, 2007; Saxenian, 2006; Grabher, 2002), but we do not yet fully understand their value and contribution to the process of entrepreneurs discovering new opportunities, making it pivotal to increase our understanding of the actual knowledge that is being exchanged through these so-called pipelines in the first place.

In addition, we need to enhance our comprehension of how these inter-cluster knowledge linkages come about, what qualities characterize these linkages and, more specifically, what purpose they serve. In the words of Burt (2007), do entrepreneurs with networks spanning cluster boundaries benefit from the subsequent *vision advantage* (i.e. the ability to profit from multiple information flows by bridging social networks)? And what does this vision advantage exactly entail? In addressing these questions, it is vital to gain in depth knowledge on the actual knowledge exchanged among entrepreneurs spanning cluster boundaries and the kind of social ties involved in this knowledge exchange. Therefore, we ask:

1. What do Amsterdam-based IT and new media-entrepreneurs learn from their inter-cluster knowledge linkages in addition to their local knowledge network?
2. What are the characteristics of the social ties involved?
3. How do these ties come about, and how are they maintained?

Tacit knowledge exchange across cluster boundaries represents the next stage in our evolving comprehension of clusters from a knowledge-based view. So doing, we challenge the view that tacit interactions are necessarily limited by geographical boundaries due to their context specific nature. Rather, we believe that these tacit interactions contribute to creating a shared worldview that easily surpasses cluster boundaries. As such, the exchange of new and innovative ideas appears to take place in a context that transcends cluster boundaries, thus questioning the role of heavily localized social context with respect to the process of localized innovation.

METHODS

The data presented in this paper are the result of thirty-two interviews in total, divided among two phases of research and incorporating both qualitative and quantitative elements.

The first phase of interviews took place during 2007, and incorporates twenty-four interviews with entrepreneurs, policy makers, and industry professionals active and located in the Amsterdam New Media-cluster. These interviews, with an average duration of ninety minutes, were conducted with the aim of generating a broad understanding of the Amsterdam based IT and new media sector. The respondents were selected based on expert interviews and extensive desk research.

The interviews that comprise the first phase of empirical research for this paper were purely qualitative of nature, and consisted of a range of open ended questions related to three main topics: (1) respondent's perception of and experience with the so-called Amsterdam New Media-cluster in terms of present disciplines and industries, (2) respondent's experience with respect to knowledge dynamics taking place in the Amsterdam New Media-cluster, and (3) respondent's social network and its significance to respondent's daily (professional) life. These interviews provided insight in certain local dynamics taking place in the Amsterdam New Media-cluster (see results section), but also proved valuable in detecting inter-local dimensions of the cluster as well.

The second phase of interviews (eight in total) took place in the beginning of 2008 and specifically was aimed at gaining an in-depth understanding of inter-local knowledge dynamics

taking place between the Amsterdam New Media-cluster and other knowledge hotspots around the world. For this second phase of interviews, entrepreneurs with both local and inter-local social contacts where approached. Interviews conducted during this empirical phase averaged a duration of seventy minutes, and involved a qualitative social network analysis, resulting in richly described ego-networks of the focal entrepreneurs. Table 1 involves the measures used to construct the ego-networks presented in this paper.

Typically, a phase-two interview would start with a number of introductory questions. These questions comprised topics such as respondent's expertise and experience, but were also aimed at determining the extent to which the entrepreneur was involved in innovative undertakings as well as the extent to which the entrepreneur was locally and/or globally active in terms of business. The introductory phase would then be followed by the set of social network questions as presented in table 1. After having generated relevant contacts and having established the nature of the relationship between respondent and each mentioned contact (resulting in a set of ego-networks), the interview would continue with a set of open ended questions.

These open ended questions where aimed at gathering in-depth insight in the nature of ideas and inspiration that had reached the respondent through his contacts. In addition, this part of the interview was aimed at understanding how and why these relationships were established and maintained, as well as establishing the nature of the ties involved in terms of tie strength.

The name generator and interpreter questions are based on previous research (Rodan & Galunic, 2004; Batjargal, 2007; Burt, 1997), but slightly adapted in order to fit the research scope. In addition, the SNA-questions were translated to Dutch; in the process of translating SNA-questions from English to Dutch, multiple colleagues were involved in order to ensure that the translation corresponds to the original.

Table 1 (appendix section)

RESULTS

A general account of the Amsterdam New Media-cluster

Before actually reporting on the results, it is useful to provide a description of the Amsterdam-based New Media-cluster, incorporating its general characteristics in terms of present industries and disciplines as well as local networking dynamics. This section is followed by a rich account of inter-cluster knowledge linkages of entrepreneurs based in the Amsterdam New Media-cluster.

The Amsterdam-based New Media-cluster is considered to give presence to a number of related industries, all in which the creative ethos prevails, to speak with Grabher (2002). Four main activities are regarded as characteristic to the Amsterdam New Media-cluster in particular, namely (1) multimedia enabling activities, (2) content distribution activities, (3) content provision activities, and (4) e-marketing (Den Hertog *et al*., 2000).[3]

The first category of activities involves businesses that are concerned with activities such as the development and production of IT hardware, e-commerce applications, consumer electronics, interface design, web hosting, consulting on e-commerce and internet strategies, et cetera (*ibid*: 3). The second grouping of activities taking place in the Amsterdam New Media-cluster involves businesses that relate to providing access to the Internet and the distribution of multimedia devices and software (*ibid*.: 3). The third category involves firms creating new formats and concepts, electronic publishing, developing new service concepts, et cetera. The final category involves activities related to 'e-marketing': webvertising, media acquisition, marketing communication, et cetera (*ibid*.: 4, 8).

The Amsterdam New Media-cluster was identified by Leisink (2000) and the OECD (2002) as the region in the Netherlands with an exceptionally high concentration of IT and new media related activity.[4] Fifteen percent of all jobs in the Dutch creative industries are located in the Amsterdam region. Clearly, this implies that the creative industries are overly represented in Amsterdam, for the relative share of Amsterdam-based jobs in the Dutch economy is 6,4 percent (Rutten *et al*., 2004). In addition, seventy percent of all optical fiber cables in the Netherlands are concentrated in the city of Amsterdam alone.

[3] Although Den Hertog *et al*.'s conceptualization of the Amsterdam New Media-cluster (which they term multimedia-cluster) dates back to the year 2000, its broad characteristics make it very much applicable to today's reality still.

[4] Officially, that is from a policy perspective, the Amsterdam New Media-cluster is perceived to comprise the greater Amsterdam region as well as the region of Hilversum. For matters of convenience, we will suffice with the term Amsterdam New Media-cluster.

Typically, new media goods and services (e.g. websites, interactive television-programs, e-marketing campaigns, et cetera) are produced in an *ad hoc* fashion. Its production depends on the collaboration of actors coming from different industrial sectors and different professional communities with different, though sometimes overlapping, epistemological backgrounds.

For entrepreneurs active in the Amsterdam New Media-cluster, networking is vital in order to stay competitive. Especially as entrepreneurs find themselves in an environment that is increasingly being characterized by constant change, dynamic interaction among different disciplines, and lots of different stakeholders running different agendas. In this cacophony of developments and change (both in terms of technology and markets), entrepreneurs experience the need to make sense of their environment, to identify possible opportunities, and to generate inspiration and ideas.

Without any doubt, the geographical aspect plays a significant part in the process of gathering ideas and inspiration, for it increases the possibility of chance meetings taking place. To quote one entrepreneur on this topic:

> "I regularly meet people from Hyves or eBuddy or that kind of companies at [a local bar], without knowing in advance what we're going to talk about, but in the end we all have great ideas. Or I run into them by chance and we chitchat a bit and before you know it you get all kinds of interesting ideas you otherwise wouldn't have had" (Interview E1_Y.B., first phase, translated from Dutch).

These sorts of occasional chance meetings are clearly facilitated by geographical proximity but, in addition, also by the existence of so-called networking events: relatively small, heavily localized, and industry specific events that provide the IT and new media entrepreneur and professional with the possibility to physically meet peers from the same, similar, or related disciplines. The network associations are organized similar to their Silicon Valley equivalents in the sense that they are regionally oriented, represent a (limited number of) professional (and related) discipline(s), and require participant membership (Saxenian, 2006). Although the network associations clearly position themselves as occasions for exchanging knowledge and ideas, they also provide an opportunity for peers to meet socially.

While at first the focus of the interviews was on local knowledge dynamics related to the New Media-cluster, it increasingly became clear that having non-local contacts with respect to gathering new knowledge and to make sense of current and future developments was at least of equal importance. To quote an entrepreneur on this issue:

> [When attending lectures at conferences] "I usually do not learn about new developments, but that's also because we have a global network through which we learn about numerous things that are going on globally, but that do not seem to be on the agenda in the Netherlands. (…) Take for instance a conference in San Francisco I went to last month, at a certain moment you take part in a round table-meeting with 50, 60 peers, of which 30 to 40 provide a lecture at that particular conference. And it's a selective group of specialists in which you learn of one another at peer level, where you exchange opinions, provide each other with suggestions, and where you identify and share current developments. And this all continues on the Internet following the conference. (…) You have a network of people through which one learns of the developments that matter very quickly, and that allows you very quickly to find yourself in a context in which sensemaking takes place." (Interview E1_F.v.O., first phase, translated from Dutch).

The transfer of knowledge, it appears, takes place in an international (or rather inter-local) context as well, liberating the entrepreneur in question from the constraining elements of the locality he is rooted in (i.e. the Amsterdam New Media-cluster).

Inter-cluster knowledge exchange from an ego-perspective

The following section represents an in-depth exploration of inter-cluster knowledge exchange by entrepreneurs interviewed during the second phase of inquiry. As explained in the method-section, the ego-networks presented in figure 1 were generated through qualitative social network analysis, meaning that the social network data was generated by means of interviews, enabling us to go in-depth as to the nature of the relationship and the knowledge content exchanged.

Figure 1 (see appendix section)

The ego-networks presented in figure 1 provide a first micro-level insight into knowledge exchange among entrepreneurs, both within and across cluster boundaries. Based on the ego-networks, current beliefs on the apparent pervasiveness of tacit knowledge flows to manifest strictly local in the form of clusters seem to be in need of some serious reconsideration. To exemplify this notion, it might be interesting to briefly elaborate on ego-network #1.

This specific case tells the story of an entrepreneur (henceforth ego) located and firmly embedded in the city of Amsterdam. At present, he owns a consultancy company (together with his business partner [GK]) that focuses on advising companies with respect to their corporate websites. So doing, ego makes use of a concept called 'service design': specialized consumer research during the early phases of new design projects, when designers and engineers aim to determine what matters to the people they are developing new products and services for. Ego developed this approach as a PhD at the Royal College of Art (London, UK), and it involves a radical new way of approaching the design process of, for instance, corporate websites.

The main developments with respect to the service design-concept take place in the Anglo-Saxon world, and hence it is not surprising that his inter-cluster knowledge contacts all are located in the UK (London). To quote ego on this issue:

> "The outlook in London is much more internationally oriented. They (his inter-local contacts [MDB]) have a better understanding of what goes on globally speaking. A topic such as 'service design' is much further developed over there. And that offers interesting opportunities for the Dutch market, you know. One of the things we are occupied with is positioning ourselves in the Dutch market as *the* party specialized in service design."

And specifically about his inter-local contacts:

> "(These people) provide me with ideas, and they allow me to test my ideas and thoughts with them. You know, ideas with respect to how to design specific research, what customers to focus on, on what sector, how to define your service and approach, et cetera." (Interview E2_B.R., second phase, translated from Dutch).

Many of these contacts were established during ego's PhD-research in London, but are for a large part maintained at conferences and trade fairs. Interestingly, ego's local knowledge contacts (excluding his business partner [GK]) play an important role as well. To ego, these local contacts are important for they have specific knowledge about the Dutch market. To quote ego:

> "They are quite valuable in that I can test ideas generated through my London-based contacts. You know, to what extent these ideas already are applied in the Dutch market. They are more knowledgeable about the Dutch market than I am. They can tell me about what is happening over here, and what's not, you know, to what extent these ideas are worth pursuing. And at the same

> time they act as a portal to potential customers." (Interview E2_R.B., second phase, translated from Dutch).

In this specific case we nicely see the interplay between ego's local and inter-local knowledge contacts. However, it also shows that the entrepreneur in question does not act in accordance with much research on localized knowledge exchange. In fact, all of the entrepreneurs interviewed during the second phase of inquiry heavily draw on their inter-local contacts when it comes down to generating new ideas and inspiration, as we shall see in the section below. Drawing on the interviews underlying the ego-networks presented in figure 1, it is safe to say that events such as congresses, conferences, trade fairs, et cetera, play a significant role in establishing and maintaining inter-cluster knowledge linkages among entrepreneurs. This section starts with describing the relevance of these so-called *temporal knowledge hotspots* in order to provide context to the inter-cluster knowledge transfer phenomenon.

Temporal knowledge hotspots

It is important to realize that the ego-entrepreneurs represented in figure 1 all consider themselves to be dependent on technological and conceptual developments taking place globally. To this category of entrepreneurs, globalization is a very real phenomenon which they experience on a day-to-day basis, and which influences the situations these entrepreneurs are confronted with as well as the decisions they eventually take.

Contacts established at international conferences are an important and primary source of inspiration. International conferences on IT and new media offer entrepreneurs the possibility to meet peers who act at the forefront of international developments in the realm of the Internet, IT, and new media. International conferences that matter in this field are conferences like Web2.0 expo (USA, San Francisco), LeWeb (France, Paris), DLD (Germany, Munich), Future of Web Apps (UK, London), The Next Web, and the Cross Media Week (both in The Netherlands, Amsterdam).

International conferences facilitate inter-cluster knowledge exchange in the sense that they bring together visions and ideas related to the present and future developments with respect to the Internet, IT, and new media, and in addition allow participants to discuss and value these visions and ideas. In the case of entrepreneurs participating in such events, these interpretations form the base by which new ideas and opportunities are inspired. As one entrepreneur recalls from visiting such international conferences:

> "You know, as I see it there are two kinds of creativity. There is market creativity with respect to the Netherlands, I have to do something in the Dutch market you know, versus long-term *undercurrents* (meaning long-term developments of a fundamental nature [MDB]), and those long-term *undercurrents* stem from *bigger* markets and people with *broader* visions, who are involved in those fundamental developments and who spent a lot of time and effort in attending these conferences to invest in things globally, which of course is very inspiring. (…) To me this is important as it helps me to decide in what to invest." (Interview E2_G.v.N., second phase, translated from Dutch).

Similarly, other entrepreneurs located in the Amsterdam New Media-cluster stress the fact that, in their case, it is important to have contacts in Silicon Valley:

> "In my profession, everything that happens in the US is relevant, also because they are still ahead of us (…). So I have to keep a close eye on them and therefore it's very useful to have contacts over there to discuss new developments with, what developments are important over there and could become important over here. (…) It helps me to keep ahead of my customers for sure." (Interview E2_E.B., second phase, translated from Dutch).

> "[My contacts in Silicon Valley] are more important to me in terms of industry-specific knowledge, because they are located at the hart of my market. In the US, the adoption of semantic web-technology is further developed than it is in Europe, as is often the case in IT. So professionally speaking these contacts inspire me." (Interview E2_R.P., second phase, translated from Dutch).

A significant part of the inter-cluster knowledge exchange involves making sense of and keeping up with *current* developments, as well as making sense of visionary ideas/ *future* developments. To provide an example, one such visionary and ideological debate that is currently taking place (at conferences but also among peers) revolves around the semantic web, and specifically about its future. The semantic web can be understood as a set of technologies designed to enable a particular vision for the future of the Internet. This future is envisioned as the Internet containing and comprehending all knowledge available on the web, meaning that the semantic web enables software applications to reason and understand (Spivack, 2006). At current, this debate is also conveyed under the heading of 'web 3.0'.

Without judging the feasibility of this specific vision, it is fair to say that debates such as the one sketched above are characterized by a high degree of ideology. In this specific case, the ideological undertone reflects a world vision in which the Internet will or should evolve into a

medium much more able to serve humanity, enabling society to progress from an *information* to an actual *knowledge* society. It also reflect a great belief in technology in general, and the Internet specifically, as the means to achieve visionary goals such as a knowledge society.

Debates as the one described above take place in numerous similar yet distinct Internet and new media-related disciplines. It is important, however, to realize that such debates aren't limited spatially, that is, in the geographical sense of the phrase. Rather, the development of visions and ideal representations of the Internet takes place on a global level, with advocates of particular standpoints spreading the message through appearing and speaking at conferences both in Europe and the USA. These debates provide strong stimuli for the creation of a shared understanding of the role of the Internet and related technologies in present-day and future society.

In addition to facilitating a debate with respect to the future of the industry and the Internet, international events provide the attending entrepreneurs with an opportunity to learn about competitors and foreign markets, as well as about possible opportunities in their home markets.

> "(…) you do have plenty of local firms who copy concepts created in the USA with the goal to implement them in Europe. (…) Of course you get involved in *brain picking* (original wording by respondent, not translated from Dutch [MDB]), you try to get inspiration from different things and you look at what your competitors are involved in, but we never copied a service concept such that it was indistinguishable from its original." (Interview E2_A.S., second phase, translated from Dutch)

To adopt the wording of Maskell *et al*. (2005), entrepreneurs participating in these events are in the position to take notice of the current market frontier. Apparently, entrepreneurs encounter interesting and inspiring new product and service concepts at such events, enticing them to reflect on their current market position and current business proposition. In addition, such encounters and conversations provide the entrepreneur with valuable knowledge about unfamiliar markets:

> "I just went to a congress in Eastern Europe for four days, you know, Zagreb, Belgrade, et cetera, and for four days you're surrounded by people from the Internet industry. (…) Because you are talking with these people, I learned so many new things, also about the Eastern European market, and how they value certain developments and you debate social media and stuff." (Interview E2_P.d.L., second phase, translated from Dutch)

Important to note in this respect is the fact that the entrepreneurs interviewed are regular participants of conferences and congresses, thus getting a chance to built relationships with other

regular participants as well. Data suggests that we are dealing with an exceptional class of entrepreneurs and business people. To quote one entrepreneur on this issue:

> "These people (i.e. his inter-local contacts [MDB]) are coincidentally located in Silicon Valley or Israel, but they are very ambulant. And it's good that they are based over there (i.e. Silicon Valley or Israel [MDB]) but it actually is more important that they are ambulant. Of course these guys do have their network in Silicon Valley or Israel or wherever." (Interview E2_G.v.N., second phase, translated from Dutch)

This class of people, being very ambulant yet firmly embedded in a particular locality, are able to transcend the cultural and institutional context distinctive to their home base, and are committed to a shared vision of the future, or rather, a belief system. This collective commitment to a joint venture does not necessarily result in a community (with its specific knowledge dynamics), but does seem to motivate people to engage in a global debate using community specific language, discussing different scenarios for the future, as well as taking a stand in terms of which vision or world view to pursue. To provide an example:

> Mark and Dick (two of respondent's inter-local contacts [MDB]) are inspiring personalities who you meet once in a while. They are leading figures in my discipline. Dick, for instance, has enormous experience with OpenID and the way in which he handles his business and is trying to change the Internet in such a way that people can do more with it, yes to me that is very inspiring, you know, to do things yourself. And Mark, well he sort of does it in the same manner but he is a very outspoken, big guy who is present on every event in the business." (Interview E2_A.S., second phase, translated from Dutch)

This inter-local debate seems to be one of the basic elements from which a shared world vision is generated. The events mentioned above are important facilitators of this debate, for they ease the process of inter-local debate and sensemaking. Bringing together representatives from different clusters (be it Silicon Valley, Munich, Amsterdam, et cetera), or rather from different cultural and institutional contexts, seems to yield new combinations of visions and perspectives, and provide the spark for inspiration and new ideas.

Inter-cluster knowledge linkages and tie strength

International events and conferences serve as temporal knowledge hotspots. However, the ties that are established at such occasions are not limited by the temporal nature of the event in

question. Rather, the consecutive nature of such events allow the development of mutual trust, shared language, and other aspects of relationships to evolve (Maskell *et al*., 2005).

> "When communicating with these guys (i.e. contacts from other clusters [MDB]) we can suffice with half a word. They also are at the front-end of the market, you know, they have an international perspective as well. And we regularly meet abroad at these events without any of us knowing in advance that the others are participating as well." (Interview E2_J.K.K, second phase, translated from Dutch)

Contacts that originate at these temporal knowledge hotspots are maintained partly because of the consecutive nature of such events (many of these entrepreneurs tend to visit multiple events a year). This notion gives good reason for a brief analysis of the characteristics of the social ties involved in the exchange of knowledge, especially since the characteristics of the tie involved (i.e. strong or weak) is considered to matter in terms of exchanging knowledge. Clusters, for instance, are considered truly dynamic when "characterized both by dense local social interaction and knowledge circulation, as well as strong inter-regional and international connections to outside knowledge sources and partners" (Gertler & Levitte, 2003: 1).

In the transfer of knowledge among inter-cluster knowledge linkages (the lines between ego and square nodes in figure 1), both strong and weak ties are involved. Apparently, inter-cluster knowledge linkages are a multidimensional phenomenon, involving different kinds of knowledge (see earlier section) as well as different types of social ties.

Inter-cluster knowledge linkages mainly serve the purpose of keeping up with the developments in their respective field as well as providing new inspiration and ideas related to these new developments, regardless of tie strength. Both strong and weak inter-cluster knowledge contacts provide the entrepreneurs in question with the necessary amount of creative input and sensemaking, providing them with new business opportunities.

The fact that similar knowledge flows through both strong and weak inter-cluster knowledge linkages requires us to reassess the relevancy of the nature of the social ties involved in this process. Tie strength does not seem to be a decisive factor in this process. The willingness of contacts to engage in knowledge sharing with both strong and weak contacts, as well as the ability to transfer highly context-specific and abstract knowledge, might be related to the earlier mentioned shared worldview that characterizes the sensemaking process taking place at such temporal knowledge hotspots. This shared worldview might be considered a decisive factor in enabling as well as motivating entrepreneurs to engage in inter-cluster knowledge exchange, as it

facilitates a common understanding (i.e. epistemic proximity [Boschma, 2005] and shared language) as well as a common (ideological) purpose. However, although a plausible explanation, this remains speculation.

CONCLUSION AND DISCUSSION

In this paper, the concept of inter-cluster knowledge linkages is brought to the forefront with the aim of deepening our understanding of the actual flow of content they facilitate, as well as the characteristics these linkages exhibit in terms of tie strength. So doing, this paper intends to move beyond our present conceptual understanding of intra- and inter-cluster tacit knowledge flows and to enrich our empirical comprehension of the phenomenon in question.

The results from this research convincingly show that inter-cluster linkages among entrepreneurs are powerful carriers of new knowledge appealing to Polanyi's (1967) tacit dimension, regardless of its supposed tendency to be "spatially sticky" in the geographical sense of the word (Morgan, 2001: 15). Rather, tacit knowledge is found to flow from one cultural and institutional context to the other.

The quotes presented in the result section can be considered a testimony of Amsterdam-based IT and new media entrepreneurs engaging in rich inter-cluster interaction with their international counterparts. In fact, the social interaction taking place among this class of entrepreneurs involves a considerable amount of making sense of past, current, and future developments. "Where practice is common, communication can be global", so it seems (Brown & Duguid, 2001: 205).

However, the data also show that there is a local – or should we say spatial – twist to this global communication mantra. International events such as trade fairs, conferences, et cetera, serve as temporal knowledge hotspots that facilitate the social interaction required for the transmission of tacit knowledge. This temporal locality provides the entrepreneurs in question with the ability to engage in rich and valuable knowledge exchange. The social interaction required for this process (e.g. face-to-face contact) seems to induce entrepreneurs to participate in such temporal knowledge hotspots, thus accepting the high costs that inherently is involved in participating in such events.

More specifically, the knowledge transfer process involves the exchange of visions and opinions with regard to the major developments taking place in the industry and the Internet. Intriguingly, this discussion is taking place at an ideological level, involving questions like what role technology and the Internet should fulfill in people's life, and how technology and the Internet can change the world (for the better). This discussion seems to be strongly embedded in a

shared worldview, namely that society as a whole can benefit from technological progression (i.e. progression in the realm of the Internet, IT, and new media). Such conversations and discussions prove to be a big source of inspiration to the entrepreneurs interviewed for this paper. Indeed, this process of knowledge exchange across cluster boundaries seems to be the spark for new – entrepreneurial – ideas and opportunities. At the same time, this process influences entrepreneurs – whether or not consciously – in their attitude towards new developments and the role they and their firm should fulfill in this movement.[5] It appears that debates such as the one revolving around the semantic web create strong loyalties among participants and recipients to a shared problem and world vision (Amin & Roberts, 2008), enabling a common language and understanding to evolve, and as a consequence, the exchange of creative knowledge (*ibid*.).

Besides the ideological debate taking place at such temporal knowledge hotspots, events like DLD and Web 2.0 expo provide the participating entrepreneurs with the opportunity to engage in "brain picking", i.e. to learn about competitors' products and services as well as developments at other markets. It induces entrepreneurs to introduce such new products and service concepts at their (domestic) markets, and basically involves a process of imitation and adaptation.

The data also show that inter-cluster knowledge linkages manifest both as strong and weak ties (Granovetter, 1973; 1983) among entrepreneurs. The knowledge involved – being highly abstract and context-dependent – travels through both weak and strong ties. Tie strength, like geographical proximity, does not seem to play a decisive part in this process. This is a surprising finding for strong ties supposedly are necessary, or rather preferable, for the transmission of knowledge to take place between clusters (Gertler & Levitte, 2003). At the same time, weak ties are considered more likely to be involved in the transfer of new and innovative knowledge. To quote Granovetter, "whatever is to be diffused can reach a larger number of people, and travels greater social distance (…), when passed through weak ties rather than strong" (1973: 1366). The fundamental assumption prior to this notion is that the actors to whom one is weakly connected, will probably move in different social circles compared to one's own, and thus will have access to different kinds of information and knowledge (Granovetter, 1973; 1983). Weak ties, hence, can for instance form a crucial bridge between two densely structured social networks (Granovetter, 1983), and are consequently argued to be of importance in obtaining new information (for instance regarding business opportunities). Analyzing the social network data gathered through the name generator and interpreter presented in table 1 (see method section), the characteristics of inter-cluster knowledge linkages between entrepreneurs portrait an ambiguous picture. Inter-

[5] The open-source communities can be considered another striking example of this notion, for they seem strongly influenced by as well as allied in their quest for open-source software.

cluster knowledge linkages originating from the ego entrepreneur manifest both as strong and weak ties (as for intra-cluster knowledge linkages).

Basically, we believe that the results presented in this paper require us to reassess our current approach to clusters as so-called repositories of knowledge. In this paper we have seen that generating new and innovative ideas by entrepreneurs involves different geographies of interaction. At the very least, the assumption that local knowledge networks (i.e. building local ties) are a prerequisite for regional economic revitalization is premature. New and innovative ideas enter the Amsterdam New Media-cluster through distant contacts as well.

When departing from a knowledge-based perspective in studying knowledge dynamics confined to or unobstructed by cluster boundaries, it increasingly becomes clear that geographical space does not seem to be a decisive factor. Having established that tacit knowledge travels great geographical distances through both weak and strong social ties, is the 'cluster-paradigm', with its emphasis on geographical proximity, the appropriate theoretical lens to make sense of knowledge flows spanning oceans and continents?

Apparently, a number of assumptions related to the knowledge-based perspective of clusters do not hold. First of all, the assumption that localized interactions are fundamentally different to their inter-local counterparts in terms of tacit knowledge exchange is challenged. In their search for new and creative ideas, entrepreneurs recognized as inhabitants of the Amsterdam New Media-cluster draw both on local and non-local ties in their 'quest' for new and innovative ideas. In relation to this, the assumption that inter-local networks or ties are relatively weak or thin and mainly technology driven, while local ties are characterized by rich interaction and understanding, shared values and identities, and trust (Malmberg & Maskell, 2005) does not hold as well. The ego-networks presented in figure 1 clearly show that both local and inter-local tacit interactions manifest in both strong and weak ties. Intriguingly, inter-cluster knowledge linkages serve the purpose of fueling an ideological debate taking place across cluster boundaries. This global, or inter-local, debate, revolving around issues such as the role technology *should* fulfill in people's lives leads to a shared belief system that surpasses any local knowledge hotspot, thus further challenging our current beliefs concerning clusters as repositories of knowledge.

Limiting ourselves to a knowledge-based view of clusters, to what extent does it make sense to apply cluster boundaries when studying knowledge flows crossing these boundaries? In other words, to what extent are cluster boundaries (as well as the cluster phenomenon itself) social constructions of our sensemaking minds (Weick, 1995), and more importantly, to what extent do these socially constructed cluster boundaries obscure our understanding of micro-level

phenomena such as tacit knowledge exchange among entrepreneurs? Is our language-in-use, the theories we apply, and the hypothesis we construct influencing what we observe even before the actual observation takes place? Are we, in fact, entrapped in this socially constructed reality, to speak with Burrel & Morgan (1979)? And what alternative explanations or paradigms might release us from the constraints associated with this entrapment?

A possible way out of thinking in terms of fixed cluster boundaries is realized by thinking in terms of different forms of proximity (Amin & Roberts, 2008; Boschma, 2005). In addition to geographical proximity, other forms of proximity such as relational and epistemic proximity can aid us in developing a more precise understanding of knowledge flows across large distances. A start would be by determining the extent to which different forms of proximity relate to each other as well as to what extent one form of proximity can act as substitute for the other in facilitating tacit knowledge exchange among entrepreneurs (Boschma, 2005).

We end this paper with a strong inclination to conclude that tacitness does not inherently bind knowledge to geographical space. In fact, the postulation that knowledge is inherently spatially sticky because of its context-specificity is in need of some fundamental reconsideration. Thus, we argue to critically approach the idea of clusters when discussing the phenomenon from a knowledge-based perspective. We need to account for the sociology of knowledge, clusters, and entrepreneurship if we are to come to an understanding of the complex and ambiguous nature of knowledge dynamics within and across cluster boundaries.

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APPENDIX SECTION

Name generator regarding the role of local and non-local contacts with respect to gathering new ideas, inspiration, and opportunities	
Question 1	Some contacts are particularly useful in helping you to be creative as an entrepreneur, such as helping you to generate new ideas. Who are the key people that help you the most to formulate and generate new ideas? (based on Rodan & Galunic, 2004, adapted to fit the scope of this research)
Question 2	Considering all of the professional contacts you have made in your career so far, who have been most valued contacts in the sense that they were the most important to your creativity and spotting new opportunities? (based on Batjargal, 2007, adapted to fit the scope of this research)
Question 3 (SNA probe)	Please mention contacts who helped you to generate and formulate new ideas, but who aren't located in Amsterdam and/or the Netherlands.
Question 4 (SNA probe)	Please mention contacts who have been very relevant in this process, but with whom you rarely interact.

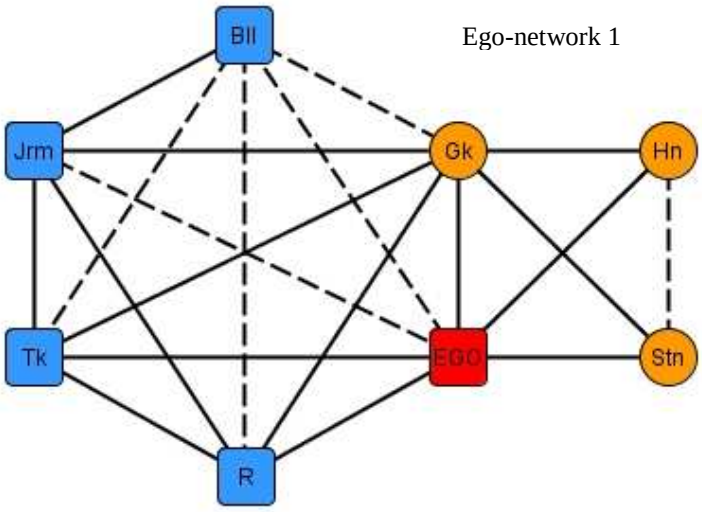
Name interpretation (based on Burt [1997], adapted to fit research scope)						
	Frequency of contact (1=daily; 2=weekly; 3=monthly 4=rare)	**Emotional closeness** (1= especially close; 2= close; 3= less close; 4= distant)	**Duration** (1= met within last two years; 2= known for three to five years; 3= known for six years or more)	**Friend or Acquain-tance** (1= friend; 2= acq.)	**Geogr. location**	**Is this person a colleague of yours?** Yes or No
Contact 1						
Contact 2						
Contact 3						
…						
…						

How well do your contacts know one other? (from Rodan & Galunic, 2004) 0= not; 1= especially close; 2= distant					
	Contact 1	**Contact 2**	**Contact 3**	**…**	**…**
Contact 1					
Contact 2					
Contact 3					
…					
…					

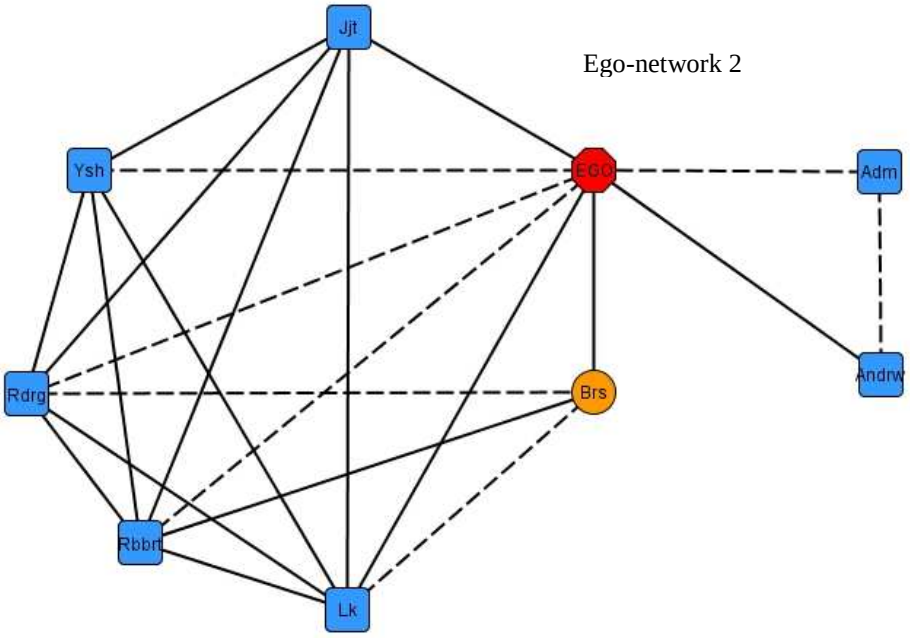
Table 1: Social network analysis instrument for research phase 2

Figure 1

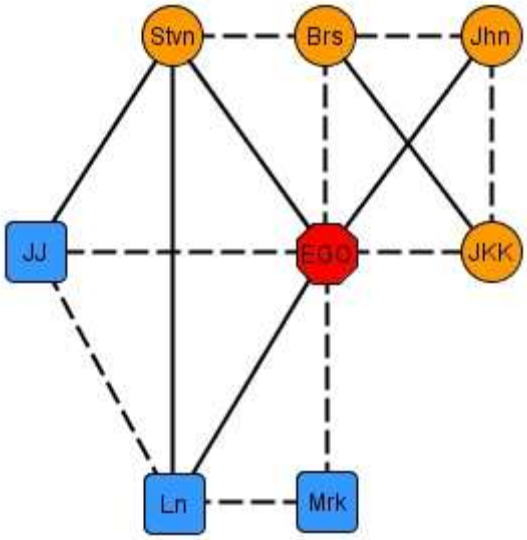
Ego-network 1



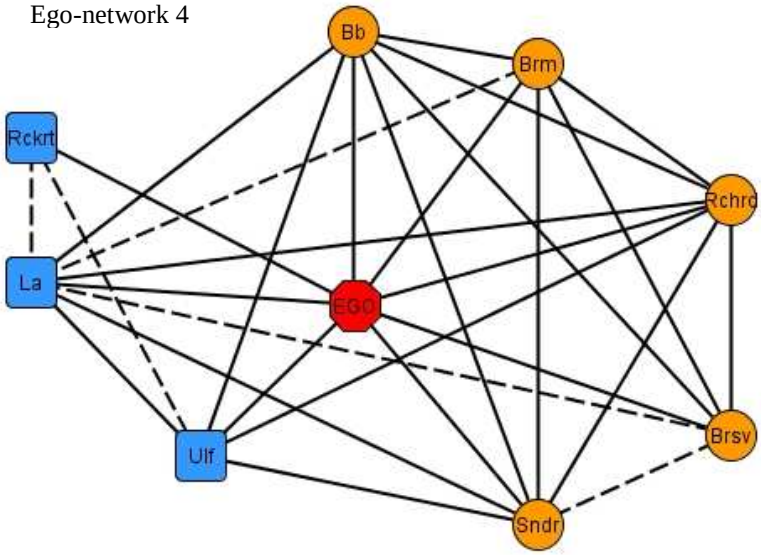
Ego-network 2



Ego-network 3



Ego-network 4



= ego (entrepreneur)

= contact located in cluster same as ego

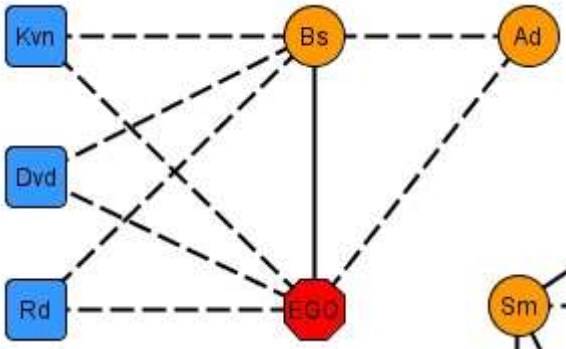
= contact located in cluster diff. from ego

= strong tie

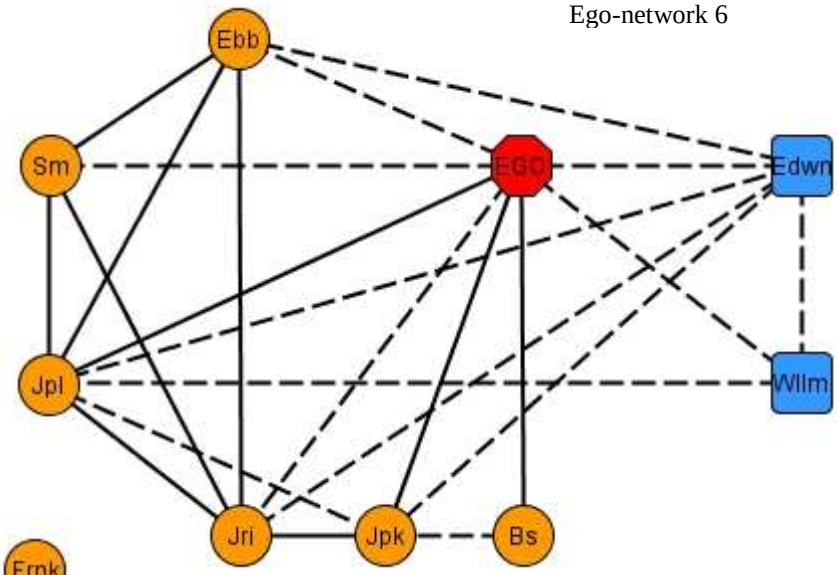
= weak tie

Figure 1 (continued)

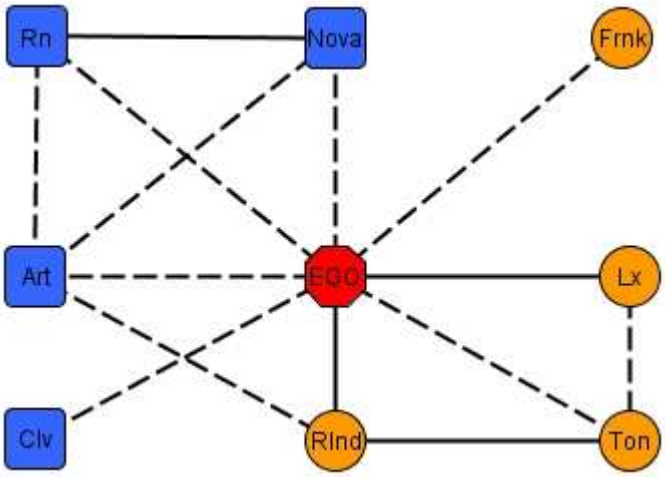
Ego-network 5



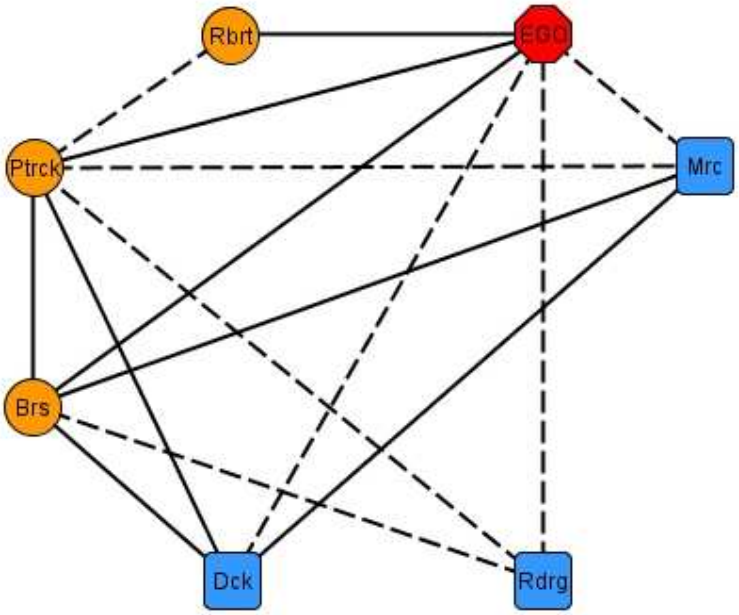
Ego-network 6



Ego-network 7



Ego-network 8



= ego (entrepreneur)

= contact located in cluster same as ego

= contact located in cluster diff. from ego

= strong tie

= weak tie