

Igor Pustylnick

Enterprise Collaboration Platform Based on Social Network Architecture



Content

| | |
|-------------------------------------|----|
| Content | 2 |
| Abstract..... | 3 |
| Introduction | 4 |
| Literature Review | 5 |
| Problem Description | 7 |
| Proposed Solution Architecture..... | 9 |
| Conclusions | 12 |
| References | 13 |
| About the Author | 15 |

Abstract

Enterprise Collaboration Platform (ECP) represents a paradigm shift from the system-centric to the collaboration-centric approach. It is the major step in aligning real employee interactions in the enterprise with the systems, which facilitate them. ECP allows a clear separation of the system administrators and their function from the key communication processes within the enterprise. ECP achieves this by borrowing its concepts from Social Network collaboration approach. It is envisioned as a tool which would (1) retail all enterprise communications from e-mail to IM; (2) eliminate the needs in using external communications; (3) allow users to administer portions of the content (similar to group moderation in Social Networks).

Introduction

Social networks and social media web sites are the mechanisms of the modern day social communication. The new generation entering the workforce is familiar with the concept of communication using the modern communicators such as Twitter™, Instant Messengers and Social Network web sites. Employees of the same organization often use these tools to conduct professional conversations with the colleagues working in the remote corporate as well as home offices. This situation creates a number of workplace conflict situations between the employees and their managers who cannot control what is passed from one employee to another during the conversation over such communication mechanism. In parallel it also creates the perceived communication network vulnerability which is often flagged by network and security personnel of the organization.

Created conflict situation is often resolved via the means of restricting the access to the aforementioned network and communication mechanisms by the network administrators of the organization. Although this measure somewhat resolves the problem it leaves the following problems untouched: (1) employees are left to communicate over the most expensive means of communication, namely phone and fax systems; (2) newly developed 3G and 4G wireless networks negate the restrictive efforts of the corporate network and security administrators because they can be accessed from anywhere inside the company outside of the control of the networking and security infrastructure hence rendering the existing restrictions practically obsolete.

The described situation shows that protecting people from accessing the means of communication is not very effective. Instead of using assigned workstations for communicating with the colleagues the employees will be using personal communication devices for the same purpose. However, one very important problem still remains unresolved: the safety of the information communicated over the unsecured channels to the remote locations. The existing external communicators do not guarantee the safety of the information as it travels over the uncontrolled networks. This information can be stored in the intermediate locations. It is possible to hijack this information outside of the corporate network and potentially replace it with the rogue or useless information which can inflict harm to the operations of the enterprise.

This paper discusses the paradigm of application of the social media/social network infrastructure to the communications of the large global multinational organizations where conventional communication approach is very expensive and inefficient. The paper describes the means and the high level architecture of the new communication network. It also describes the potential for using this approach in creating the new innovative mechanisms of communication within the enterprise.

Literature Review

The use of the networking approach to the management of the various aspects of enterprise is described by (Jones, Hesterly, & Borgatti, 1997). They equate the communication in management of the complex enterprise processes with the communication in the social networks. (Tichy, Tushman, & Fombrun, 1979) attempted to describe all organization processes as social network mechanisms. They assert that any organization processes can be viewed as a series of complex interactions of the participants. (Brass, 1995) describes human resources management in the scope of the social network concept. (Bjorkman & Lu, 1999) approach the same problem from the Chinese perspective, which is quite important in the today's economy as many companies have internal or external infrastructure in China. Another aspect of the social networks and the enterprise communication mechanism was researched by (Lewis, Isbell, & Koschmann, 2010), who established that tension patterns between various groups can be easily described in terms social network interaction. (Balkundi & Kilduff, 2005) research the influence of the social network to the management approach and discern three types of ties: direct reports, surrounding leaders and the pattern of ties where leaders is embedded in the organization much akin in the social network.

(Ahn, Han, Kwak, Moon, & Jeong, 2007) discussed the topology of the Social Network Websites and asserted that this topology is very similar to the topology of any human social network. However, the topology of the sites of the first and the second categories are significantly different. The sites of the first group create a user-centric topology. Each user creates a sphere or a space (as in MySpace) where they create their connections and interact with the people based predominantly on the "personal ties". Sites, such as Facebook, allow very little to no interaction with the other users who are not accepted as "friends" by the user, who wants to initiate/accept any communication. The majority of people connected via these sites have some kind of a connection in the real life. Because of this fact the connections (friends) of any user do not have in common much more that the knowledge of existence of the person, who is the center of the topology. From the point of view of any user they become a center of star-like topology where each ray connects them with a "friend" within the Social Network Site. According to the influence of any given participant in such networks is distributed via their personal connections.

The sites of the second group maintain a ring topology where circles (communities, groups) are built based on a certain interest and/or affiliation. The members of the groups may have no prior connection to each other in the non-internet life. At the same time the affiliation with the same group does not constitute that they share the same opinions on the subject(s) discussed in the group. (Stephen & TToubia, 2010) discuss the discovery mechanism used in the online shopping networks. The grouping approach to connecting users creates a very similar mechanism of introduction. (Maldonado, 2010) discusses a similar mechanism of promotion in career social networking, which is based on the same effect of introducing a set of marketable assets to the previously unknown group of people. (Du, Wu, Pei, Wang, & Xu, 2007) prove that social networks of the second category do have a distinct community pattern and supply the algorithm of detection of these patterns. (Tang & Liu, 2009) show that social media users do use the information stored/ published in the social networks to learn about the variety of subject of interest. Using the same approach towards the social networks of the second category we can conclude that information supplied to the specialized networks is used for the purposes of learning more about the subject related products and services. (Cross, Borgatti, & Parker, 2010) stress the importance of the informal relationships in the workplace and their projection on the social media. The informal character of the social media relationship plays an important role in the acceptance of the advertising/promotion message. The customers automatically consider social media messages as genuine without performing a proper scrutiny and due diligence. (Calvó-Armengol & Zenou, 2005) come to the similar conclusions with respect to the problem of job matching using word of mouth leads. The social media participants appear to trust the leads and reviews of the positions placed online.

From the technical perspective, (Motani, Srinivasan, & Nuggehalli, 2005) offer a wireless solution to the collaboration in the form of so-called "PeopleNet". A forthcoming article of (Vaidya & Seetharaman, 2011) attempts creating a dependency between the sophistication of the human interactions and the need for the new technology solution, which can address this need. (Turban, Liang, & Wu, 2011) offer a specific solution in the form of new "Web 2.0" tools for solving this problem. However, according to (Valente, 1996) the adoption of these mechanisms cannot be uniform and follows the same pattern as an adoption of any other innovation in the conventional social network.

Reviewed literature exhibits a solid evidence of the following: (1) the relationships in the workplace falls under the category of social networking; (2) the management of the enterprise is very similar to the influence existing in some of the social networks; (3) present technical capabilities of the social media web sites can be applied in the human resources area with the purpose of managing and regulating various aspects of human resource relationship.

At the same time the modern literature does not make a connection between the social media and its application within a modern enterprise. While there are plenty of articles on human resources there isn't too many which apply social media aspect to it. At the present time social media and web social networks remain a part of the leisure pastime. This paper will make one of the first attempts to match the capabilities of the social networks with the needs of the modern day human resources management infrastructure.

Problem Description

The goal of this paper is to prove the potential for building the Human Resources Management (HRM) software based on the Social Network/Social Media infrastructure. In order to do so we must first establish that there is a match between these two entities at the conceptual level. (Pustylnick, 2011) talks about two different topologies existing in the Social Network websites, namely (1) Star Topology, which exists in many Social Network user-centric web sites; (2) Ring Topology, which exists in the group-centric social network web sites. Many of larger Social Networking websites represent a mix between Star (User Centric) and Ring (Group Centric) topologies.

Modern workplace represents the mix of interactions between various employees. For instance, weak matrix (Hobday, 2000) represents a method of interaction where employee may participate in one or more project as a resource. In terms of Social Network infrastructure this employee would be enrolled as a member into multiple groups. As a member of these groups the employee would be allowed to see the posted documents, participate in the discussions and potentially the conference calls. The similarity between the Social Network Groups (Rings) is underscored by the following: (1) the members of the groups are granted access to the group resources by an administrator/moderator of the particular group whose role would be very fitting with the role and the responsibilities of the project manager within the project; (2) the non-members of the group, who would be similar to any non-participant of the project in the enterprise domain, do not have any access to the group resources and cannot participate in any activities of the group. Described principles uncover the potential for using the group portion of the Social Networking software for the project needs.

On the other hand as a member of the enterprise any employee participates in the wide range of non-organized or very loosely organized activities. This employee can communicate with the rest of the enterprise on the work related and non-work related topics. Within the confines of the enterprise this employee can share both work-related and personal information with certain people who would be called "friends" in terms of Social Networks. The information may include personal items, such as news, invitations, classifieds, etc. Another layer of information may include work related items, such as documents, software, meeting recordings, and so on. Although this description is very similar to a description of friend interaction in Social Networks it may require finer tuning in order to accommodate certain requirements to security and task separation existing in different enterprises.

There exist a large number of enterprise applications which ensure certain level of collaboration. These applications can be loosely divided by their usage into three large areas: (1) Content Managers or CMS, the applications which provide users with the opportunity of sharing documents or document templates; (2) Communicators, such as e-mail, instant messengers, and specialized software for sending messages to the external systems, such as paging or SMS; (3) collaborators which allow users communicating with each other as well as in the social networking.

The software based on the Social Network principle must be capable of the following: (1) deliver any enterprise concept to the user in the real time format (much like e-mail, but somewhat shorter and more interactive); (2) give users the opportunity to create and maintain groups based on their activities, such as project management and participation, product design and build, and internal corporate activities; (3) give users the ability to collaborate in real time using text, audio and video messages; (4) give users the access to the outside sponsored activities. The goal main goal of this software is to keep all information, related to the internal enterprise activities within the enterprise domain rather than using external tools to deliver internal content.

Despite certain differences existing in highly differentiated enterprise environments we can accept the Social Network organization as a starting point of building the architecture of the Enterprise Collaboration Platform (ECP).

The abbreviation ECP is not new and it is attributed to the number of platform applications, such as TWiki¹ or Tibbr² from Tibco. These platforms provide a necessary level of collaboration in the core business of the enterprise. From the existing applications, Tibbr remains the closest to the Social Network capabilities, but it attempts to use the external message carriers, such as Facebook³, Skype⁴ and Twitter⁵ for its needs. This violates the main principle of the Social Network software to be as independent and as conservative as possible.

¹ See <http://www.twiki.org>

² See <http://www.cmswire.com/cms/enterprise-20/tibbr-a-true-enterprise-collaboration-platform-providing-both-content-and-context--009934.php>

³ See <http://www.facebook.com>

⁴ See <http://www.skype.com>

⁵ See <http://www.twitter.com>

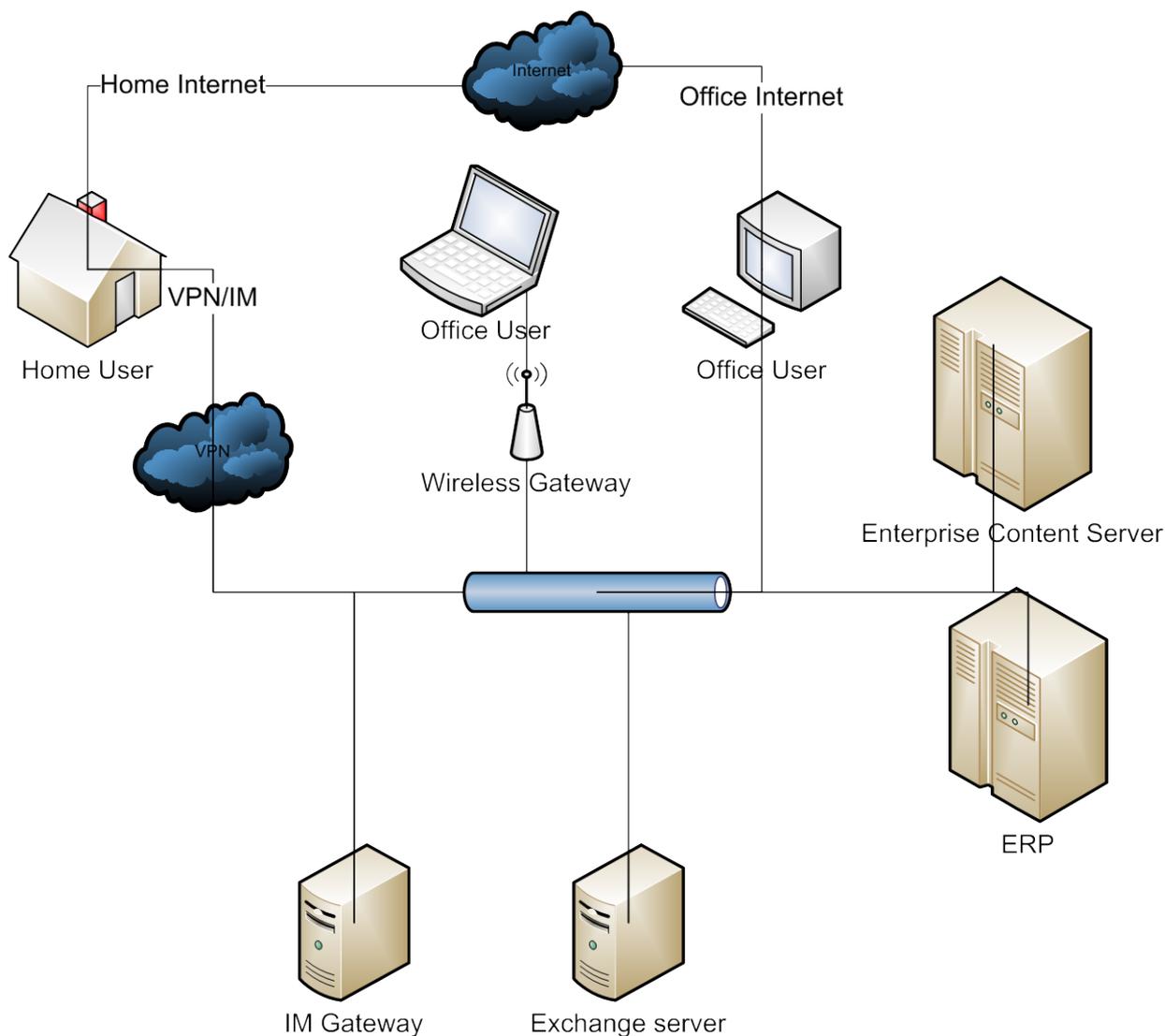
Proposed Solution Architecture

Present day enterprises have a number of software systems, which they use in their everyday life. The new Social Network based Enterprise Collaboration Platform will not deny or even diminish the use of this software. It will extend its use within the enterprise. ECP must also make use of all existing communication mechanisms, such as e-mail and/or instant messaging. The differentiation point of this platform is the organization of user rights and the organization of the communication between these users.

The platform must provide ALL communication mechanisms from short intrusive messages to e-mails with attachments. ECP must be able to change mode of delivery (e-mail, vs. IM or short messages) and the mechanism of the delivery (offline, synchronous text, synchronous text with video, etc.) upon demand of the user.

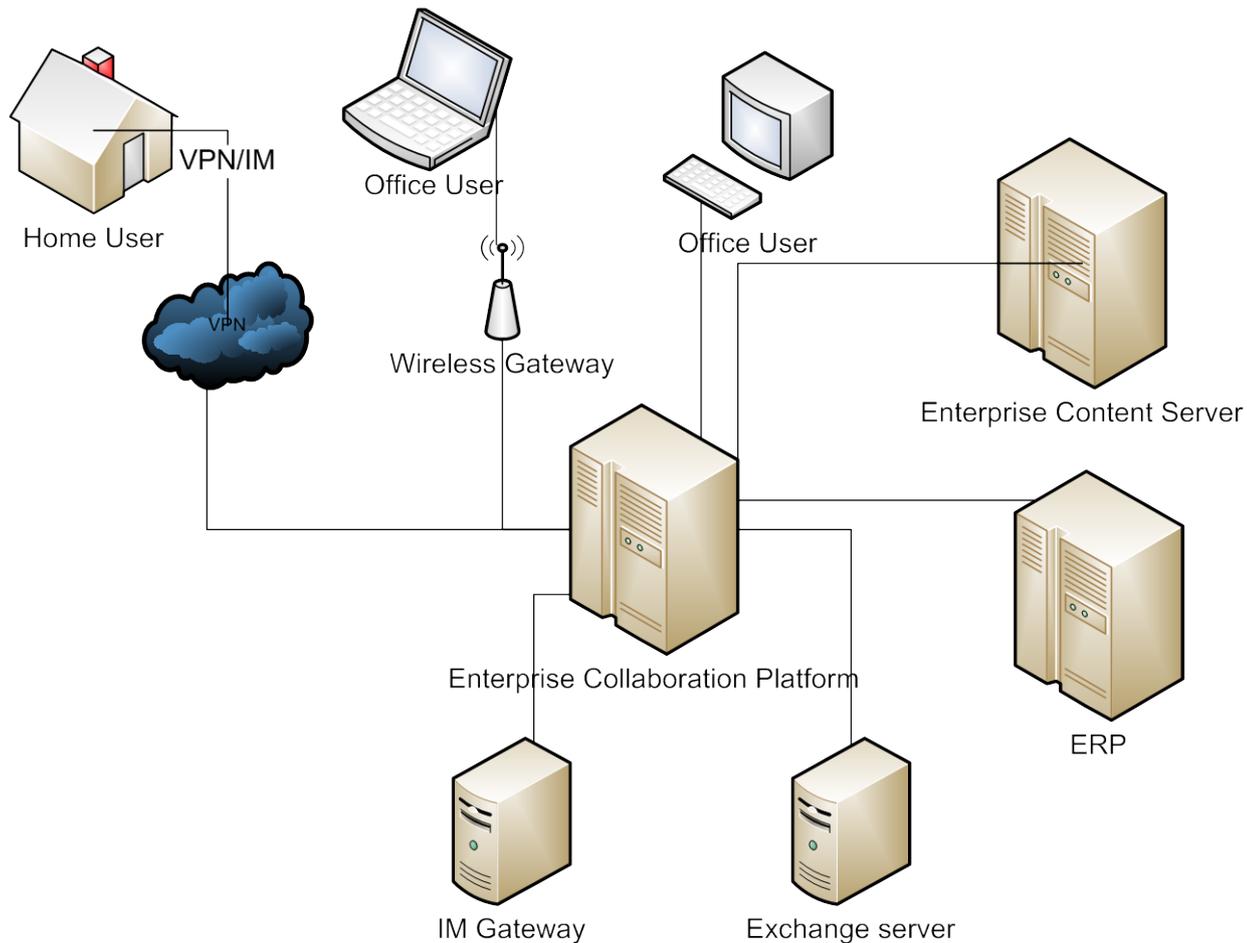
The other major concept of ECP which is presently not welcome by the enterprise IT administrators is the concepts of delegation of user rights. User can obtain the individual rights for sending different kinds of messages to the other users. However, the same user can optionally accept or deny the communication with the users who would like to subscribe to the individual user's content (analogue of friendship concept in the Social Networks). The users of the systems, who act in the influencer capacity (line managers, project managers) can also create their own space (analogue of a Group in the Social Networks) and accept members of their teams into this group. The same users must be able to co-opt and remove user rights to participate in the project group based on their status with the project. It should make it easier to organize users within the project based organization where users participate in the multiple projects at the same time.

The following picture shows the regular enterprise architecture as it is utilized by many companies today



As we can see the architecture in its present form leaves many possibilities for the instant collaboration outside of the enterprise domain. Even if users are banned from using external IMs and Skype they can still communicate over Facebook and Twitter as these means of communication are performed over the regular web connection. If home user and office user are located in the different countries and continents the company often authorizes the use of Skype or Google Talk in order to save the costs of the long distance communications.

The following diagram shows the proposed enterprise Social Network based architecture.



In the newly proposed architecture the communication between the participants is performed strictly via ECP. At the first glance this architecture is prone to a collapse because it has a single point of failure. However, the enterprises use single communication points in the form of the Mail/Exchange servers for a significant amount of time. The centerpiece of the architecture (ECP server) will require hot and cold backup which is quite achievable.

The ECP must provide control over the means of communication and over the content in the same way it is performed in the Social Networks. From the end-user perspective the communication paradigm change will be seamless as all enterprise communication mechanisms will remain in place. From the perspective of the administrator ECP must remain a “closed box” architecture where administrators have no control over the routes and the context of the content movement (similar to present mail servers).

Conclusions

This paper does not have a mandate to design a development ready architecture for ECP but only propose the guidelines for its design. In its present state the enterprise architecture is built by using centralized security. The rest of the architecture components are disjointed and the right use of each one of the components of the architecture is strictly limited. To be even more precise each element of the enterprise architecture such as ERP or Content system requires separate training. Many companies do not allow their employees using external means of communication, such as Skype or Twitter without offering anything in return. As a result internal communications in the large multinational corporations are reduced to e-mail, occasional authorized long distance individual and conference phone calls. This “promotes” the unauthorized use of external free communication means over the personal and mobile communication devices, such as communication USB sticks and 4G cell phones.

The new platform offers employees of the company the ability to communicate on corporate matters. It means that none of work related messages should be sent over the external networks, such as Twitter, Skype, ICQ, etc. The new platform will allow users creating and maintaining project spaces in the form, known in Social Networks as groups. While the central security administrator may restrict the ability of the users to create groups they will not affect the rights of the users within the groups as they will be granted by the group administrator (known as moderator in the Social Networks). The content of the group documents and ability to see them will also be regulated by the group administrator.

Overall ECP will reduce the dependency of the large organizations on the centralized security and administration group as the majority of the ECP functions must remain self-administered. All modules and building blocks required to build the components of the ECP already exist in the industry. With the decrease in the cost of hardware, network bandwidth and disk space the platforms of this size installed in the large enterprises will not exceed the costs of the extra maintenance required to support security ban for the existing external networks. From the management perspective ECP must be very helpful in mirroring the enterprise organization instead of adapting it to the capabilities of software as it happens today.

It must be noted that Social Network websites today represent a new generation of Web 2.0 entities which are tested simultaneously by the millions of users. Sites like Facebook, Orkut, Ravelry, etc. are constantly online and used by millions of people. ECP can be simply developed based on the architecture and development solutions used in the mentioned social network websites. The combination of communication paradigms natural for the modern enterprise and the use of proven architectural decisions should result in the overall successful acceptance of ECP.

References

- Ahn, Y., Han, S., Kwak, H., Moon, S., & Jeong, H. (2007). Analysis of topological characteristics of huge online social networking services. *16th international conference on World Wide Web*, (pp. 835 – 844).
- Balkundi, P., & Kilduff, M. (2005). The ties that lead: A social network approach to leadership. *The Leadership Quarterly* , 16(6) 941-961.
- Bjorkman, I., & Lu, Y. (1999). A Corporate Perspective on the Management of Human Resources in China. *Journal of World Business* , 34(1) 16-25.
- Brass, D. (1995). A SOCIAL NETWORK PERSPECTIVE ON HUMAN RESOURCES MANAGEMENT. *Research in personnel and human resources management* , Volume 13, 39 pages.
- Calvó-Armengol, A., & Zenou, Y. (2005). Job matching, social network and word-of-mouth communication . *Journal of Urban Economics* , 57(3), 500-522.
- Cross, R., Borgatti, S., & Parker, A. (2010). *Making Invisible Work Visible: Using Social Network Analysis to Support Strategic Collaboration*. Retrieved January 12, 2011, from The NETWORK ROUNDTABLE at the UNIVERSITY OF VIRGINIA:
<ftp://ftp.cba.uri.edu/Classes/aboveda/Personal/Dissertation/Cross,%20Borgatti%20and%20Parker%202002.pdf>
- Du, N., Wu, B., Pei, X., Wang, B., & Xu, L. (2007). Community detection in large-scale social networks. *Proceedings of the 9th WebKDD and 1st SNA-KDD 2007 workshop on Web mining and social network analysis* . New York.
- Hobday, M. (2000). The project-based organisation: an ideal form for managing complex products and systems? . *Research Policy* , 29(7-8) 871-893.
- Jones, C., Hesterly, W., & Borgatti, S. (1997). General Theory of Network Governance: EXchange Conditions and Social Mechanisms. *Academy of Management Review* , 22(4) 911-945.
- Lewis, L., Isbell, M. G., & Koschmann, M. (2010). Collaborative Tensions: Practitioners' Experiences of Interorganizational Relationships. *Communication Monographs. Annandale* , 77(4) p. 460.
- Maldonado, N. (2010). Connect and Promote. *Career World* , 38(5), 26-29.
- Motani, M., Srinivasan, V., & Nuggehalli, P. S. (2005). PeopleNet: engineering a wireless virtual social network. *Proceedings of the 11th annual international conference on Mobile computing and networking* . New York: ACM.
- Pustylnick, I. (2011, January 23). *Patterns of Concealed Advertising in Social Network Websites*. Retrieved February 22, 2011, from SSRN: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1746163

- Stephen, A., & TToubia, O. (2010). Deriving Value from Social Commerce Networks. *Journal of Marketing Research* , 47(2), 215-228.
- Tang, L., & Liu, H. (2009). Relational learning via latent social dimensions. *Proceedings of the 15th ACM SIGKDD international conference on Knowledge discovery and data mining* . New York.
- Tichy, N., Tushman, M., & Fombrun, C. (1979). Social Network Analysis for Organizations. *Academy of Management Review* , 4(4) 507-519.
- Trusov, M., Bodapati, A., & Bucklin, R. (2010). Determining Influential Users in Internet Social Networks. *Journal of Marketing Research* , 47(4), 643-658.
- Turban, E., Liang, P.-T., & Wu, S. P. (2011). A Framework for Adopting Collaboration 2.0 Tools for Virtual Group Decision Making. *Decision Making. Group Decision and Negotiation* , 20(2), 137-154.
- Vaidya, S., & Seetharaman, P. (2011). Explaining Sophistication in Collaborative Technology Use: A Context--Technology Fit Perspective. *Group Decision and Negotiation. Dordrecht* , 20(2) p. 185.
- Valente, T. (1996). Social network thresholds in the diffusion of innovations . *Social Networks* , 18(1) 69-89.

About the Author

Dr. Igor Pustylnick is a Professor of Finance and Management Information Systems in SMC University, Zurich, Switzerland. He can be reached by post: 8990 Wellington Rd 22, Hillsburgh, ON, Canada; by e-mail: i.pustylnick@swissmc.sh and by phone: +1(416)479-4320