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## Mixed-Methods Social Network Analysis to Assist HR Practices and Consultancy

Keywords: change management; consultancy; leadership; mixed methods; social network analysis

### **Introduction**

Mixed-Methods Social Network Analysis (MMSNA) is an important tool for research when, for example, studying students (Sarazin, in this volume), teachers (Thomas, in this volume), and professionals (Froehlich, in this volume). But it can be more than that. The perspective taken by social network analysis (SNA)—the emphasis of relations over attributes, the embeddedness of social entities, and the recurring theme of empirical research that uses relationships to produce tangible outcomes for the actors involved (Kilduff & Brass, 2010)—may complement the viewpoint that is taken during consultation with the participating organizations (Borgatti & Foster, 2003; Borgatti & Li, 2009; Collins & Clark, 2003; Cross, Borgatti, & Parker, 2002; Tichy, Tushman, & Fombrun, 1979; Zupan & Kaše, 2007).

In contrast to “traditional statistics”, which often appear too complex for the layperson, and as distinct from qualitative research, which the layperson may disregard as not being generalizable and, therefore, untrustworthy, SNA has the capability to produce intuitive visualizations that make SNA and MMSNA important tools for driving organizational change. By collecting quantitative data about an organizational network and then analyzing and discussing qualitatively the features of the network directly with its actors and stakeholders (see for example Chapter 11 Bohle, Chapter 27 Froehlich), many social network theories and concepts can be more easily contextualized and communicated.

In this chapter, which is written with evaluators, organizational consultants, applied researchers and their stakeholders in mind, we aim to inform about the “What?” and the “How?” of using MMSNA for work organization purposes. We give one example of a

consultative approach using MMSNA and discuss the possibilities and limitations of this method of consulting.

### **The social network perspective for evaluation and consultancy**

SNA and MMSNA research covers a range of topics relevant to improving organizational performance at various levels (cf. Froehlich and Schoonenboom, in this volume; Monge & Contractor, 2003). With more and more decentralized organizational structures (Starkey, Barnatt, & Tempest, 2000) and the increasing prevalence of distributed leadership (Mehra, Smith, Dixon, & Robertson, 2006), the question about an individual's influence on an organization becomes relevant. When we want to find out which factors determine whether an employee can initiate or implement change, we must remember that work organizations are not democracies but hierarchies. How much individual workers can have influence on wider context is much related to their work position. Organizational training measures are often focused on the individual's characteristics, such as their need to become more assertive, to increase their knowledge about change management, or to develop their general communication skills. We should not either forget the influence rising from organizational culture and other factors beyond individual agency.

SNA research and its mostly structural perspective has established that an actor's position within the organizational topology does play an important role (Brass, 1984; Froehlich & Messmann, 2017; Moolenaar, Daly, & Slegers, 2010). Within SNA studies, who the employees look to for information and expertise, who they engage with in routine decision-making, or who they turn to when dealing with problems, has been studied and evidenced. Earlier research on the benefits of networks has especially emphasized individual-level results, such as the importance of cohesive network positions, mediator- and boundary-crossing roles, and the relationship between informal and formal power positions. For

instance, Sparrowe and Liden (2005) have shown how having a central position in an organization's advice network translates into them having greater influence.

Organizational-level gains have been less frequently investigated (Palonen & Hakkarainen, 2014). Previous research has, therefore, mostly demonstrated a relationship between the network's structure and the individual's instrumental outcomes. For instance, employees' collaboration networks have been analyzed so as to understand how high-performing individuals and teams communicate or take part in decision-making. Specifically, the most optimal level of connectivity has been sought for. Those who manage organizations, especially within creative environments and those settings which demand high levels of expertise, try to construct functional, effective, and innovative networks of informal collaboration. The reason for this is that innovative solutions often emerge unexpectedly through informal and unplanned interactions between individuals who see problems from different perspectives (Robert Lee Cross, Gray, Cunningham, Showers, & Thomas, 2010).

Consequently, SNA is a useful tool to understand how members' and leaders' social network structures help or hinder the effectiveness of a work organization. Densely-linked networks are shown to be efficient at diffusing information when compared to sparsely-linked groups. This suggests that, while bridging across structural holes allows information to reach isolated actors, it may not be the most efficient way of transferring information. Brokers for knowledge or resources can become overwhelmed by their role (Long, Cunningham, & Braithwaite, 2013).

What is true for whole organizations is also true for smaller social entities such as teams. A team's nature is not so much the average of its members but instead highly dependent on the individual relationships that span the social network (Froehlich & Bohle Carbonell, Forthcoming), see also Chapter 11 Bohle. For instance, Balkundi and Harrison (2006) have indicated in their meta-analysis that teams with denser expressive and

instrumental social networks tend to perform better and remain more viable than other teams. Teams perform better when their leaders are central in their intra-team network and when they, as a team, are more central in an intergroup network. Indeed, factors such as the team leader's centrality in the network, or the overall density of relationships, seem to have an impact on team performance and viability. Also, Cross, Borgatti, and Parker's (2002) classic study showed how a very basic analysis of information flowing within a small organizational entity can deliver large-impact implications. It may be these interactions that can be used fruitfully to get a more honest estimate on latent constructs, such as climate for example (Zohar & Tenne-Gazit, 2008).

SNA, therefore, provides useful insights for the field of leadership (Balkundi & Kilduff, 2006; Day, 2000). For instance, Hoppe and Reinelt (2010) developed a typology of what they call organizational leadership networks. This suggests that, depending on the leaders' configurations of relationships with his or her followers, and the followers' relationships with each other, different leadership styles can be advocated. In this case, (MM)SNA is an important tool for diagnosis and subsequent leadership development—after all, by its very nature, leadership is a relational activity (Uhl-Bien, 2006).

Another feature of MMSNA that makes it a fruitful approach for the processes of consultancy and evaluation is its versatility: MMSNA has been applied in several domains, including history (Elo, 2015), politics (Ansell, Bichir, & Zhou, 2016; Apkarian, Bowler, Hanneman, & Martin, 2015), economics (Harris, Louis, & Baker, 2014), music (Vlegels & Lievens, 2015), health (Yang, Latkin, Muth, & Rudolph, 2013; Cunningham, Ranmuthugala, Plumb, Georgiou, Westbrook, Braithwaite, 2012), and education (Froehlich & Gegenfurtner, Forthcoming). This demonstrates that it is a flexible tool, adjustable to manifold organizational research questions.

Nevertheless, it has remained unclear how this information could be utilized by human resource managers and consultants. More discourse between science and practice is needed. A problem associated with a large part of the findings (predominantly based on quantitative data) is that they depend heavily on the underlying causes (Crossley, 2010). For instance, effects of density may be very different depending on the size of the organization being studied. Therefore, the findings need to be contextualized. This is where the use of qualitative methods helps: in trying to understand the client organization in a more nuanced way, the quantitative findings can be enriched and interpreted from the point of view of the organizational ‘insiders’. Other researchers agree with this requirement to include more qualitative information so as to produce more meaningful research (Bolíbar, 2015; Domínguez & Hollstein, 2014; Franke & Wald, 2006; Rienties, Johan, & Jindal-Snape, 2015). As noted by Hollstein (2011), qualitatively-oriented SNA can facilitate SNA because qualitative data can “explicate the problem of agency, linkages between network structure and network actors, as well as questions relating to the constitution and dynamics of social networks” (p. 404).

We continue by presenting case studies where results based on SNA have been employed for an organization’s development.

### **Case study I: Leaders’ brokering power**

#### *Data collection*

Data was gathered from 135 followers and ten leaders representing a Nordic technology company. The participants worked in the same department but across different units and countries. Data was gathered with an e-based survey tool. Questions regarding advice-seeking, collaboration and trust were presented for each respondent separately, based on a list of the names of their colleagues. All respondents’ answers to the sociometric survey

have been used to evaluate their leaders' (N=10) knowledge-brokering value (Gould & Fernandez, 1989, see Figure 1).

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Figure 1 about here.  
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### *Data analysis*

The spheres in the visualization (see Figure 2) represent employees, with leaders being indicated by big spheres. Distances between spheres are calculated by using 3D MDS non metric scaling techniques by UCINET software (Borgatti, Everett, & Freeman, 2002). Links between spheres indicate mutual connections. Sphere color indicates the country where the employees come from (see Figure 2).

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Figure 2 about here.  
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### *Evidence-based consultation*

In Figure 1, some leaders (especially 2 and 3) are indicated as knowledge brokers. They bridge the information between employees coming from various parts of the company (see especially liason values). In contrast, some leaders (7, 8 and 9) do not have much brokering capital. Still they might be trusted leaders in their own units and appreciated by their colleagues. Figure 2 indicates that even if various e-tools are available for knowledge exchange in the company, geographical distances still matter. Locations within the same time-zone (yellow, green, pink, and violet) are connected more tightly than the other locations (blue and orange). Organizational barriers are (too) visible. They are based on geography but also on language and cultural patterns, not on the strategic decisions of the company.

Results have been given for each leader (individually) as part of a bigger evaluation process. In addition, nationally-based communication silos have occurred between all the

employees and consultants that took part in the intervention, and some changes to bridge the organizational borders are planned as a result. In all, SNA was coupled together with a wider educational consultancy project that was targeted for the leaders of the company. Researchers were responsible of SNA procedure, whereas educational intervention, including e.g., interviews for each participator was leaded by a tiny consultancy company. Joint meetings were organized together with Human Resource (HR) staff members coming from the target organization, consultants of the company, and researchers. After the results were published at the organization, all participants were provided an individual discussion related to the results gained through SNA. Some participants but not all used the opportunity. Later the results were discussed among the leaders so that the researchers were not any more invited to take part in the meeting. This seems to be a typical way in private companies. At public side, our experience is that the forum is often more open for discussion, at least so long as the topics and labels for discussion are jointly agreed. Sensitivity is expected about what one can say. Often it is wise to say less if the atmosphere is not open for reflection.

### **Case study II: Organizational change**

#### *Data collection*

All employees (N=85) of a Finnish company in the field of marketing took part in a consultation project. The focal organization at that time was going through a restructuring process. The reason behind the change was that the leaders wanted to strengthen the know-how within the company. The old structure was based on shared clients (see Figure 3). Data was gathered with an e-based survey tool at exactly the moment that the new organizational structure was changed. Questions regarding advice-seeking and collaboration were presented to each respondent separately, based on a list of names.



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Figure 3 about here.  
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### *Data analysis*

The spheres in the visualization (see Figure 4) represent employees, the key workers with the highest advice-seeking in-degrees are indicated with big spheres. Distances between spheres are calculated by using 3D MDS non metric scaling techniques (Borgatti et al., 2002). Links between spheres indicate mutual connections. The colors of the spheres indicate sub units in the new and old structures (see Figure 4).

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Figure 4 about here.  
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### *Evidence-based consultation*

Before the change (see the left side of Figure 4), there is more interaction inside the units than between them. This is to be expected because the organizational design has been unchanged for several years. However, all sub units are in close proximity and consequently collaboration is moderately active across the organization. It is especially strong in the unit for Private Customer Service (green).

After the change (see the right side of Figure 4), the unit for Network Solutions (red) is not tightly connected but it is integrated well with other units and has a degree of internal cohesion. Its task is to organize services for other units. The unit for Private Client Service (blue) is coherent and slightly apart from the other units. Furthermore, there seem to be extra challenges in unifying the Logistics unit (green), though many of its subgroups are already collaborating together. The situation is somewhat similar in two other units. Yet the tiny Administrative unit (orange) is quite coherent.

In sum, after organizational change, there are fragmented subgroups that collaborate, but not any bigger entities. The mission is to bring together the smaller groups. Much needs to be done to get the collaboration clustered as well as it was in the old design. The positive news is that there are no units that would be total outsiders in communications. Small subgroups can be seen here and there in all of the organization's sub units, indicating tight local collaboration.

The analysis also helped in determining key workers. These are persons that are trusted by their colleagues as sources of advice. These individuals are central in the knowledge exchange networks and often help other workers in problem situations. Many of the key workers are leaders but not all leaders have a good position in the network. Key workers are especially important in organizational change situations. Reflection over the case was organized by collecting together a small group at the target organization that was responsible of managing the change procedure. Especially, HR unit was active toward university researchers. In addition, a report with names and other personal information hidden of the visualization was sent to all employees of the company and a meeting to discuss about the results was organized for those that were willing to know more. After the project ended, a representative of the organization visited one meeting at university, to have one delayed feedback meeting to reflect the project results and further plans. It has been learnt that the way how schedules are organized in business world differs from how these are organized at university side. Tempo is fast in companies and there does not use to be too many possibilities for doing follow ups. Instant discussions are welcomed but as many parallel changes in form of organizational re-structuring and turnovers take place, no longitudinal approach is expected. Projects use to be temporary and being fast in analyses in only way to manage the collaboration.

### **Case study III: Innovation networks**

Parts of this case study are also described by Froehlich, Schneider, and Mamas (in this volume).

#### *Data collection*

An electronic survey was used to collect data in several client organizations. Since a roster of employees was to be used in the questionnaire, this information was procured via an informal inquiry made to the consultant at the client organization. The questionnaire included psychometric questions related to the theme of the consultation project: innovation and innovative work behavior (Froehlich & Messmann, 2017; Gerken et al., 2018; Messmann & Mulder, 2012). It also asked for information about the formal collaboration networks of the respondents and their informal feedback-seeking networks (Frieling & Froehlich, 2017; Froehlich, Beusaert, Segers, & Gerken, 2014; Harwood & Froehlich, 2017).

#### *Data analysis*

The collected data was fed into an algorithm that analyzed the data and generated an automated report (cf. Froehlich, 2018; Froehlich, Schneider, and Mamas, in this volume). This report contained general descriptive information about the participating organization (such as number of employees or sectors), key metrics of the psychometric data (which employees are active in which stage of innovation), sociometric data (who the most central actors in the network are), and different visualizations of the networks.

#### *Evidence-based consultation*

The report was discussed with representatives of the client organization. Depending on the size of the client organization, this meant having a workshop with the whole workforce or with the leadership team only. This step of adding qualitatively-oriented data to the automated report was vital in understanding what was going on in the networks. Participants learned

about their innovative work behavior, their network, and how all this information forms an innovation network within the client organization. Making this network visible was an important step in collaboratively developing ideas for improvement (Robert L. Cross & Parker, 2004).

### **Opportunities of MMSNA in consultancy**

Work organizations invest in organizational designs and procedures that should stimulate interaction. However, the tools available for this practice are often underdeveloped when it comes to assessing these organizational designs and making informed and evidence-based decisions about restructuring the company. The informal social networks based on trust and commitment are often ignored following the credo “If you can't measure it, you can't improve it.” What leaders and human resources consultants should do is create the conditions where meaningful, productive interactions are expected to emerge (Robert L. Cross & Parker, 2004; Zupan & Kaše, 2007). This task seems impossible to achieve without knowledge about the specific social structures at hand.

As briefly presented above, SNA research has produced a wide array of empirical evidence about the impact of social relationships and social structures on various organizational indicators. Dandi and Sammarra (2009) conclude this by nominating four such areas in a Post-Fordist spirit:

- connecting activities through the improvement of cross-hierarchy (or cross-organizational) business processes;
- connecting people through both leadership, culture, and information and communication technologies;
- connecting experts and non-experts, through the identification, creation, diffusion, and re-use of knowledge; and
- connecting suppliers, customers, and partners, as in the so-called “network organization”.

But it is not just the knowledge about social relationships at work that the literature about SNA and MMSNA contribute to the consultant's work. MMSNA is also a tool to be applied directly in the client organization. We have presented three cases that show that MMSNA (a) may be applied in various contexts, (b) is useful to answer very different questions about a company, and (c) produces palpable insight for the organizations' leadership teams.

One of the most useful contributions relating to SNA, is the way it is possible to visualize data with the tools developed by SNA practitioners. Tools that reduce the complexity of data processing are vital and this is also true of consultancy. Enabling visual exploration of data via a variety of layouts can aid in the discovery, understanding, and presentation of network properties of the organization and its working communities. Visual images do not only highlight the positions of the individual actors but they also, for example, provide insights into network structures. Along these "maps" or "organizational x-ray pictures" it is possible to communicate with people, without the need to understand mathematical concepts or theory (Freeman, 2000). There are several toolsets available for this purpose and most software packages have their own drawing tools. Sometimes it may even be too easy to make visualizations compared to how hard it is to collect the data or interpret the results. Although clients do not need to know the theory behind the tools, the consultants must do so. At best, the ability to identify the social or structural configurations within an organization to create organizational advantage, allows for an explorative view of its organizational communication and collaboration procedures. The visualizations then provide a way of both monitoring and managing the organizational design so as to improve its employees' abilities. At worst, the visualizations are misleading and lead to biased conclusions.

## **Challenges of MMSNA in consultancy**

There are, however, also limitations that govern why SNA has not been in wider use for work organizations. First, SNA studies have mainly been based on frequency measures instead of on measuring the true quality of the relationships; that is, how to indicate that some collaboration relationships are more worthy than others (see Zupan & Kaše, 2007).

Second, there are many ethical concerns, especially regarding the use of names for data-gathering, see also Chapter 17 Korir. Most importantly, anonymity is a relevant concern—especially in smaller networks. Even if the names and other attributes of actors are anonymized, one cannot easily hide the structural embeddedness of single actors. This is the focus of the analysis and, in most cases, also something that makes actors easy to identify for network insiders. Next to that, information about persons not participating in the evaluation may be given by the participants. Since this information may be used against the non-participants, it is important to have a thorough ethical review of procedures before the project and, again, before releasing the conclusions (cf. Froehlich & Brouwer, Forthcoming; Korir et al., in this volume). Actually, SNA would be a very effective tool for indicating which employees are at the peripheries of the work community. Yet, from a sustainable perspective, it would not be wise to use these methods for such purposes. The most useful aim from the point of view of consultation is to be able to use group level outcomes and indicators instead of individual level ones. Most organizational consultation decisions are based on groups, not on individuals, and at the same time this would decrease the problems regarding ethical issues. As such, information related to negative ties is rarely collected in organizations (Labianca, 2014), even though the information was sometimes helpful in solving conflicts.

Third, besides the ethical challenges, the other data collection issues that are specific to SNA are its relevant limitations. These include, for instance, the requirement of a high response rate, which is not always easy to achieve when the work is based on a voluntary

participation principle. Furthermore, the decision about who is actually in the relevant network and who is not—the so-called boundary specification problem (Laumann, Marsden, & Prensky, 1983; Smith, 2013)—is difficult to make and may impact the conclusions.

Last, social network data—that may also be enriched with psychometric data—is very complex. This complexity may make it difficult to derive implications for the client organization. This is also a call for further MMSNA research to help us understand how networks can be managed for more efficient knowledge creation and human resources practices.

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Figures

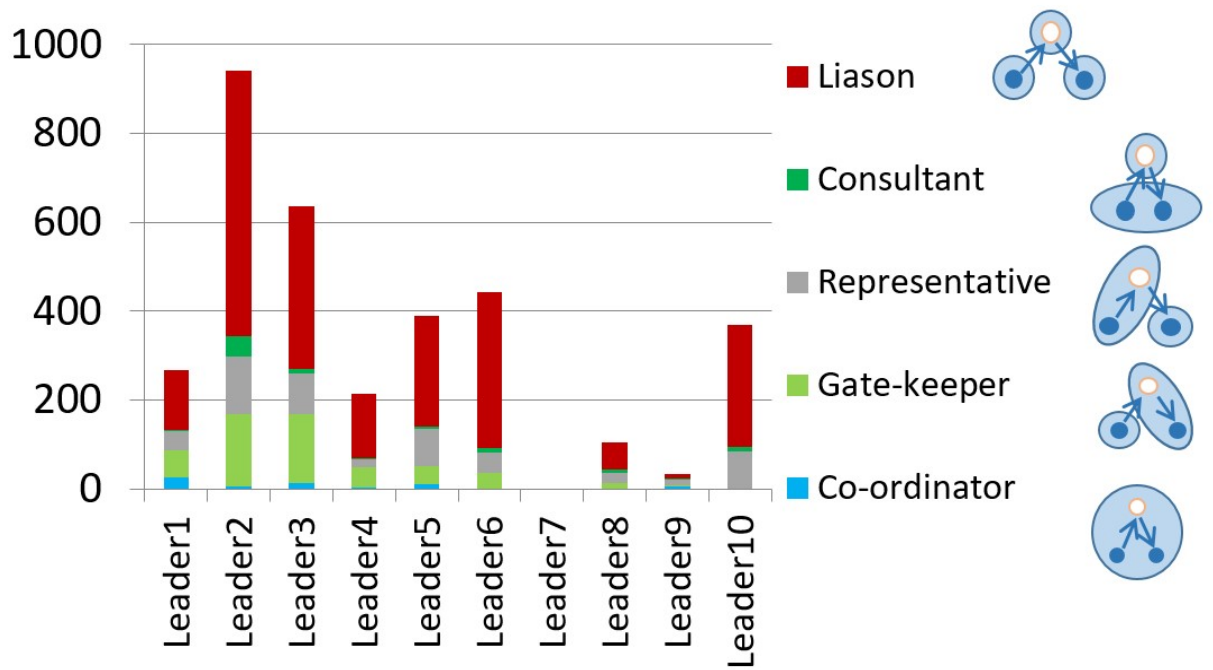


Figure 1. Leaders' brokering power (based on Gould-Fernandez, 1989)

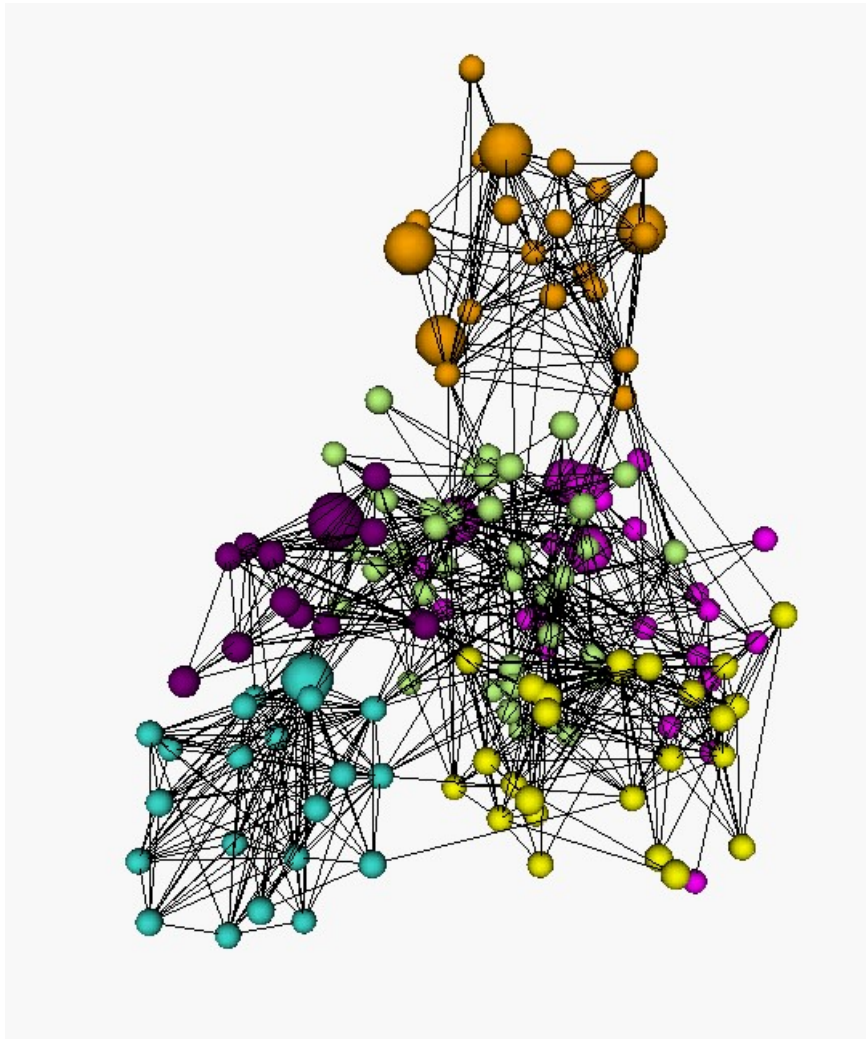


Figure 2. 3D MDS map based on network ties among employees (small spheres) and leaders (big spheres). Colors indicate geographical locations. Snapshot of the video screen.

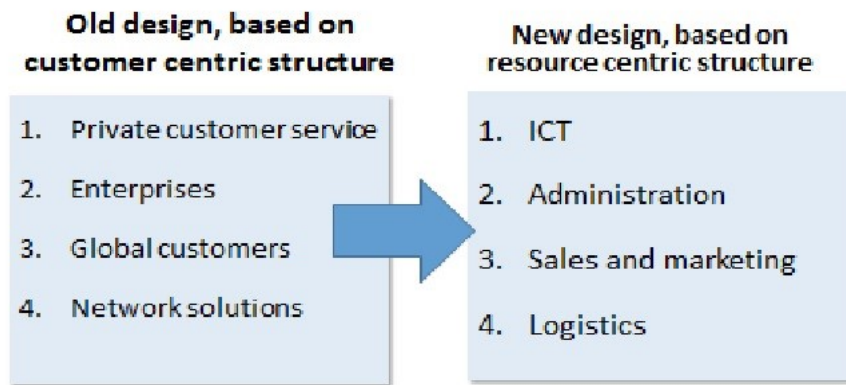


Figure 3. Strategy behind the company's organizational change



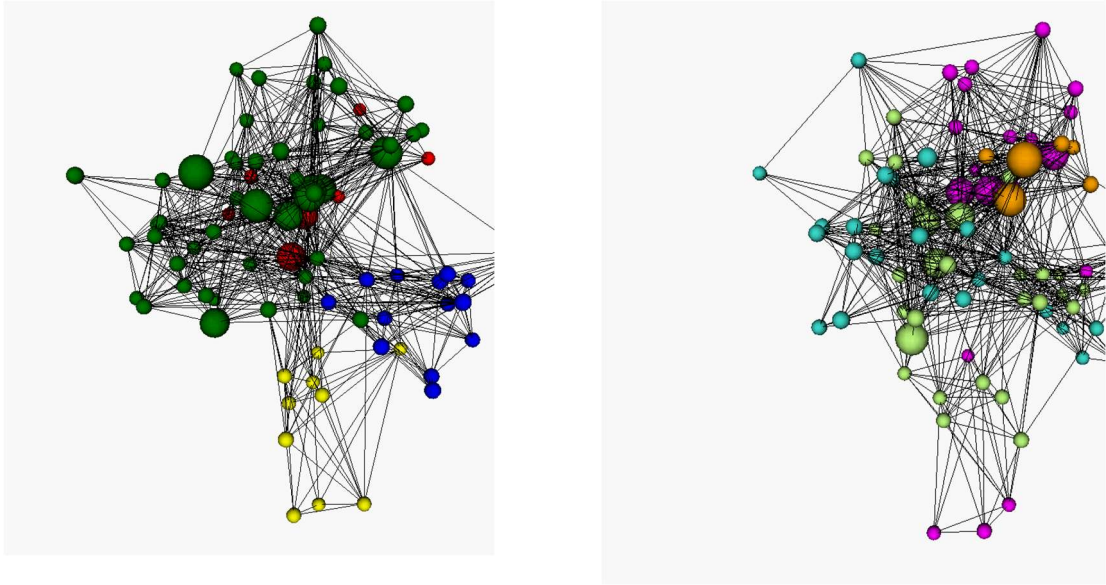


Figure 4. The organization before (right) and after organizational change. The colors indicate old and new sub units. In the Figures the key workers are indicated with bigger spheres. Snapshot of the video screen.