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Node-Link Diagrams as Lenses for Organizational Knowledge Sharing on a Social Business Platform

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Abstract. This poster shows to what extent simple node-link diagrams based on social business network data reflect knowledge sharing behavior within an organization. We show that the number of in- and outgoing messages and key positions of employees in the network are not necessarily good indicators of knowledge sharing. Filtering work-related messages and encoding visually specific attributes of (sets of) employees provide more reliable diagrams that allow us to gain insight into the way social media tools are used for knowledge sharing purposes within an organization. It turns out that currently, most organizations do not exploit social business software to its full knowledge sharing potential.

Keywords: Social networks · Node-link diagrams
Knowledge sharing · Enterprise microblogging

1 Introduction

Social business software introduces social media tools, such as a microblogging service, in a corporate context [3]. It intends to facilitate knowledge sharing, collaboration and connection that go beyond hierarchical, inter- and intra-departmental, and geographical frontiers within a company or organization. It allows to create networks of groups of employees with complementary knowledge, common interests, and to make information streams more directed. Moreover, it may stimulate social involvement, which is important for connecting employees and creating a feeling of community [2]. For knowledge sharing it is crucial that employees with expert knowledge are active on the platform, when their expertise is needed by other employees, departments or locations. These employees are the so-called knowledge holders. Also it is important that employees in higher levels of the organizational hierarchy, such as managers and CEO's, state their views on the platform [1]. Their presence shows the value to use social business tools. Social business software also allows non-located (sets of) individuals to share knowledge. A common observation is that most online activity depends

on knowing each other offline. Social media tools in a corporate context may help to motivate knowledge sharing across departments and geographical locations. When adopted by organizations, social business software generates data that may reflect the extent to which employees share knowledge, collaborate, and connect by using the tools afforded. These data are worth studying in order to get insight into the question whether and how the intended goals of social business software tools are achieved. The tools we propose to use to evaluate the current knowledge sharing activity within organizations, as revealed by social business software data, are simple node-link diagrams, easily generated by visualization tools such as NodeXL and Gephi.

2 Method

To visualize the social network behavior of employees in social business software, we use simple node-link diagrams. Nodes represent different entities. Nodes correspond to individual persons, or professions related to them, or sets of persons, working in different departments and at different geographical locations. The relationships between the nodes are represented by edges. The edges are directed, indicating who replies to whom. The edges are weighted, based on the number of posts of one node to another. We have assessed the position of nodes in the diagram by characterizing them as bridges, central nodes and isolated nodes by visual inspection. The node positions in the diagram are determined by the common metrics used in visualization tools. Bridges and central nodes are seen as key nodes with respect to knowledge sharing.

There are several potential indicators within a node-link diagram for knowledge sharing. We have investigated which ones are truthful. First we have combined visual inspection of node-link diagrams with content analysis of in- and outgoing posts. Second we have used the insights gained to improve the diagrams so that they provide more truthful information about knowledge sharing. Due to privacy laws, the figures given in this paper are not based on real customer data.

Fig. 1. Managers (blue) and non-managers (red). (Color figure online)

However, they correspond to diagrams generated by social network customer data of different organizations.

3 Towards More Insightful Node-Link Diagrams

Edge weights indicate the intensity of connections between individuals or groups of individuals. As nodes can represent both individuals and groups (departments or locations), weights of edges and key positions can be a result of the amount of posts sent or received by a large group of individuals. Visual enhancement can help to correctly interpret nodes that represent different entities. To add information about the type of entity represented by a node, size can be used to encode the cardinality of the set of persons involved. Edge weights can be interpreted in relation to the size of the node.

In some node-link diagrams, central and bridging roles can be caused by non work-related events. Some users get key positions in the diagram because they send out non work-related posts, which get a lot of replies of other employees who show social involvement. Messages that usually get a lot of replies are messages about birth of a child, illness or birthdays. These key positions cannot be associated to work-related knowledge sharing. It is important to analyze post content (by manual and/or machine learning coding) to get insight into the exact link between the post and direct work-related knowledge sharing. Taking into account only specific content allows to get more reliable diagrams.

To get a good overview and interpret correctly what the role of specific individuals is in the network, you can encode different professions by color. To

Fig. 2. Separate departments in organizations (different colors). (Color figure online)

get an even more reliable result, you can only select data of messages that contain work-related content. When knowledge sharing is performed in an optimal way, knowledge holders will be visible in key positions. Knowledge seekers know whom to connect with to get an expert answer to their questions.

Platform activity of managers and CEO's are important for the willingness of employees to participate. As a result you would like to see managers in key positions in the network. Figure 1 shows an example of a node-link diagram that positions managers in networks based on observations in current organizations. Managers are represented by blue nodes, other employees by red nodes. It shows that managers connect two different groups, so they are bridges. However, they also send messages to each other or get them from each other.

Especially in large, hierarchical organizations employees do their jobs in separate departments. Figure 2 is an example of a diagram that involve intra-departmental connections. The nodes of employees working in the same department, have the same color. We see that the departments are interconnected, but that most individuals make barely connections with other departments. Especially the green nodes form an isolated cluster.

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