Social Networks in Emerging Work Models

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Abstract:

Purpose: The outbreak of the COVID-19 forced companies to transform from the on-site work model to the remote or hybrid ones. This paper analyzes threats and challenges resulting from changes in the network structures before and during the pandemic-driven emergence of new work models.

Design/Methodology/Approach: This study compares the structure of the social networks in three different work models, (a) office work model before COVID-19, (b) remote work model after the outbreak of coronavirus, and (c) hybrid work model during some of the pandemic restrictions loosening. Research is based on series of experiments conducted in the frame of strategic business simulations. In our approach, the primary source of information where people with their knowledge, behaviors, and points of view.

Findings: Our findings confirm the early stage of remote and hybrid work model proficiency among managers and shed light on emerging threats for organizational transformation and innovation capability in such distributed work models.

Practical Implications: New work models need to be deeply verified and improved. In the reality of distributed work models, we believe that analyzing social networks will become a critical approach used in organizations to understand weak ties forming their innovation and transformation capabilities.

Originality/Value: We used the opportunity of ongoing longitudinal research during which the COVID-19 outbreak occurred. We recorded and analyzed disruptive changes in the social networks of competing teams during pandemic-caused transformations. We found the importance and threats of fragile social ties for organizations operating under distributed work models for innovation and transformation capabilities.

Keywords: Social networks, distributed work models, simulation experiment.

JEL Classification: L10, L20, L22, M10, O30.
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1. Introduction

The outbreak of the coronavirus pandemic resulted in a radical breakthrough for the entire world. As a result, a new, remote model of functioning companies and the whole economy is emerging. However, we are only at the beginning of the emerging so-called "new normal." Managers currently lack the possibility of direct observations of their co-workers, and therefore, they have minimal opportunity to detect undesired trends in up-to-now efficient cooperation.

We have been conducting several social network analyses (SNA) and experiments for a couple of years now. COVID-19 pandemic has provided new settings for our research due to lockdown and forced working in the remote environment. It resulted in unexpected opportunities to compare social networks' structures in the three different work models: the so-called "office work model" (OWM) existing before the outbreak of the COVID-19, "remote work model" (RWM), which occurred after the outbreak of coronavirus pandemic, and "hybrid work model" (HWM) which emerged in late summer 2020. In this paper, we present early-stage research results to discover key topology characteristics of social networks driving efficient remote and hybrid work models. We also share our findings concerning threats for organizational long-term innovation and transformation capability.

2. Literature Review

Just in the first several weeks of the COVID-19 outbreak, businesses and employees have undergone years of change in how they operate. According to a McKinsey Global Survey of executives, companies have accelerated digitizing their processes, products, and services (Blackburn *et al.,* 2020). One of the most contemporary aspects of this transformation is the overwhelming adoption of remote work models. Brynjolfsson *et al. (2020)* study suggests about half the US workforce researched in April 2020 has been working from home (Brynjolfsson *et al.,* 2020). It's a massive jump from pre-COVID-19 15% and only 5% in 2018 (Thompson, 2020).

Moreover, executives expect most of these changes to be long-lasting and are already making investments supporting their long-term persistence (Blackburn *et al.,* 2020). As noted in the discussion on the new reality of working from home - the future will be increasingly digital, flexible, and remote-friendly, or even remote-first (Singer-Velush, Sherman, and Anderson, 2020).There are different remote work models. So-called "remote-first" is the approach of organizing workflow such that a remote worker can contribute as much as those on-site do. Another one, so-called "remote-friendly," describes a company simply open to hiring remote workers. The ultimate type, called "remote-only," explains the organizational configuration and mindset wherein employees only work remotely (Sutherland and Janene-Nelson, 2020).

Unfortunately, what we have been experiencing for the last several months indicates remote work weaknesses in informal communication, employee identification, and

innovation capability, to mention a few. That is why many managers and researchers believe the new standard would be more hybrid than a remote work model. Still, the efficiency of any distributed work model is nowadays one of the critical challenges for managers. Gratton's latest research suggests consideration of four principles for distributed work model (Gratton, 2021). Two of them relate to place and two to time. The first place principle focuses on designing the office for cooperation. It's very much connected with recognizing the social activity value of being in office.

Thus, its space should be prepared to let people meet, cooperate, feel the buzz of the entire organization community. The second-place principle focuses on making work from home a source of energy. It assumes that people should reassign their former commuting time to activities that boost their physical energy (through exercise and recreation) and their emotional energy (by spending time with family and friends). Gratton also set two-time principles. The first-time code calls for letting asynchronous time boost focus. Using the flexibility of hybrid work to create an optimal environment for tasks requiring focus is a primary productivity driver. For such tasks, asynchronous schedules are ideal whether working from home or office. The second time principle calls for enabling synchronized time to be the basis of coordination. It's related tasks, which require coordinating in real-time on projects with in-the-moment dialogue and feedback. Although synchronized time becomes a challenge in distributed work models, technological advances enable the design of synchronized time that is place-agnostic and where it is possible to create opportunities for fruitful, real-time virtual interactions (Gratton, 2021).

The researches mentioned above show the necessity for new conceptualizations for future work models. We believe that the basis for new theory in that field may be traced in social networks connecting organization members. To understand changes caused by the outbreak of COVID-19 in the ways organizations work, we believe it is crucial to utilize the potential of Social Network Analysis (SNA). SNA is a method used in management studies to provide insights into the employees' formal and informal organizational relations. Social networks exist both at the corporate level (Gulati, Dialdin, and Wang, 2002) and between organizations (Baker and Faulkner, 2017). Network research helps explain the essence of social phenomena, from individual creativity to corporate profitability (Borgatti *et al.*, 2009).

Social networks in an organization understood as organizational networks, create relationships between actors (employees), shaping the everyday work environment. Areas of network analysis, indicated by Borgatti and Halgin (Borgatti and Halgin, 2011), are used to understand such managerial phenomena as work efficiency (Sparrowe *et al.,* 2001), innovation (Obstfeld, 2005), and creativity (Burt, 2004). We follow the work of Ghoshal and Gratton and distinguish between networks that are characterized by (Ghoshal and Gratton, 2002):

- operational ties (e.g., cooperation or information flow networks),
- informational ties (e.g., knowledge diffusion networks),
- emotional ties (e.g., trust or inspiration networks).

For presentational purposes, we consider in this paper just two specific networks out of these categories. The first one is the cooperation network which presents the relationships arising from cooperation relationships in terms of achieving results, efficiency (ability in the sense of decision-making and agency), and the strength of influence of individual people. The second one is the communication network which presents the connections resulting from the communication of actors on the web and the occurrence of more profound and lasting relationships based on understanding and trust. It applies to both simple and complex messages. Nevertheless, we would like to emphasize that different selection of networks is equally possible and arguably would lead to similar outcomes.

Throughout our longitudinal research, we spent months on the network analysis in the organizations from different sectors and evaluating results from a diverse set of business simulation experiments. We analyzed diverse backgrounds of available network visualizations, e.g., Fruchterman-Reingold, LinLog, Target Sociograms, PreOrgNet, and network representations based on matrices. Tight cooperation with managers and their valuable feedback confirmed that network visualizations ought to be maximally straightforward while still providing helpful information without causing any ambiguity. As we follow the conclusions from the recent Global Human Capital Trends where future organizations are to be considered as a "network of teams" (Deloitte, 2016) to present differences between work models, we decided to use the LinLog (LL) algorithm (Noack, 2007) which inherently emphasize the fact of clusters (more closely connected set of nodes – teams in our case) existence in the overall network structure.

Finally, in our work, we build on the weak ties theory that originates from Granovetter, who argued that this kind of tie offers non-redundant information (Granovetter, 1977). His influential "strength-of-weak-ties" thesis states that weak links facilitate spreading information or resources because they act as bridges between otherwise disconnected social groups. Social network researchers have demonstrated the effect of tie strength also in other contexts than information acquisition, such as transferring complex, "tacit" knowledge (e.g., know-how), as well as in innovation (Ruef, 2002; Levin and Cross, 2004).

3. Research Methodology

Our research used a business simulation game, which allows us to observe people's reactions in certain business situations and events. Due to its experimental nature, our analysis relies on an approach in which the primary source of information is people with their knowledge, behaviors, and points of view. The behavioral context of the experiment is set within a business simulation game in which participants compete in a virtual market to win the best competitive position and maximize company value. Participants were international students of the elite MBA programs in Poland. Thus, they represent at least several years of experience in medium and large companies in managerial positions.

The game scenario describes a hypothetical new market with demand for new products, which are getting available through new disruptive technologies. The game model is deterministic in that scenario predefines markets, customer groups, distribution channels, products, and demands. Game algorithms simulate customers' decisions based on marginal utility. What is nondeterministic - only behaviors and decisions of game participants. Such an approach lets us create a simulation environment allowing the comparison of participants' behaviors in each predetermined work model. The game is iterative and consists of so-called quarters.

During each quarter there are series of actions to be taken by the companies. They involve, for instance, investments in technologies, improvements and distribution channels, product management, and sales. During the game, the teams may choose to cooperate with others in the model of competition. It may relate to operational aspects (e.g., outsourcing manufacturing operations or sharing distribution channels) or tactical cooperation in given markets (e.g., offering complementary products). Both internal and external collaboration causes the emergence of extensive social networks. Despite being short-lasting, these networks are strongly experienced by the participants due to the emotions caused by intense competition.

The experiment described here was conducted multiple times in each of the three phases determined by the COVID-19 outbreak, lockdown, and loosening restrictions. In each of those phases of our longitudinal research, we have been gathering data on social networks in the mature stage of each game. It let us analyze social networks from datasets collected separately during each of the games. We realized that social network structures coming from games in the given research phase (pre-COVID-19 summer 2019, lockdown phase of COVID-19 of spring 2020, and late summer 2020 with some loosened restrictions) are very similar simultaneously significantly different between games carried out during other stages.

For this paper, we selected particularly representative games conducted in June 2019, June 2020, and October 2020. Each business game experiment lasted nine quarters. It resulted in engaging people for 18 hours during three intensive working days. The opportunity for coopetition appeared each time in the 6th quarter, i.e., after about 12 hours of the experiment. The model of work was the element that differentiated the conducted experiments. The first experiment was born in a stationary form. The lecturers and the participants worked together in the classroom environment. The participants sat at tables together as teams and used the computer application for decision-making. The second experiment was conducted remotely. Teams worked utilizing a tool for remote communication and, as before, entered their decisions into the application that each had access to. The third experiment was carried out in a mixed formula, where half of each team was in the classroom with the trainer, and the second half cooperated with their on-site teammates online.

We organized a quick online social network survey after 15 hours of the simulation game to analyze how managers perceive and understand social networks in business

decision-making. To ensure a high response rate, which is crucial for the correctly conducted social network analysis research, we offered particular "market" bonuses unlocking access to exciting business opportunities in the game. Altogether, the survey in each experiment delivered more than 1,000 indications of network connections.

Collecting data for network analysis was based on a survey examining relationships among the respondent (ego) and other participants in the organization or network (alter). 15 questions constituting the survey were selected based on literature analysis, especially about the research presented by Borgatti, Prusak, and Parker (Cross, Borgatti, and Parker, 2002; Cross and Parker, 2004).

4. Results

In this section, we present results from three conducted experiments. For cooperation and communication networks, we shortly offer network analysis results in two parts, network and teams. In-Network part, the overall network structure is described for each of the analyzed work models, whereas internal teams' designs are described in the Teams part. Finally, a short analysis describes our findings, including outcomes presented in terms of weak ties theory. In all presented and analyzed network visualizations, node color indicates team (company), while the node size represents the in-degree measure.

Network: Overall, the cooperation network is relatively dense in each analyzed work model compared to other network perspectives. Nevertheless, primarily dense is the network in the OWM. There are visible strong social ties responsible for standard operations that secure and maintain daily efficiency. Teams: Inside legal teams, cooperation seems to be evenly strong regardless of the work model. In general, there are not visible significant disproportions between nodes' sizes, maybe apart from Charlie in the OWM model where 23 is the weakest whereas 25 is the most robust connected node in the entire network (see, for instance, Figure 1a).

Analysis: We can observe the lower intensity of network relations in both distributed work models (RWM & HWM – 0.13 and 0.12 of their network densities, respectively) in comparison to OWM. However, keeping relations cost time and energy. But still, they are strong enough to maintain all basic actions and duties. Strong operational ties such as in cooperation network are thus maintained regardless of implemented work model. They are driven by responsibilities in crucial business processes and supported by the game software. They are also necessary for fulfilling basic tasks and most directly drive teams' business outcomes.
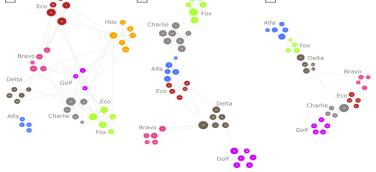
Network: Communication network (Figure 2) belongs to the relatively dense networks in the OWM. Its density equals 0.20, which, compared to knowledge diffusion, or information flow networks, is significantly greater equals 0.15 and 0.14, respectively. In this network, there is a severe drop in the number of weak ties existing between

teams in the RWM compared to the OWM. Those weak ties are partially "rebuilt" in the HWM, however, the difference between OWM and HWM is still significant. Network structure in the RWM model consists of separate components (network is shattered), whereas it is one consistent component in others.
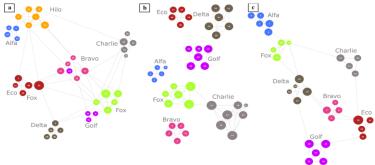
Teams: Inside legal teams, there can be observed that team members communicate with one another, and especially in the RWM, sounds seem to be evenly distributed. There is slightly greater differentiation between node sizes in the HWM and even more significant in the OWM.

Figure 1. *Cooperation network, LL visualizations, (a) OWM, (b) RWM, (c) HWM.*

Source: *Authors' own work.*

Figure 2. *Communication network. LL visualizations. (a) OWM, (b) RWM, (c) HWM.*

Source: *Authors' own work.*

Analysis: While the OWM communication is visible in the entire network, shifting from on-site to distributed work models (both RWM and HWM) caused dramatic defragmentation of communication ties between teams. It reflects the specific vital challenges they have been facing during the game. Dealing with distant cooperation has put intense pressure on coordination and exchange of information inside teams. It resulted in high internal focus in all groups. What's visible, the return to direct physical contacts between all teams' representatives in HWM resulted in the actual resurrection of communication ties among them.

5. Discussion and Conclusions

This research has implications for managers in the economic sectors where the remote work model is possible and has already been implemented. Awareness of changes they are facing in their everyday work is of much value. It is important not only what changed but also how to manage and lead teams in the new reality. Lost opportunities to observe interactions between employees in face-to-face contacts cause the necessity to introduce additional methods and ways of analysis whether an organization is on the expected track of its innovation, development, and transformation processes. We showed that SNA is a suitable method for presenting numerous challenges that appeared because of the outbreak of the COVID-19 pandemic and could be treated as an initial way of verifying where the organization is in the context of innovation and transformation capabilities. In the proposed approach, managers could, for instance, determine what interventions might be taken to enhance the innovation potential.

Our work made three main contributions: First, we perceived that due to extreme pandemic circumstances, we witnessed the emergence of the new, more distributed work models. Our research finds new challenges for managers and team leaders, which are rooted in the often hidden and unintuitive topology of social networks. Thus, we conclude that SNA could be the proper method to analyze, monitor, and provide a deeper perspective on the differences between traditional and distributed work models under development. SNA visualizations allow comparing the structures of diverse existing social networks and present assumptions or outcomes which would be otherwise very hard or even impossible to obtain. Thirdly, we showed that there are significant differences in the network structures between analyzed work models. From that point of view, it is essential to notice that switch to remote work eliminated weak ties between teams. This appears to be especially important for the digital transformation process in the context of innovation and transformation capability, now endangered under the deterioration of those weak ties.

This study is not without limitations: Limitations of lab-based experimental work have been noticed in literature, e.g., supporting decision-making areas (MacGeorge *et al.,* 2016). Our research mentions that market simulation simplifies the emergence and existence of competition and cooperation interactions, which potentially influences the social network structure. Therefore, analysing the natural company transition from office to the remote work model would be highly anticipated. By the inherent nature of the recent events caused by the sudden pandemic crisis, such research could be currently hardly possible.

Nevertheless, by using potentially existing historical data in the form of the digital footprint from which informal networks could be reconstructed, this might be achievable. Second, the inherent nature of the simulation impedes keeping the same conditions for all three cases. This would materialize in the different groups of participants that took part in each of the simulations. Even though all of them were students of the MBA programs and had significant professional experience in

management they theoretical knowledge and worked out practical schemes of action could be diverse.

In this study, we concentrated on the changes in the informal network structures formed by the emergence of distributed work models – both remote and hybrid. Our research and analysis, based on social network analysis and weak ties theory, sheds light on two issues. The first is the dilemma what are the challenges in the transition from one model to another. The second deals with the question of what tools are helpful for the managers to observe, identify and finally overcome issues occurring in the so-called "new normal."

Our findings show a significant drop in the number of weak ties between teams which leads to the conclusion that companies' innovation and transformation capability are now endangered. Further research should be focused on experimenting and verifying what leadership and managerial attitudes, methods, and tools most efficiently sustain the weak ties leverage for innovation and transformation capabilities in organizations operating under distributed work
models.

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