Introduction to Organizational Network Analysis

Over the past decade or so significant restructuring efforts have resulted in organizations with fewer hierarchical levels and more permeable functional and organizational boundaries. While hopefully promoting efficiency and flexibility, a byproduct of these restructuring efforts is that coordination and work increasingly occur through informal networks of relationships rather than through formal reporting structures or prescribed work processes. These seemingly invisible webs have become central to performance and strategy execution. Research shows that appropriate connectivity in networks within organizations can have a substantial impact on performance, learning, and innovation, and benefits also accrue from well-connected networks between organizations.

Organizational network analysis (ONA) can provide an x-ray into the inner workings of an organization — a powerful means of making invisible patterns of information flow and collaboration in strategically important groups visible. For example, we conducted an ONA of executives in the exploration and production division of a large petroleum organization. This group was in the midst of implementing a technology to help transfer knowledge across drilling initiatives and was also interested in assessing their ability as a group to create and share knowledge. As can be seen below, the network analysis revealed a striking contrast between the group's formal and informal structure.

Three important points quickly emerged from the ONA:

First, the ONA identified mid-level managers that were critical in terms of information flow within the group. A particular surprise came from the very central role that Cole played in terms of both overall information flow within the group and being the only point of contact between members of the production division and the rest of the network. If he were hired away, the efficiency of this group as a whole would be significantly impacted as people in the informal network re-established important informational relationships. Simply categorizing various informational requests that Cole received and then allocating ownership of these informational or decision domains to other executives served to both unburden Cole and make the overall network more responsive and robust.

Second, the ONA helped to identify highly peripheral people that essentially represented untapped expertise and underutilized resources for the group. In particular, it became apparent that many of the senior people had become too removed from the day-to-day operations of this group. For example, the most senior person (Jones) was one of the most peripheral in the informal network. This is a common finding. As people move higher within an organization their work begins to entail more administrative tasks that makes them both less accessible and less knowledgeable about the day-to-day work of their subordinates. However, in this case our debrief session indicated that Jones had become too removed and his lack of responsiveness frequently held the entire network back when important decisions needed to be made.

Third, the ONA also demonstrated the extent to which the production division (the sub-group on the top of the diagram) had become separated from the overall network. Several months prior to this analysis these people had been physically moved to a different floor in the building. Upon reviewing the network diagram, many of the executives realized that this physical separation had resulted in loss of a lot of the serendipitous meetings that occurred when they were co-located. Structured meetings were set up to help avoid operational problems the group had been experiencing due to this loss of communication between production and the rest of the network.

Interpreting a Network Diagram

Information collected from social network surveys can be used to create network diagrams that illustrate the relationships between members of a group. The network below reveals information flow within a dispersed new product development team. In this case each member of the team was asked ‘Whom do you turn to for information to get your work done?’ The network has been color-coded to differentiate between team members that are in manufacturing, finance and marketing.

Lines and Arrows. The diagram above shows the flow of information within a new-product development team. Each line indicates an information link between two people; arrows represent the direction of the relationship (incoming arrows show that the person is a source of information; outgoing arrows show that the team member seeks information from the linked parties).

Central People. Network diagrams make clear who the most prominent people within a group are. On this team, nine people rely on Paul for information. His colleagues in finance come to him, but so do people in marketing and manufacturing. Paul himself does not reach out to people outside of finance. The diagram alone can't tell us if Paul's impact is positive or negative. If the group is overly dependent on him, he may be a bottleneck, slowing the flow of information and holding up decisions. On the other hand, people like Paul often play a very positive role, providing valuable information and holding a group together.

Peripheral People. Some people are only loosely connected to a network; a few may be completely isolated — members in theory but not in practice. In this network, no one goes to Carl for information, and Kevin is out of the loop entirely. As is true with central people, the diagram alone doesn't say anything about the value of peripheral people. Sometimes such outsiders turn out to be underutilized resources, and integrating them can be critical to a network's effectiveness and efficiency. Sometimes people are peripheral for good reason; perhaps they are trying to manage work-family balance or are specialists such as research scientists, who need to maintain strong ties to academia. And on occasion people are peripheral because they lack skills, social and otherwise, for the job.

Subgroups. Groups within a network often arise as a product of location, function, hierarchy, tenure, age, or gender. In this case, the team is split by function; very little information is being shared among the three groups. Moreover, connections in marketing and finance are sparse, while the manufacturing subgroup is tightly knit. That can be good or bad. It may be that the manufacturing people have developed communication practices that the team as a whole could use to its benefit. It's also possible that those people rely on one another so heavily that they are preventing integration. Again, only follow-up interviews can reveal which scenario is true.

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