PLUG IN YOUR NETWORK

REVIEW OF THE ROLE OF INFORMAL NETWORK FOR KNOWLEDGE SHARING AND INNOVATION

STOCKHOLM SCHOOL OF ECONOMICS

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- a review of the role of informal
network for knowledge sharing
and innovation

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SIR, Stockholm School of Economics Institute for Research

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Foreword

It is the second report from our three-year project: "The Internet and its Direct and Indirect Effects on Innovation and the Swedish Economy" our primary objective is to examine how the Internet and digitalization have influenced entrepreneurship and innovation in Sweden. Our previous report "Chasing a Tale of the Unicorn – A study of Stockholm's misty meadows" focused on understanding the roots of the current "unicorn" success in Sweden and its capital city of Stockholm.

In our current report, we decided to explore aspects of formal and informal networks as they enable businesses to leverage: **experiences, knowledge, and resources.**

A high level of knowledge flows within companies' ecosystem, even among competitors, due to informal networking opportunities. This report outlines what kind of impact informal networks have and presents the insights about the knowledge sharing and innovation, and their growing importance in the Internet era. We have analyzed the current stage of knowledge using both scientific papers and professional literature to understand the connection of between informal networks, interlocking directorates and companies' success.

The project "Innovative Internet" is funded by **The Internet Foundation in Sweden** (IIS – Internetstiftelsen i Sverige).

Executive summary

"Professionals who want to work horizontally across an organization currently find themselves forced to search through poorly connected organizational silos for the knowledge and collaborators they need. In many companies, these matrix and other hybrid organizations have become dysfunctional. The symptoms include endless meetings, phone calls, and e-mail exchanges, as well as confused accountability for results."[1]

This led to extensive research on the role of informal networks for knowledge sharing, innovation and corporate development and has attracted significant media interest in recent decades. Yet, results are contradictory. This report based on published research, media coverage and books on the subject, suggests that the diverging results are connected to the vastly different characteristics informal networks can have and the diverse circumstances they are found in. Unlike formal hierarchical networks, informal networks are not confined to a corporation or organization. Therefore this article is a resume on three main aspects related to informal networks – the role of informal networks in regard to external support, the role of informal networks within an organization and the role of informal networks related to interlocking directorates.

Researches show that informal networks result in ecosystem that favor economic growth and stability, i.e. start-ups that have larger informal communication networks have an improved chance to survive eternal shock. However, it has to be noted that the development of these ecosystems is similar to natural ecosystems and is time intensive.[2]

A strong influential factor on the development and prevalence of informal networks is the Internet with its fundamental peer-to-peer structure by significantly increasing the opportunities for all sorts of horizontal communication and the kind of transboundary contacts, even between employees in competing firms.[3] Especially for knowledge-intensive and technology-driven companies, research shows the importance and proliferation of social networks[4].

As a consequence large companies are no longer advised to suppress the development of informal networks but to nurture them and leverage their beneficial effects. As Krackhardt and Hanson describe in their article in Harvard Business Review, it is important to map advice networks to uncover the source of political conflicts, while trust networks can often be used to reveal the causes of non-routine problems, and communication network mapping can help identify gaps in information flow[5].

Similar to the effect of search for external support within informal networks is the effect of interlocking directorates or board interlocks, which occur when directors sit simultaneously on two or more corporate boards. There are multiple factors that lead to interlocking directorates ranging from economically driven reasons such as monitoring through e.g. investors or bank to socially

1.Bryan, Lowell L., Matson, Eric, and Weiss, Leigh M. Harnessing the power of informal employee networks. McKinsey Quarterly. November 2007. http://www.mckinsey.com/business-functions/organization/our-insights/harnessing-the-power-of-informal-employee-networks (Accessed 2016-10-07).

2. Raz and Gloor, 2007. "Size really matters – new insights for start-ups' survival." Management Science 53(2):169-177. February 2007.

3. Collins, Rod. Is Hierarchy Really Necessary? The Huffington Post. 2016-05-05. http://www.huffingtonpost.com/great-work-cultures/is-hierarchy-really-neces_b_9850168.html (Accessed 2016-10-07).

4.Healey, Matthew; Saldin, Lakshan: "The Social Network". Rail Professional, June 2016, Issue 223.

5.Krackhardt, David, and Jeffrey R. Hanson. "Informal networks." Harvard business review 71.4 (1993): 104-111.

driven reasons such as social cohesion. The general assumption behind it is that increased contact between people in networks of a certain scale and density lead to an increased rate of innovations. On the other hand, research does not provide significant results that interlocking directorates are automatically effective regarding KPIs like profitability or growth.

As mentioned, this report is a concise summary of three major characteristics of informal networks. As you can read, there is still research to be done regarding the long-term effect of informal networks inside and outside organizations, especially taking into consideration co-variables such as cultural background or company size.

SUPPORT

This report would not be possible without the support of The Internet Foundation in Sweden (IIS – Internetstiftelsen i Sverige) is an independent organization for the benefit of the public that promotes the positive development of the Internet in Sweden. IIS is and intends to remain the natural choice for companies, private individuals, and organizations that want a domain name associated with Sweden.
The Foundation's ultimate objective is for everyone to be able to harness the internet's potential.

Questions connected to the Internet Foundation of Sweden, please contact Erika.Olsson@iis.se

Introduction

The role of informal networks for knowledge sharing and innovation has been extensively researched and has attracted significant media interest in recent decades. Yet, results are somewhat contradictory. This report based on published research, media coverage and books on the subject, suggests that the diverging results depend on the vastly different characteristics informal networks can have. It also proposes that extensive informal networks have a growing prevalence and an increasing importance for innovation and knowledge sharing in the Internet era, building on mechanisms for productive exchange of ideas proven before the Internet in the Silicon Valley, but originally dating back to the first cities in human history, 10,000 years ago.

Informal networks—for external support and knowledge sharing

An important field of research on informal networks—the networks of relationships that individuals form with friends, extended family, neighbors and wider communities of interest, and with colleagues across functions and divisions in an organization—regards how they are used for finding external support and for sharing knowledge outside the organization. Much of the results hint at a significant use and positive effects of such networks, although there are examples of contrary findings, e.g. a survey among 315 executives in China aiming at exploring the quantitative effect of informal networks on innovation performance.

The hypothesis—that informal personal networks among Chinese have a positive impact on innovation performance—was rejected since it was found that innovation performance did not rely on the size of the social networks. As an explanation, the researchers suggest that innovation performance is time-critical since it takes time to build up an informal network. Several other results, however, underline the importance of external networks, not the least for start-ups.

In a survey among executives of 100 software start-ups in Israel during the dot-com economic growth, with information added eight years later about their ability to survive the burst of the dot-com bubble, it was found that start-ups that have larger informal communication networks improved their chance to survive the external shock.[6]

Another study shows that the internationalization process of small software firms is rapid and appears to be largely driven by existing network relationships, with major partners often guiding foreign market selection and providing the mechanism for market entry.[7]

Several articles on the topic are found in mainstream media. In an article in Rail Professional, two directors at Agilis KLM note that social networks are especially important in knowledge-intensive industries, such as those associated with engineering and technology. They also refer to research showing that engineers are five times more likely to turn to friends or colleagues for information than to impersonal sources.[8]

With the primary focus on creativity for investors, investment manager and author Andrew Hunt refers to innovators as a parallel in creativity, noting: "It is amazing how many of the greatest leaps in almost every field have come when someone has crossed over from another subject and taken a fresh look at things. So it

6. Raz and Gloor, 2007. "Size really matters – new insights for start-ups' survival." Management Science 53(2):169-177. February 2007.

7. Coviello, Nicole, and Hugh Munro. "Network relationships and the internationalization process of small software firms." International business review 6.4 (1997): 361-386.

8. Healey, Matthew; Saldin, Lakshan: "The Social Network". Rail Professional, June 2016, Issue 223. https://issuu.com/railpro/docs/june_issue_2719d1b7b4d1b1/82 (Accessed 2016-10-07).

is no surprise that most successful innovators have vast, informal networks of diverse people, with whom they constantly share their thoughts and ideas."[9]

More substantial results are reported by The Economist Intelligence Unit, EIU, based on a survey of 1,000 entrepreneurs across ten cities with reputations as innovation hubs.[10] The overall finding is that start-up founders value informal meet-ups and virtual communities more than other factors in overcoming challenges such as identifying funding sources, grappling with red tape and dealing with the fear of failure. 78 % of the respondents are convinced that the informal environment will be important or crucial to their business over the next three years. Additionally, more than half of the survey group, 58%, takes part in business-oriented social networking groups on global platforms such as Facebook or LinkedIn.

Vietnamese entrepreneurs in Ho Chi Minh City are the most prolific, with 39% taking part in more than ten groups. Singapore and San Francisco entrepreneurs are almost as active, with 34% and 32% of respondents respectively taking part in more than ten groups. "In recent years it has become apparent that entrepreneurs helping entrepreneurs in informal networks are a core component of what's become known as a 'start-up ecosystem. Access to finance, talent and ideas are integral to any such ecosystem, as are the formal structures which facilitate such access, such as incubators, accelerators, and co-working spaces. Entrepreneurs' connections with their peers, however, have been shown to be as important to start-up growth in some cities as the role of institutions." the authors write.

The report also quotes Bryce Keane, co-founder of London-

based entrepreneurial community facilitator 3beards, saying: "If you don't have an ecosystem of people you can tap into for support, to help out with, say, finding talent or just making contacts, it is 20-30 times harder to get your business off the ground."

One of the most significant testimonials on the importance of informal networks for innovation and knowledge sharing, however, is the extensive research on cultural differences between Silicon Valley and "Route 128" in the Boston area, told in the book Regional Advantage: Culture and Competition in Silicon Valley and Route 128 (1994) by AnnaLee Saxenian, Professor and the current Dean of the UC Berkeley School of Information.

Saxenian outlines the industrial history of electronics and computer companies in Silicon Valley and Boston's Route 128 since the 1970's. She points out that the two regions had similar growth until the early 1980's when they both experienced crisis, after which their performance diverged—in Silicon Valley, a new generation of semiconductor and computer start-ups emerged while Route 128 showed few signs of reversing the decline.

In her book, Saxenian gives her explanation to the following success of Silicon Valley, based on research and series of interviews. Through detailed descriptions of culture and business practices, she unfolds a narrative that convincingly delineates the reasons for the different development in the two regions. Early in the book, she summarizes her view: "Silicon Valley has a regional network-based industrial system that promotes collective learning and flexible adjustment among specialist producers of a complex of related technologies.

The region's dense social networks and open labor markets encourage experimentation and entrepreneurship. Companies compete intensely while at the same time learning from one another about changing markets and technologies through informal communication and collaborative practices, and loosely linked team

9. Andrew Hunt: Creativity For Investors – Why It Really Matters. ValueWalk.com May 2016. http://www.valuewalk.com/2016/05/creativity-investors-really-matters/ (Accessed 2016-10-07).

10. The Economist Intelligence Unit (EIU): "Informal innovation: Networks that Power Start-up Cities." May 2016. https://www.eiuperspectives.economist.com/sites/default/files/EIU_IDA_Informal%20Innovation_Intro%20and%20summary.pdf (Accessed 2016-10-01).

structures encourage horizontal communication among firm divisions and with outside suppliers and customers. The functional boundaries between firms are porous in a network system, as are the boundaries between firms themselves and between firms and local institutions such as trade associations and universities.

The Route 128 region, in contrast, is dominated by a small number of relatively integrated corporations. Its industrial system is based on independent firms that internalize a wide range of productive activities. Practices of secrecy and corporate loyalty govern relations between firms and their customers, suppliers, and competitors, reinforcing a regional culture that encourages stability and self-reliance. Corporate hierarchies ensure that authority remains centralized and information tends to flow vertically. The boundaries between and within firms and between firms and local institutions thus remain far more distinct in this independent firm-based system."[11]

It is striking how this picture aligns with the perspective on traditional hierarchical organizations versus adaptive and flexible network based peer-to-peer structures that Rod Collins, Director of Innovation at the consultancy firm Optimity Advisors, describes in an article, over twenty years after the publication of Saxenian's book. Collins' piece is written in an era characterized by the opportunities and challenges brought by the Internet, which was barely emerging at the time Saxenian wrote her book—the World Wide Web was invented by Tim Berners-Lee in 1989.[12]

Informal networks, however, were of course present already in the 1980's, and long before that, but it would be safe to claim that the Internet with its fundamental peer-to-peer structure, significantly increases the opportunities for all sorts of informal

networks, horizontal communication and the kind of transboundary contacts, even between employees in competing firms, that Saxenian describes.

It is also likely that the widespread and global presence of Internet connections today is starting to require these kinds of informal and horizontal structures, for organizations and businesses to be innovative and to adapt sufficiently fast to change.

One further aspect highlighted by both Saxenian and by author and advisor Frederic Laloux, focusing on peer-to-peer based organizations (see further down), is the advantage of avoiding secrecy.[13] In the Internet era, this is becoming even clearer since on the one hand less secrecy facilitates the exchange of ideas which in turn promotes innovation, on the other hand, secrecy is becoming more and more difficult to uphold in a world where copying and distributing information is instantaneous and completely effortless.

From this perspective, it is interesting to note that Silicon Valley had established a winning cultural system decades before it would be clear that such a system would become valuable and even necessary.

From an innovation and knowledge sharing point of view, however, not even Silicon Valley was ahead of its time in some aspects.
In his book Where Good Ideas Come From – The Natural History of Innovation (2010), author and media theorist Steven Johnson argues that innovations prosper in what he calls liquid networks. He refers to computer scientist Christopher Langton who observed that innovative systems have a tendency to gravitate toward the "edge of chaos": the fertile zone between too much order and too much anarchy. And noting that Langton sometimes uses the metaphor of different phases of matter—gas, liquid, sol-

11. Saxenian, AnnaLee. Regional Advantage: Culture and Competition in Silicon Valley and Route 128. Harvard University Press (1994), p 2-3.

12. Collins, Rod. Is Hierarchy Really Necessary? The Huffington Post. 2016-05-05. http://www.huffingtonpost.com/great-work-cultures/is-hierarchy-really-neces_b_9850168.html (Accessed 2016-10-07).

13. Laloux, Frederic. The Future of Management Is Teal. Strategy+Business. 2015-07-06. http://www.strategy-business.com/article/00344?gko=10921 (Accessed 2016-10-01).

id—to describe these network states, Johnson chooses the term liquid networks to describe situations favorable for innovation.

Examples of liquid networks stretches all the way from the beginning of life and the primordial soup where new configurations could emerge from random connections between molecules without being destroyed instantly, to the 100 billion neurons in the brain, densely interconnected, constantly exploring new patterns, but also capable of preserving useful structures for extended periods of time.

Johnson's main point, however, is that when human beings first organized themselves into settlements that resembled liquid networks, a great flowering of innovation would immediately have followed.

Such settlements were the first cities, about 10,000 years ago, and Johnson also points out that a sudden increase in innovation pace started at that point in human history, with inventions such as irrigation, baskets, agriculture, alcohol, and metalworking, followed by the alphabet, currency, candles, rulers, soap, writing, sailing and many more.

And again, it is reasonable to claim that the increased amount of informal contacts between a greater number of people in a city-what Johnson calls a liquid network—is the basis for this growth of innovation.

In other words, what became a winning system for innovation and knowledge sharing in Silicon Valley was most probably first experienced over 10,000 years ago. And today we are reasonably experiencing the same phenomenon, on a global scale and with instantaneous action, through the Internet, continuously increasing the opportunities for innovation and knowledge-sharing to organizations and regions that are capable of taking advantage of them.

Informal networks inside organizations – highly effective but often not analyzed by managers

Another important area of research on informal networks regards their role inside organizations. Focus is on how much the informal network is used compared to the official organization structure, how it is built up and which key roles are involved.

In an article in Harvard Business Review, David Krackhardt, Associate Professor of organizations and public policy at the H. John Heinz III School of Public Policy and Management at Carnegie Mellon University, and Jeffrey R. Hanson, president of the consultancy firm J.R. Hanson & Company, describe the formal organization as the skeleton of a company, whereas the informal network is the central nervous system driving the collective thought processes, actions, and reactions of its business units.[14]

While describing informal networks as extremely effective and fast, particularly when dealing with unexpected problems, the authors note that managers often have poor knowledge of the informal structure, yet believing that they know well who is talking to who.

The advice to managers is therefore to build a map of the informal network based on a network survey. The map can be used to bring out the strengths in their networks, restructure their formal organizations to complement the informal, and rewire faulty networks to work with company goals. Three types of relationship networks are identified:

- **The advice network**—prominent players in an organization on whom others depend on solving problems and providing technical information.

14. Krackhardt, David, and Jeffrey R. Hanson. "Informal networks." Harvard business review 71.4 (1993): 104-111.

- **The trust network**— tells which employees share delicate information and back one another in a crisis.
- **The communication network**— employees who talk about work-related matters on a regular basis.

According to the authors, mapping advice networks can uncover the source of political conflicts, while trust networks often reveal the causes of non-routine problems, and communication network mapping can help identify gaps in information flow.

There are a few typical structures found among communication networks:

- **Imploded relationships**—when employees in a department only talk among themselves and not with other departments.
- **Irregular communication patterns**—employees are communicating only with other groups and not among themselves.
- **Fragile structures**—group members that communicate only among themselves and with employees in one other division.
- **Holes in the network**—places you would expect to find network ties but you don't.
- **"Bow ties"**—a network in which many players are dependent on a single employee.

Key roles in informal networks are described in several research reports. Five common role-players are:[15][16]

1. **Central connectors**- The ones that link most people in an informal network with one another, and can match knowledge seekers with knowledge by either providing a human contact or retrieving such knowledge from a database.
2. **Boundary Spanners** - Persons that connect an informal network with other parts of the company or with similar networks in other organizations. They play an important role in those situations where people need to share different kinds of expertise. Network maps can be used to check if the boundary spanners are making the right connections.
3. **Gatekeepers**- Those who control what knowledge leaves a given entity and what is allowed to enter. In doing so, they ensure knowledge protection and network stability. On the other hand, gatekeepers decrease the scope and the flexibility of integration, thereby contributing negatively to competitive advantage
4. **Information Brokers or Bridges**- Individuals who keep the different subgroups in an informal network together, and also have the capability to understand a variety of knowledge in different contexts. If they didn't communicate across the subgroups, the network as a whole would be split into smaller, less effective segments. There is, however, a degree of danger in relying too much on information brokers, whose departure can tear apart an informal network.
5. **Peripheral Specialists or Experts**- Persons who anyone in the informal network can turn to for specialized expertise. Often these are intentionally on the edge of the network. They might be loners; they might be people who have to invest a lot of time outside the network, or they operate on the outer fringes of a network for personal reasons. Executives who value the expertise of these people need to be extremely sensitive to the demands placed on them and respect the desire of such people to play only a peripheral role in the informal network.

Mainstream media also report on this topic, and the number of articles found in archives suggests an increased coverage in the last two years. This, however, is not reflected in a search for 'informal networks' from 2004 at Google Trends, which indicates a significantly higher occurrence in the years 2004 to 2006, and a flat, clearly lower occurrence in the following years.
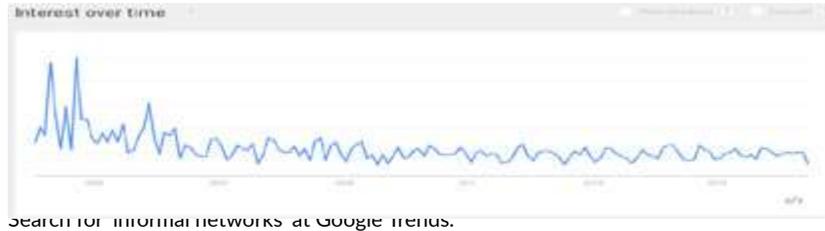
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15. Cross, Rob, and Laurence Prusak. "The people who make organizations go-or stop." Harvard business review 80.6 (2002): 104-112.

16. Awazu, Yukika. "Informal network players, knowledge integration, and competitive advantage." Journal of knowledge management 8.3 (2004): 62-70.

Search for "informal networks" at Google Trends.

Many of the articles found in mainstream media discuss informal networks inside organizations. Robert J. Thomas, managing director of the Accenture Institute for High Performance, and Yaarit Silverstone, managing director responsible for leadership and talent in Accenture Strategy Talent & Organization, point out in an article in Harvard Business Review that CEOs can leverage the efficiency in informal networks to create alignment in organizations.[17]

They suggest three ways in which digital media can be used by CEOs and managers:

- **Tune into global conversations** - Using analytical software it is possible to identify rising topics in internal digital communication systems, even in large amounts of messages, before they might become an issue inside the organization, or in time for identifying and supporting new ideas.   Knowing   and   paying attention to e.g. central connectors, and influencing networks, through corporate digital tools like Facebook and LinkedIn. Also being careful not to limit personal contacts to "familiar" faces and people with similar background, since this is no longer viable in an era when workforces are increasingly diverse, and a difference is a source of both innovation and revenue.
- **Leverage global networks** - Using analytical software it is possible to identify rising topics in internal digital communication systems, even in large amounts of messages, before they might become an issue inside the organization, or in time for identifying and supporting new ideas. Knowing and paying

17. Thomas, Robert J., Silverstone, Yaarit. How Smart CEOs Use Social Tools to Their Advantage. Harvard Business Review. 2015-03-09. https://hbr.org/2015/03/how-smart-ceos-use-social-tools-to-their-advantage (Accessed 2016-10-07).

attention to e.g. central connectors, and influencing networks, through corporate digital tools like Facebook and LinkedIn. Also being careful not to limit personal contacts to "familiar" faces and people with similar background, since this is no longer viable in an era when workforces are increasingly diverse, and a difference is a source of both innovation and revenue.

- **Deepen the dialogue**- Using analytical software it is possible to identify rising topics in internal digital communication systems, even in large amounts of messages, before they might become an issue inside the organization, or in time for identifying and supporting new ideas. Knowing   and   paying   attention to e.g. central connectors, and influencing networks, through corporate digital tools like Facebook and LinkedIn. Also being careful not to limit personal contacts to "familiar" faces and people with similar background, since this is no longer viable in an era when workforces are increasingly diverse, and a difference is a source of both innovation and revenue.

Expressing strategies and key ideas in a richer, more compelling and more accessible way, e.g. through social media, achieving a more robust digital presence than would be possible even by the most ambitious internal media campaign or whistle-stop tour of the company.

In an article in McKinsey Quarterly, three collaborators of the consultancy firm propose that informal networks at a certain degree can be formalized, thereby becoming more stable and robust, while also offering a complement or even replacement to cumbersome and outdated matrix structures that are suffering from time-consuming interactions in an increasingly globalized world.[18] The authors note, in line with other findings, that when studying informal networks, they were surprised to find how much information and knowledge flows through them and how little through official hierarchical and matrix structures. "Professionals who want to work horizontally across an organization currently

18. Bryan, Lowell L., Matson, Eric, and Weiss, Leigh M. Harnessing the power of informal employee networks. McKinsey Quarterly. November 2007. http://www.mckinsey.com/business-functions/organization/our-insights/harnessing-the-power-of-informal-employee-networks (Accessed 2016-10-10).

find themselves forced to search through poorly connected organizational silos for the knowledge and collaborators they need. In many companies, these matrix, and other hybrid organizations have become dysfunctional. The symptoms include endless meetings, phone calls, and e-mail exchanges, as well as confused accountability for results." the authors write.
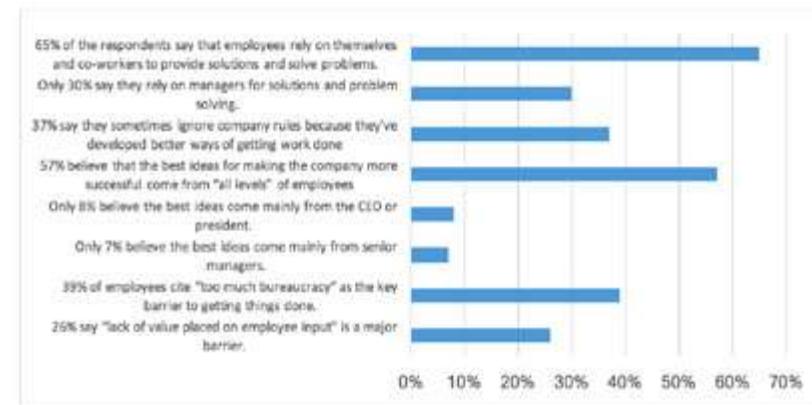
They admit that the suggested formal organization could easily be mistaken for matrix organizational entities because they both cross line structures, but underline that the difference is fundamental since matrix organizes work through authority while formal networks organize work through mutual self-interest.

They believe that a formal network must be defined and have standards and protocols that describe how it should work. It should also have an owner, but as opposed from in a matrix, the owner is not a boss but rather a "servant leader" who doesn't oversee its work or personally manage or evaluate the performance of individual members but may provide input to the evaluation process. The authors suggest that despite this limited hierarchical authority, a formal network's leader should be held accountable for the network's performance, together with line management, since much of the leader's impact comes from the ability to inspire and persuade. "Rather than pushing knowledge and talent through a hierarchical matrix, formal networks let employees pull these necessities toward them," they conclude.

The difficulties found in many traditional organizations, and the importance of informal networks reflected in the article is confirmed by a recent survey by consulting firm Katzenbach Partners, based on telephone interviews with 510 American workers at firms employing 1,000 or more employees.[19]

The key findings of the survey are:

- Percentage of total answers.

The consequences of Internet's impact on people's networks and on organization structures are further discussed in already mentioned article by Rod Collins.[20] Collins asks whether hierarchies are necessary, and notes that many people would say that hierarchy is essential and that, unless it is clear who is in charge and who is ultimately accountable, organizations will rapidly morph into anarchy.

He also thinks people would point out that the hierarchical model has been the most successful and the near universal structure for effectively organizing the work of large numbers of people since the days of the Roman Empire. Yet, he continues, companies such as Netherlands-based healthcare nonprofit Buurtzorg and U.S.-based tomato processing company Morning Star, provide evidence that eschewing a top-down hierarchy doesn't inevitably lead to chaos.

These two companies and about a dozen others use an organizational model called Teal, promoted under this name by author and advisor Frederic Laloux[21] , who Collins refers to in his article.

19. Katzenbach Partners LLC. Survey Finds Most Workers in Big Companies (65%) Rely on One Another, Not Management, to Solve Problems... Press Release. 2007-07-31. http://www.prweb.com/releases/informal/companies/prweb543720.htm (Accessed 2016-10-03).

20. Collins, Rod. Is Hierarchy Really Necessary? The Huffington Post. 2016-05-05. http://www.huffingtonpost.com/great-work-cultures/is-hierarchy-really-neces_b_9850168.html (Accessed 2016-10-07).

21. Laloux, Frederic. The Future of Management Is Teal. Strategy+Business. 2015-07-06. http://www.strategy-business.com/article/00344?gko=10921 (Accessed 2016-10-07).

Collins explains that the model avoids the traditional top-down hierarchy and instead prefers the dynamics of peer-to-peer networks, with no bosses to give directions, make assignments, or hover over workers to make sure that things get done. Instead, work is distributed among self-organized teams who decide among themselves what to do, who does what, and how things get done.

Collins observes that hierarchies have long been recognized as a fundamental dimension of the natural world, ever since Aristotle first organized life with plants at the bottom, animals in the middle, and humans at the top. But, as he points out, hierarchies in nature are a consequence of the evolutionary process where higher forms of life emerge from earlier forms through natural selection—a bottom-up emergent process, which is fundamentally different from socially constructed hierarchies that are built top-down.

He also underlines that nature's bottom-up structure of emergent processes is known as a complex adaptive system—a system in which large networks of components with no central control and simple rules of operation give rise to complex collective behavior, sophisticated information processing, and adaptation via learning or evolution.

The point Collins makes is that such self-organizing systems are more capable of adapting to change, compared to top-down hierarchies that leverage control to maintain equilibrium, and he asks the rhetorical question whether the primary orientation of today's organizations should be about maintaining equilibrium or adapting to rapidly changing circumstances.

This question could be answered noting that the Internet era brings two major implications—a technology base that is continuously increasing the pace of change, and the technological means for building network-based adaptive structures capable of dealing with continuous change. Maybe this simultaneous emergence of increased pace of change, and of the means to dealing with continuous change, is not a coincidence.

It can also be noted that Teal organizations, as described by Laloux, are mainly based on structures where the qualities of informal networks have been made the main feature of the organization.

Interlocking directorates—

extensively researched but having unclear effects

The third field of research on informal business networks regards interlocking directorates or board interlocks, which occur when directors sit simultaneously on two or more corporate boards. Such networks have been studied for over 100 years, starting with the 1905 study by Jeidels[22] on board interlocks between German banks and industrial firms.

Research on interlocking directorates is considered to be of interest to scholars from a variety of disciplines, including political science, sociology, business administration, and more recently, network science.

In the perspective of this report, the interesting aspect is whether informal networks in the form of interlocking directorates have any influence on firm performance, which turns out to be a complex question.

The short answer is that results are mixed, partly varying with countries. A positive association between profitability and interlocking—in some cases with regard also to how well-connected directors are, or their 'centrality'—have for instance been found in studies in Canada, the Netherlands, and the UK, whereas negative associations have been found in Germany and mixed results in the US and Belgium.[23] [24]

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22. Jeidels, O.: Das Verhältnis der Deutschen Großbanken zur Industrie mit besonderer Berücksichtigung der Eisenindustrie. Duncker & Humblot (1905)

23. Takes, F. W., & Heemskerk, E. M. (2016). Centrality in the Global Network of Corporate Control. arXiv preprint arXiv:1605.08197, p 5.

24. Mizruchi, M.S.: What do interlocks do? An analysis, critique, and assessment of research on interlocking directorates. Annual Review of Sociology 22, p 275 (1996).

There are many possible explanations for the varying results, essentially depending on the vast range of characteristics the relationships offered through interlocking directorates can have. First, the reasons for sitting on two or more corporate boards may be many.
Among those suggested are:

- **Collusion**—a way for competitors to restrict competition.
- **Cooption**—e.g. inviting a member of the council from a source of environmental uncertainty, such as a bank to which the firm is heavily indebted.
- **Monitoring**—when for instance an investor or a bank wants to control the operations of an unprofitable business.
- **Legitimacy**—certain board members might increase the reputation of a firm, e.g. improving chances of attracting investors.
- **Career advancement**—individuals who join boards for financial remuneration, prestige, and contacts.
- **Social cohesion**—interlocks that represent social ties among members of the upper class.

With these different motives for interlocking, it is not surprising to find a mixed association with profitability. Looking at the case of monitoring, for example, a high rate of interlocking could occur in situations when firms have financial difficulties and need to be controlled by investors.

The inverse association with profitability might be found when outside directors prefer to join the boards of well-performing firms. In both these scenarios, interlocking is a consequence rather than a cause of a certain firm performance. In fact, in some studies, it is unclear whether the association between interlocking and profitability is a cause, consequence or both.

From a knowledge sharing and innovation perspective, a few things can be noted. There are good reasons to assume that increased contact in general between people in networks of a certain scale and density lead to an increased rate of innovations.

However, it is not obvious that interlocking directorates are automatically effective in this sense, which is confirmed by the mixed associations with profitability found in research.

One thing worth noting in this regard is that since 1914, interlocks between firms deemed to be competing in the same markets are expressly prohibited in the US. This is obviously not the case for informal networks between collaborators in competing firms, leaving an opportunity for knowledge sharing open for all collaborators but not for directors.

On the other hand, whereas interlocking hitherto has contributed to national business communities, networks now form a global network of corporate control, yet with a footprint of the national networks still visible in the global network.[25]

Assuming that social cohesion is an important motive for interlocking, which reasonably means that diversity of knowledge being shared in the community is limited, an increasingly global reach of directors' network could compensate for such a limitation.

One side note is a finding in a study on interlocking directorates across five Latin American economies that corporate elites tend to build cohesive networks only in economies with strong business associations and high trade openness, whereas fewer networks are formed in economies where state-business relations dominate, business organizations are weak and trade openness low.

25. Takes, F. W., & Heemskerk, E. M. (2016). Centrality in the Global Network of Corporate Control. arXiv preprint arXiv:1605.08197, p 2.

Conclusions

Research, literature, media reports and books on informal networks are providing varying results regarding such networks' impact on innovation and knowledge sharing. However, the large range of networks and relationships, with varying characteristics, which is included in these reports, provides a reasonable explanation for the observed variation.

Meanwhile, credible and convincing descriptions of the effect on innovation and knowledge sharing that informal networks and horizontal structures have from a generalized perspective—not the least in the analysis of Silicon Valley's successful growth of performance since the 1980's—makes it plausible that benefits should be expected, and that it is valuable to encourage, map and analyze informal networks in and between all kinds of organizations.

There are also good indications that well developed informal networks can be a significant competitive advantage, both for firms and regions.

Furthermore, it is fairly obvious that the Internet provides increased opportunities for informal networks, while also offering the means for building flexible and network-based organizations that are well prepared for adapting to the accelerating pace of change in the Internet era.

Last but not least, it is worth noting that exchange of ideas in environments that are not too chaotic, neither too rigid—sometimes called liquid networks—is strongly connected with increased innovation since over 10,000 years ago.[26]

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26. Cárdenas, J. (2016). Why do corporate elites form cohesive networks in some countries, and do not in others? Cross-national analysis of corporate elite networks in Latin Americ International Sociology, February 19, 2016, 0268580916629965, p 1