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IN SEARCH OF REQUISITE CONNECTIVITY

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The term "connectivity" began as a description of the relationship between electronic devices but is now commonly applied to social relationships. Like technical connections, social connectivity is generally seen to be a good thing. Take, for example, the tremendous power of social networks and the idea of social capital. But, more connectivity is not always better. For most of us, the ideal degree of connectivity would include both robust and reliable social and technical connections with others and adequate privacy and personal space. Requisite connectivity means having just enough, but not too much, contact with others in a connected world. On the one hand, establishing and maintaining connectivity between people and places is not always easy. When gaps occur in one form of connection, having multiple links to others (connective density) enhances our ability to maintain requisite connectivity. On the other hand, as communication technologies become increasingly ubiquitous and invasive, being able to disconnect is becoming an equally important necessity and challenge. Contact with others is important, but so is personal space and privacy, especially for creative and generative reflection. In this paper, we explore what a zone of requisite connectivity might look like in the context of globally distributed work.

Key words:

requisite connectivity, connective density, distributed work

1. INTRODUCTION

The pervasive uptake of communication tools such as email, instant messaging, mobile email, Internet phone and other global information services means that connecting with others for personal and/or work purposes is getting easier and less expensive for an increasing percentage of the world's population. One can now be 'at work' almost anywhere as 'continuous computing' (Roush, 2005), distributed (Hinds & Kiesler, 2002) and nomadic (Cousins & Robey, 2005) work become realities. Information and communication technologies (ICTs) have made it easier than ever before to make contact with others across borders and around the world. This unprecedented surge in technical connectivity has led many observers to be wildly enthusiastic regarding the potential for information and communication technologies to transform organizational life. This paper considers the fundamental question: How much connectivity is enough? And, is there such a thing as too much connectivity? In an organizational context, competitive success requires both effectiveness and efficiency. Requisite connectivity meets both of these conditions, but it is not always easy to achieve. We call this the search for requisite connectivity. We believe it may be a way to reframe how we think about communication within and beyond organizations in the future.

2. REQUISITE CONNECTIVITY

The term "connectivity" began as a description of the relationship between electronic devices but is now commonly applied to social relationships. Like technical connections, social connectivity is generally seen to be a good thing. Take, for example, the tremendous power of social networks and the idea of social capital. But, is more connectivity always better? Not necessarily. For most of us, the ideal degree of connectivity would include *both* robust and reliable social and technical connections with others *and* adequate privacy and personal space. We refer to this condition as *requisite connectivity* and define it as the state of having robust and reliable communication and/or transportation media/modes, with operable alternative work-around options, so that contact may be initiated or maintained at the rate, richness and intensity required for a given task or social outcome.

Too little connectivity can obviously be a problem. Most of us have experienced the frustrations of working from home without technical support, travelling abroad where your cell phone doesn't work, and so on. Indeed, for some, the difficulties of keeping connected are simply more trouble than they are worth (Wyatt, Thomas, & Terranova, 2002). Most of us, however, struggle to stay connected, even though it is not always easy (Brown & Duguid, 2000; Woolgar, 2002). Fortunately, like social networks, where weak ties can work as well as strong ones (Granovetter, 1973; Wellman and Milena, 1999), 'thin' connectivity can be sufficient in many circumstances.

At the other end of the spectrum, more connectivity is not necessarily better (Freedman, 1975; Nardi & Whittaker, 2002). In some computer science models, high connectivity is at the low end of the security continuum, since highly connective systems bring higher risk of hacking and other intrusions into our private lives. We might call this the weakness of strong ties. Most of us recognize the threats associated with technical connections (spam, telemarketing, computer viruses), but, even in the realm of face-to-face communication, recent work by von Glinow, Shapiro and Brett (2004) suggests that, especially in some cross-cultural contexts, too much talking exacerbates conflict, overloads us with information and/or wastes time. Hanson and Nohria (2004) point to some of the negative aspects of too much connectivity in organizations.

While collaboration can create substantial value, it also has a downside that executives need to manage. One pitfall is that it can easily be overdone. Prompted by collaboration initiatives, employees may begin to participate in all kinds of meetings in which nothing of substance is accomplished. Such unproductive collaboration will undermine overall company performance. (2004: 29)

In sum, what most of us seek is not necessarily more and more connectivity, but *requisite* connectivity, that is enough connectivity for our intended purposes, but not so much that it undermines performance, invades our personal space, wastes time, and/or produces stress and anxiety. Each of these conditions—getting sufficient connectivity and avoiding hyperconnectivity—will be addressed below.

3. CONNECTIVE DENSITY

Establishing and maintaining contact with others depends in part on how many dimensions of connectivity exist between actors. Consider a synchronous virtual meeting, for example, where participants have called in from around the globe. Of course, there are usually several connective media present, so that if the audio or video link goes down, participants reach for their mobile phones or turn to a PC or laptop computer to send email or instant messages to those not physically assembled (Kane, 2005). In this case, a connective gap is keeping the group from its real-time task. In many distributed work contexts, connective gaps matter more than location. Fortunately, connective gaps can be managed by involving multiple connective options, which allows some form of interaction among participants to continue even after one form of connection fails. Watson-Manheim and colleagues (2002: 200) suggest that, "Discontinuities introduced into organizational processes are accompanied by continuities, i.e., factors that are in place or emerge to bridge the discontinuities. Continuities play a significant role in bridging the potential differences introduced with discontinuities."

Both social and technical dimensions of connectivity are vulnerable to connective gaps. So, what do actors do to ensure continuity when confronted with connective gaps? They repair or bridge gaps, or they seek alternative links. One way to ensure continuity across connective gaps is to increase connective density whereby gaps in one dimension can be offset by other social and/or technical linkages. We refer to the combined viable range of social and technical connections between two or more persons or collectives as *connective density*. The more dimensions of robust connectivity that exist between parties, the more options they have to overcome connective gaps. For instance, a relationship with a peer who has very fast Internet and roaming cell phone coverage, a travel budget to visit you, and who also shares your personal interests, political views and cultural background could be described as having high connectivity density. By contrast, low connective density would be expected between parties of very different cultures communicating via low quality telecommunications with no possibility for face-to-face interaction.

4. CAN WE JUST SAY 'NO'?

One of the issues underpinning the notion of requisite connectivity is that of human agency or free will. Seeking requisite connectivity implies that individual actors have varying needs and desires for connections with others and that individuals have the ability to act upon those needs and desires. However, in seeking that which is *requisite*, the question arises: To what degree are requisite levels and types of connectivity socially constructed and normative versus idiosyncratic and spontaneously determined by the individual actor? The question of human agency, e.g., free will vs. normative conformity, goes back to the Renaissance and has subsequently spawned much controversy in the social sciences (Emirbayer & Mische, 1998). On the one hand, our use of tools (and our choices in general) can be seen as largely socially constructed and thereby individual choice or free will is limited. If, for example, everyone around us is using email or mobile phones, then we feel compelled to use them too. On the other hand, individuals can and often do make unique decisions and act in ways that break with tradition, or with their own personal habits, thereby evoking a sense of (spontaneous) choice and individual action.

For example, Cousins and Robey found that mobile bankers' choices about connective tools (Blackberries and Palm Pilots) can be explained in terms of actor agency, drawn from Emirbayer and Mische (1998), wherein past experiences, present practical considerations and judgements and future projections affect our choices and actions. Cousins and Robey's empirical work highlights the fact that with additional mobility and flexibility, contemporary work is increasingly an option anytime, anywhere, but that does not mean *all* the time and *every* place, as individuals still choose *some* times and *some* places to work and other times and places to disconnect from work roles. Cousins and Robey (2005) summarize their findings as follows.

Given their common pressure to perform, demanding travel schedules, and the availability of a nomadic computing environment to enable work anytime anyplace, each worker faced a basic dilemma. *How could boundaries between work activities and personal activities be controlled?* From a human agency perspective, these choices are best understood as practical judgments, made in the present but containing elements of past practice and future possibilities, and dependent on space and context. … Our data further suggest that each nomad was in control of the process rather than overwhelmed. (2005: 21) (emphasis in original)

Consistent with these findings, Leonardi, Jackson and Marsh (2004) found that distributed workers chose to uptake or reject technologies and/or to 'disconnect' (i.e., to stay off-line) in order to create or maintain emotional space for themselves. Creative and knowledge-intensive work often requires periods of intense collaboration punctuated by periods of reflective retreat in isolation from others. It is possible that as technical connectivity increases, states of *disconnectivity* are likely to become more rare and consequently more valuable.

In short, to greater or lesser degrees, just as social actors consciously and unconsciously attempt to make contact with others, they also consciously and unconsciously create and maintain connective distance from others. Leonardi and colleagues (2004) have found that individuals "strategically" manage distance to their own advantage. In addition to supporting cooperative work with others, collaborative tools may soon assist us in controlling access and meeting the individual user's need for privacy. Since what constitutes adequate private space and/or robust and reliable connections will vary from person to person and from situation to situation, connectivity levels remain contingent, which defies the likelihood of any single tool or technology providing a requisite connectivity solution. What is foreseeable, however, is that individuals, groups and whole organizations will continue to seek ways in which to achieve requisite connectivity.

5. REQUISITE CONNECTIVITY IN DISTRIBUTED WORK

So, how might the idea of requisite connectivity help us better understand distributed work? In Figure 1, we show a general model portraying zones of connectivity, wherein requisite connectivity exists between the states of hypo-connectivity and hyper-connectivity. Hypo-connectivity means not having sufficient connections for the task or job at hand. In an organizational context, this could involve technical challenges such as sluggish Internet connections, poor telephone reception and/or limited travel options between Head Office and regional branches and/or between members of a distributed team. It might also include a lack of social capital and/or a lack of cross-cultural understanding. Hyper-connectivity means too much connectivity, such as information overload, attention-taxing workflow and interruptions in collocated space. It may include pervasive and ubiquitous computing applications such as wireless email and 24/7 telephone accessibility. Hyper-connectivity does not necessarily undermine performance, as individuals and teams often cope and some even thrive in highly connected states. There does come a point, however, where connectivity becomes so excessive that the individual or group can no longer successfully complete tasks or maintain processes effectively due to the inefficiency associated with information overload, invasive connective media and/or constant social contact. At some point, in the hyper-connective zone, teams are neither efficient nor effective.

Figure 2 shows states of connectivity within a distributed team context, with connectivity on two dimensions, effectiveness and efficiency. Like most teams, distributed teams mature and develop over time. Few teams are both efficient and effective in their formation phase. As time passes, some teams progress in both efficiency and effectiveness, achieving requisite connectivity (Point A), that is they have the social and technical connections necessary for the tasks, processes and/or roles expected of them. Other groups may work quickly to divide and distribute tasks among team members and may develop elaborate mechanisms for relaying information among members, storing documents and other artefacts, generate rules on media choice, contingency plans and so on. These groups (Point B) become efficient in their methods, but in Katzenbach and Smith's terms (2001), they often lack 'mutual accountability' and/ or a sense of 'shared purpose.' Consequently, such teams are high on the efficiency axis, but fail to be as effective as they could or should be due to a lack of integration, trust, social cohesion and other subtle but nonetheless important aspects of effective teamwork. Other groups (Point C) may indeed be effective in terms of performance, but their means and processes are undeveloped and/or severely strained. These groups are effective, but lack efficiency in their methods, i.e., their gains come at a high cost in terms of time and effort.

In Figure 3, we show how one might apply the concept of requisite connectivity and team connective states in troubleshooting distributed work teams. In the zone of requisite connectivity, teams function effectively and efficiently, with the possibility of achieving sustainable high performance over time. By comparison, some teams may be well coordinated in the sense that each member has a long list of things to accomplish, but there is too little integration and essentially the team yields results that are no more than the sum of its parts. This type of team can benefit from perhaps less management and more leadership, that is to say more attention to getting input and integrating diverse talent and ideas and less emphasis on simply delegating more and more tasks to team members. Alternatively, some teams get things done and are therefore effective in terms of outputs, but their members are overloaded due to inefficient work practices, including hyper-connectivity (too much information and too little attention-focused time) and/or hypo-connectivity (lack of information, gaps in personal, professional and cultural understanding, etc.). The overloaded achievers' productivity levels mask the fact that their work practices are unsustainable in the longer term. The management and leadership challenge for this type of group is to recognize the symptoms of process and information overload and to find ways to equitably and fairly manage highly motivated members without overly exploiting their commitment and passion for the project or task at hand. Finally, laissez-faire groups (unlikely to meet the criteria of a functioning 'team') include well-intended on-line initiatives that fail to reach adequate performance, but rather drift along without satisfying effectiveness standards or expectations, but which are also inefficient as they require 'more effort than they are worth,' either in their set-up time and resources and/or the time it takes participants to interact without meaningful or rewarding outcomes.

6. CONCLUSION

The intent of this article is to encourage us to think about connectivity as a two-way street. The goal of ubiquitous, anywhere/anytime connectivity is not to trap its creators. If we build a boat to cross the river, we do not chain ourselves to the mast. Along with increases in social and technical connectivity, individuals and groups will at times choose to keep or establish some gaps between themselves and others. Individuals are already seeking requisite connectivity and groups and organizations may be doing so in the future. Requisite connectivity is about having options, including the option of disconnecting from others, which can be desirable and occasionally necessary in a world where, along with its benefits and opportunities, too much connectivity has its limitations, burdens and hazards.

Requisite connectivity requires alignment of technology, task, and team attributes to address a collective need or purpose. It may involve sophisticated synchronous communication tools for a global virtual team, or a cell phone at a roadside. It may require us to build more diverse social networks (McDonald, 2003) and work with diversity in groups differently (Gibson & Vermeulen, 2003; von Glinow, L., & Brett, 2004). Like the king offering his kingdom for a horse, requisite connectivity has value because it meets our immediate needs. It means not being isolated, but also not being overwhelmed by spam and information overload. There is no one "right" level of connectivity. It is contingent. Therefore, seeking requisite connectivity is an ongoing dynamic challenge for individuals, groups and organizations.

Leaders and managers of distributed work groups need to understand what constitutes requisite connectivity for the situation or task at hand. Indeed, it is possible that a key leadership attribute or skill in distributed work environments in the future will be the ability to diagnose and understand a group's level of connectivity and the ability to address both the social and technical connective issues. It is a start, as we are doing here, to simply ask the question, 'How much is enough connectivity?' The answer to that question may lead us as researchers to think about connectivity in groups and teams differently. Moreover, managers and leaders of groups and teams may increasingly be recognized for their understanding of and contribution to requisite connectivity when their team achieves its goals and objectives and does so with efficiency, trust and a sense of ease. Representing effectiveness and efficiency, requisite connectivity may itself become recognized as a valuable competitive advantage.

REFERENCES

Brown, J. S., & Duguid, P. (2000). *The Social Life of Information*. Boston, MA: Harvard Business School Press.

Cousins, K. C., & Robey, D. (2005). Human agency in a wireless world: Patterns of technology use in nomadic computing environments. *Information and Organization, 15*(2), 151-180.

Emirbayer, M., & Mische, A. (1998). What is agency? *The American Journal of Sociology, 103*(4), 962-1023.

Freedman, J. L. (1975). *Crowding and behavior*. San Francisco: Freeman.

Gibson, C. B., & Vermeulen, F. (2003). A healthy divide: Subgroups as a stimulus for team learning behaviours. *Administrative Science Quarterly, 48*(2), 202-239.

Hanson, M. T., & Nohria, N. (2004). How to build collaborative advantage. *Sloan Management Review*, 22-30.

Hinds, P. J., & Kiesler, S. (Eds.). (2002). *Distributed work*. Cambridge, MA: MIT Press.

Kane, D. (2005). *We've got to talk about this: Structuration and artifact systems in virtual teams.* Unpublished Masters, University of Auckland, Auckland.

Katzenbach, J., & Smith, D. (2001). *The discipline of teams*. New York: John Wiley and Sons.

Leonardi, P. M., Jackson, M. H., & Marsh, N. N. (2004). The strategic use of „distance" among virtual team members: A multi-dimensional communication model. In S. Godar & S. Ferris (Eds.), *Virtual and collaborative teams: Process, technologies, and practice* (pp. 156-172). Hersey, PA: Idea Group.

McDonald, M. L. (2003). Getting by with the advice of their friends: CEO's advice networks and firms' strategic responses to poor performance. *Administrative Science Quarterly, 48*(1), 1-32.

Nardi, B. A., & Whittaker, S. (2002). The place of face-to-face communication in distributed work. In P. J. Hinds & S. Kiesler (Eds.), *Distributed work* (pp. 83-110). Cambridge, MA: MIT Press.

Roush, W. (2005). Social machines. *MIT's Technology Review, 108*(8), 44-51.

von Glinow, M. A., L., S. D., & Brett, J. M. (2004). Can we talk, and should we?: Managing emotional conflict in mulitcultural teams. *Academy of Management Review, 29*(4), 578-592.

Watson-Manheim, M. B., Chudoba, K. M., & Crowston, K. (2002). Discontinuities and continuities: A new way to understand virtual work. *Information Technology and People, 15*(3), 191-209.

Woolgar, S. (Ed.). (2002). *Virtual society?: Technology, cyberbole, reality*. Oxford: Oxford University Press.

Wyatt, S., Thomas, G., & Terranova, T. (2002). They came, they surfed, they went back to the beach: Conceptualizing use and non-use of the Internet. In S. Woolgar (Ed.), *Virtual Society?: Technology, cyberbole, reality* (pp. 23-40). Oxford: Oxford University Press.

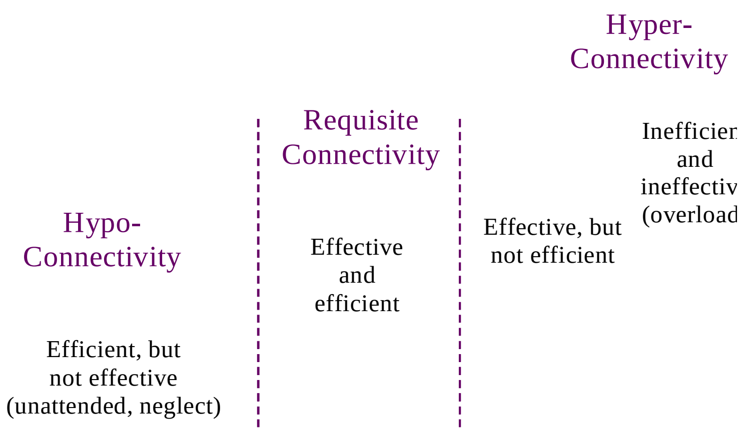

Figure 1 - Connectivity Zones

Figure 2
Team Connective States

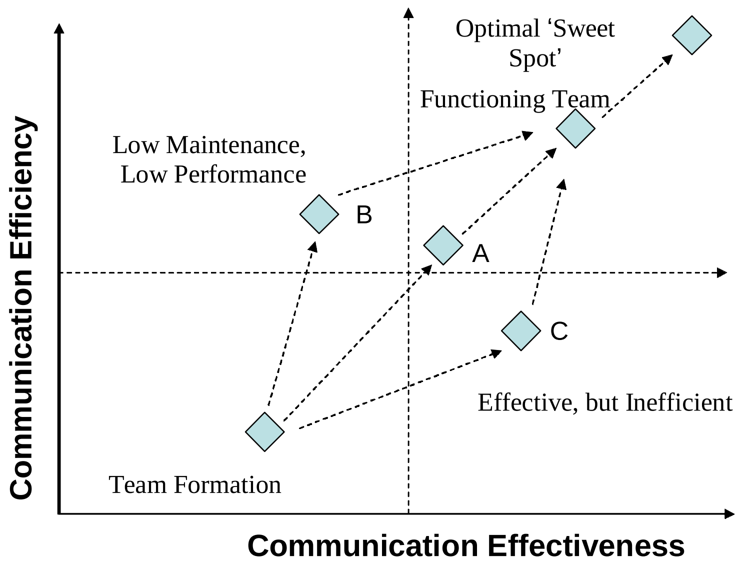

Figure 3
Troubleshooting Distributed Teams