Automated Organizational Network Analysis for Enterprise 2.0

Hady Abi-Nader

School of Systems Engineering
University of Reading
Reading, UK
h.abinader@reading.ac.uk

Abstract— **Social Networking Sites have recently become a mainstream communications technology for many people around the world. Major IT vendors are releasing social software designed for use in a business/commercial context. These Enterprise 2.0 technologies have impressive collaboration and information sharing functionality, but so far they do not have any organizational network analysis (ONA) features that reveal any patterns of connectivity within business units. This paper shows the impact of organizational network analysis techniques and social networks on organizational performance, we also give an overview on current enterprise social software, and most importantly, we highlight how Enterprise 2.0 can help automate an organizational network analysis.**

Keywords - enterprise social software; enterprise 2.0; social network analysis; web 2.0; organizational network analysis; ona.

I. INTRODUCTION

Social capital and innovation are nowadays regarded as one of the main competitive advantages of an organization, a factor that helps succeed in a highly competitive market and overcome tough economic conditions. Social capital depends on social interaction. In recent years, social network sites like Facebook and MySpace have been booming with popularity. These Web 2.0 technologies are now coming in packages specially designed for enterprises as major vendors (IBM, Oracle, Microsoft) are releasing social business software. This phenomenon is described as Enterprise 2.0

In today's knowledge-intensive organizations, most work of importance is heavily reliant on informal networks of employees within organizations. However, most organizations do not know how to effectively analyze this informal structure in ways that can have a positive impact on organizational performance.[1] Apart from implementing a collaborative technology in the workplace, many organizations are not taking any concrete actions to support these networks. [2]

A Social Network is a joint combination of actors and relations. [3] Social Network Analysis displays relationships as graphs, with nodes representing individuals, and edges representing interactions types. The degree and type of interactions may be represented by the lengths and widths of nodes and edges. Even though there are many tools to help perform a social network analysis for an organization, the information used to perform the analysis is almost always gathered manually through different ways such as observation, recording of activities, and/or long questionnaires to employees, interviews and diaries. Incorrect reporting might happen when participants record their own activities, and different interactions with other employees may not be remembered equally as well. [4]

This process can become extremely complex, time-consuming, and costly when applied on large organizations, moreover reliability of the results can be questioned because of the complex nature of this process.

The aim of this paper is to show an existing gap in order to help to bridge the wealth of information in organizations that has recently become accessible by enterprise social software with the social network analysis techniques in use. In this field, some work has been done on automated social network analysis technologies on interactions by email messages, files, instant text messages, network activities, etc. [5] but it seems that no work yet focuses on automating the process of organizational network analysis based on the data in enterprise social software, which is the focus of this paper.

The next section will show an overview on current Enterprise Social Software on the market and their different features. Section III will introduce Organizational Network Analysis and what it involves. Finally, Section IV will show the further research intended on this topic.

II. ENTERPRISE SOCIAL SOFTWARE

Small and large enterprises are always looking for tools to bring their employees closer together, even for workers located in the same place, they are often part of multiple projects which require attention and time management, thus the need for web-based collaboration. [11]

Social Network Sites offer many features from forming communities and creating blogs, to sharing photos and videos and organizing events. These technologies are now coming in packages specially designed for large enterprises. [12] As compared to Facebook that "helps you connect and share with the people in your life", the following tools keep the employees in touch with their colleagues and the projects to get work done.

The most popular Enterprise Social Software on the market is Jive's Social Business Software previously known as ClearSpace. In addition to *Profiles,* which is the main social networking feature, Jive has an *Analytics* Module which tracks user activities and offers some statistics. Information can be easily exported to other formats and tools such as Microsoft Excel and Microsoft Access. An *Insight*

Module reports on user engagement and sentiment extracted from user-generated content. [15] [16]

IBM Lotus Connections is the closest product to Jive's [14]. Lotus Connections wraps many social networking technologies into one package. It has discussion forums, blogs, bookmarks, and a *homepage* allowing a customized overview of the user's social network: A list of colleagues' profiles, new entries in the Wikis, latest blogs, popular bookmarks, and new activities. [17]

Socialtext is a platform that allows organizations of all sizes to collaborate using social networking features. It has *collaborative weblogs* to facilitate internal communication and a social messaging service for micro-sharing among a group of colleagues to share brief messages like on Twitter, messaging is in near real-time and kept to short messages of 140 characters to encourage briefness. [18]

Microsoft is also on the Enterprise 2.0 market through SharePoint. In SharePoint, Microsoft focuses on function over user-friendliness. SharePoint has some collaborative tools such as blogs, wikis, and message boards along with other features such as share calendars, task lists, etc. Components are not very well connected to others. [11] Microsoft added the social networking functions as features of its already-existing product rather than make a separate package. [12] *Team Sites* are a collaboration tool in SharePoint that offers groups some capabilities such as document libraries, lists, group calendaring, tasks, contacts, and announcements. Other features include the common Blogs, Wikis, and Discussions forums. [19]

Oracle has introduced new features to its Oracle Beehive enterprise-collaboration platform. The product now includes team workspaces and instant messaging, Web and voice conferencing, as well as the standard email, calendar, and other features. [13] Other major Enterprise Social Software include SuiteTwo and Salesforce.

A. Summary of functionalities

With the increased usage of Enterprise 2.0 software in organizations, it is expected that in the future employees might start to rely more and more on these collaborative technologies to collaborate more than email.

The Enterprise 2.0 tools previously mentioned encourage collaboration, save companies a considerable amount of time, and have many revolutionary features that capture the essence of Web 2.0 in all its ways. However, they do not offer a network insight or reveal any patterns of connectivity in a network, thus not benefiting from the dynamic and immense amount of information available in them.

The limitations of all existing enterprise software are that none of them contains a social network analysis module integrated in them.

Many of these have available source code, and support plug-ins, while others offer the option to export data to Excel or Access such as Jive SBS, or have an API such as IBM Connections, will be useful in the future for adding a tool for network analysis.

III. ORGANIZATIONAL NETWORK ANALYSIS

Based on the incredible amount of media coverage, many people might believe that social networks are a recent discovery – a phenomena resulting from consumer participation in web sites such as MySpace, LinkedIn and Facebook.[7] However, social network analysis has been an interdisciplinary field/multidisciplinary method from the very beginning. [3] Network analysis can be traced to three or four disciplines: Psychology, Anthropology, Sociology, and Mathematics.

Social network analysis is the mapping and measuring of relationships and flows between people, groups, organizations, computers, URLs, and other connected information/knowledge entities. [8] The two main elements of any social network are actors and relations. Their combination jointly constitutes a social network. [3]

According to Knoke (2008), an actor may be an individual person or collectivities such as informal groups and formal organizations. Common examples of individual actors include employees in a corporate work team, or high school students attending a graduation. Collective actors might be firms competing in an industry, or political parties holding seats in a parliament. [3]

A relation is generally defined as a specific kind of contact, connection, or tie between a pair of actors, or dyad. Relations may be either directed, where one actor initiates and the second actor receives (e.g., advising), or non-directed, where mutuality occurs (e.g., conversion). A relation is not an attribute of one actor but a joint property that exists only as long as both actors maintain their association.

Organizational network analysis (ONA) can provide a deep inner view into the workings of an organization, a powerful means of making invisible patterns of information flow and collaboration in strategically important groups visible.[21] Even in small, contained groups, executives are often surprised by patterns of collaboration that are quite different from their beliefs and from the formal organization chart. [2]

There are a lot of research and work done in this area and still carried out. Cross and Parker are among the researchers leading in the field of Organizational Network Analysis are Cross and Parker. Rob Cross has been researching the area of applying social network analysis ideas to business issues and has worked with over 200 leading organizations on a variety of solutions including innovation, revenue growth, cost containment and talent management. Their work describes a full methodology to conduct an organizational social analysis, the highlight the process that transforms a formal organizational chart (Figure 1) into an information one revealed by SNA (Figure 2).

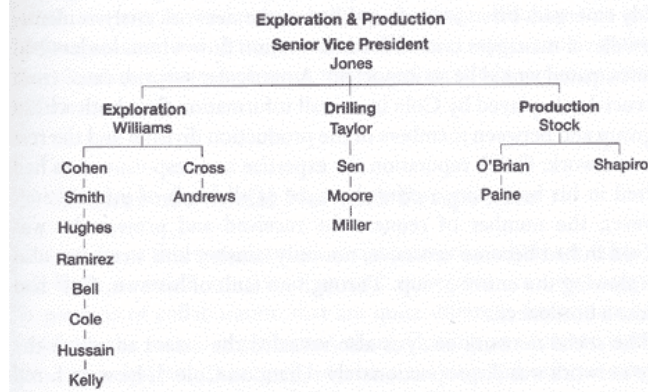**Formal Versus Informal Structure**

FORMAL ORGANIZATIONAL CHART

Figure 1. Formal Organizational Chart [20]

was the role that Cole played, being the point of contact between different groups on the network and central for the information flow. The social network analysis revealed the extent the entire network was reliant on Cole, if Cole leaves his job, this would have a significant impact on the organization [20].

Organizational Network Analysis may be suitable in supporting mergers, partnerships, and large-scale change in companies where it may highlight the information flow and knowledge transfer. Similarly, it may be useful for developing communities of practice within an organization as the process may identify the key members of the community and assess the strength of connectivity within a community, along with other situations such as improving strategic decision making and promoting innovation [2].

IV. FURTHER RESEARCH

Network analysis can be very helpful in revealing patterns of connectivity in specific functions, divisions, or business units. [2] By going through the features of the main Enterprise 2.0 packages on the market, we saw the lack of the social analysis component in these enterprise software, hence the need to more research in this area to benefit from the abundant data that becomes available as a result of using these packages in organizations.

In the further research in this area, a tool will be developed to get social FOAF data from an organization's social software, and analyze it applying organizational network analysis techniques to automatically discover patterns of connectivity and the informal structure of the organizational chart as inferred from the interaction of employees on the social software. The automated analysis will remove the high cost and the complexity of conducting an ONA manually through interviews, surveys, without the data in social software.

Conducting a Social Network Analysis manually involves the following steps of identifying a strategically important group, assessing meaningful and actionable relationships such as relationships that reveal collaboration, rigidity, or supportiveness in a network, then conducting a survey, and then analyze the results.
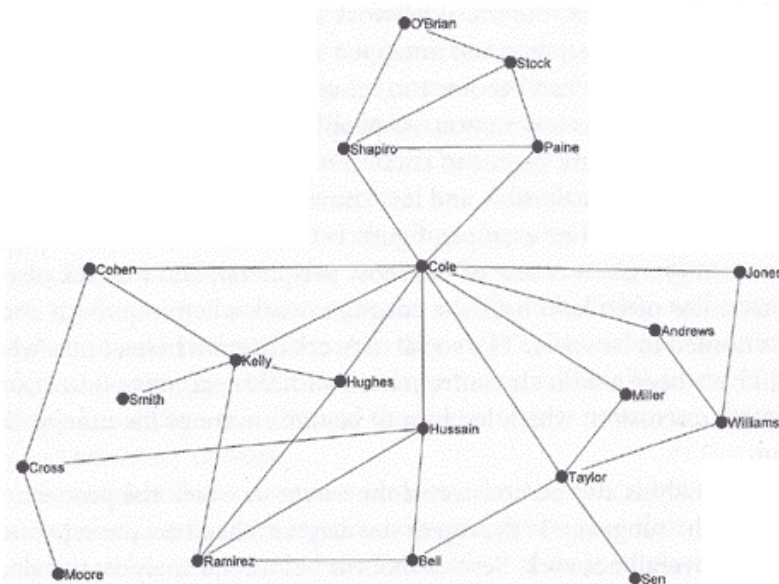
Figure 2. Informal Organizational Chart as revealed by Social Network Analysis [20]

Among the many revelations that were a result of the analysis in the example chart obtained in Figure 2 is that many of the senior people had become too-removed from the groups day-to-day operations, and this helped turn what could have been a difficult confrontation with a particular executive into constructive discussion that led the person to commit more time to the group. [20] Another point emerged

REFERENCES

[1] Cross, R., A. Parker, and L. Sasson, Networks in the Knowledge Economy. 1st Edition ed. 2003: Oxford University Press, USA. 368.

[2] Cross, R. and A. Parker, The Hidden Power of Social Networks: Understanding How Work Really Gets Done in Organizations. 2004: Harvard Business School Press.

[3] Knoke, D. and S. Yang, Social Network Analysis. 2nd Edition ed. Quantitative Applications in the Social Sciences. 2008: SAGE Publications. 144.

[4] Mayfield, A., What is social media? 2007, iCrossing.

[5] Korba, L., et al. Automated Social Network Analysis for Collaborative Work. in Proceedings of the Third International Conference on Cooperative Design, Visualization and Engineering (CDVE). 2006. Palma de Mallorca, Spain.

[6] Gibson, O., Internet means end for media barons, says Murdoch, in The Guardian. 2006.

[7] Gotta, M. Analysis Of Social Networks: Telling Old Stories In New Ways. 2008 3 April 2008. Available from: http://mikeg.typepad.com/perceptions/2008/04/analysis-of-soc.html (accessed 25 September 2010).

[8] Krebs, V. Social Network Analysis, A Brief Introduction. 2008; Available from: http://www.orgnet.com/sna.html (accessed 25 September 2010).

[9] Rowe, R., et al. Automated social hierarchy detection through email network analysis. in International Conference on Knowledge Discovery and Data Mining. 2007. San Jose, California: ACM.

[10] Creamer, G., et al. Segmentation and Automated Social Hierarchy Detection through Email Network Analysis. in Advances in Web Mining and Web Usage Analysis: 9th International Workshop on Knowledge Discovery on the Web, WebKDD 2007, and 1st International Workshop on Social Networks Analysis, SNA-KDD 2007. Revised papers. 2009: Springer-Verlag.

[11] Harris, J. Jive's Clearspace Brings Collaboration and Social Tools To Enterprises. 7 April 2008; Available from: http://webworkerdaily.com/2008/04/07/jives-clearspace-brings-collaboration-and-social-tools-to-enterprises/ (accessed 26 September 2010).

[12] Hamm, S., IBM's Social Networking Push, in BusinessWeek. 2007.

[13] Kolakowski, N. Oracle Beehive Platform Offering Social Networking, Collaboration Tools. 4 May 2009; Available from: http://www.eweek.com/c/a/Messaging-and-Collaboration/Oracle-Beehive-Platform-Offering-Social-Networking-Collaboration-Tools-387441/ (accessed 26 September 2010) .

[14] Hersh, D. Another Clearspace Competitor: Lotus Connections. 24 January 2007; Available from: http://www.jivesoftware.com/jivespace/community/jivetalks/blog/2007/01/24/another-clearspace-competitor-lotus-connections (accessed 22 August 2010) .

[15] Jive SBS. Available from: http://www.jivesoftware.com/products (accessed 26 September 2010).

[16] Jive introduces SBS 3.0. 10 March 2009 Available from: http://www.kmworld.com/Articles/News/Industry-Watch/Jive-introduces-SBS-3.0--52984.aspx (accessed 25 September 2010).

[17] Lotus Connections. Available from: http://www-01.ibm.com/software/lotus/products/connections/(accessed 22 August 2010).

[18] Socialtext: Products & Services. Available from: http://www.socialtext.com/products/(accessed 22 August 2010).

[19] Microsoft SharePoint - Social Capabilities.Available from: http://sharepoint.microsoft.com/en-us/product/capabilities/Pages/default.aspx (accessed 30 September 2010).

[20] Cross, R., A. Parker, Prusak L., and Borgatti S, Knowing What We Know: Supporting Knowledge Creation and Sharing in Social Networks. 2001: Organizational Dynamics, Vol. 30, No. 2, pp. 100–120.

[21] Cross, R. Introduction to Organizational Network Analysis; Available from: http://www.robcross.org/network_ona.htm (accessed 22 August 2010).