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Analyzing collaborative networks emerging in Enterprise 2.0: the Taolin Platform

Michela Ferron^a, Paolo Massa^{a*}, Francesca Odella^b

^a *FBK-IRST, Via Sommarive 18, Povo Trento (TN) - Italy*

^b *University of Trento, Dept. Sociology and Social Research, Via Verdi 26, Trento – Italy*

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Abstract

Coordination and networking among people working in the same organization is not a trivial activity: competences, positions, and the structural characteristics of the company together with communication preferences and group assets may prevent a positive flow of knowledge and decrease opportunities for collaboration. Technologies and, in particular, Web platforms have great potential to serve as a solution to these issues and to promote the spread of innovation and effectiveness inside the work environment. These platforms were usually referred to as Intranets and, more recently, as Enterprise2.0, a new keyword representing how some of the most important characteristics of Web2.0, mainly user participation, can be adopted inside organizations. In this working paper we report the ongoing creation of an open source Enterprise2.0 platform and its deployment inside Fondazione Bruno Kessler (FBK), a research institute with around 400 researchers and employees conducting studies in different research areas. We also investigate the usage and communication patterns in the platform, and analyze the activities of different kinds of users in the platform and their group relations. Our initial investigation reveals that the main social activities, such as chatting and profile viewing, are performed by users more often towards members of their own research group than with other colleagues. When we analyze users according to their seniority level, we find that colleagues who recently joined FBK exhibit larger betweenness centrality both in chat and profile view networks.

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1. Introduction: Enterprise2.0 and organizations

Enterprises and organizations often face a variety of challenges concerning different kinds of communication-related problems, such as providing a sufficient level of information diffusion, improving the knowledge sharing among employees, enhancing their communication and collaboration, and assuring up-to-date information and

* Corresponding author. Tel.: +39-0461-314-336; fax: +39-0461-314-501.

E-mail address: massa@fbk.eu.

advertisement about new projects or products. In the same way, inside an enterprise workers are often in the need of keeping up with others' ongoing projects and of finding colleagues with the right skills which could be helpful to solve a particular problem they are coping with. Even if several services can be offered to support this information and knowledge sharing demand, such as intranet services and institutional websites, it can be difficult for enterprises and organizations to motivate employees to update their profiles with relevant, useful and dynamic information.

At the same time, social network sites (SNS), such as Facebook.com, MySpace.com or Orkut.com, are broadly used by people to connect, communicate, and share different kinds of information online (Boyd & Ellison, 2007). In this context, the spread of specialized social network sites that address particular targets suggests the advantages and the value social networking can provide to specific contexts, such as workers inside an organization (DiMicco *et al.*, 2008). Few empirical studies, however, have been focused on this opportunity and to the exploration of the social aspects that are involved in the application of Enterprise 2.0 features to intra-organizational communication.

In this working paper we report the ongoing creation of an open source Enterprise2.0 platform and its deployment inside a research organization, the Fondazione Bruno Kessler (FBK), and we describe initial findings about the usage and communication patterns of users within the platform. The goal of our study is to explore how social network sites can be used within a work environment and which changes they produce in users and precisely in their online interactions. The research perspective of our paper adopt a current methodology, social network analysis, to collect, organize and analyze real usage data of the platform and by means of social network measures carry on a comparison across different group of users and usage.

We believe our work is relevant in two ways; firstly because it investigates a topic which is relatively unknown, and secondly because it tries to implement analysis of both social and information processes that are involved in the application of Enterprise 2.0 projects inside organized contexts. In fact, as (Steinfeld *et al.*, 2009) acknowledge, “few companies have reported deploying their own internal Social Networking Sites”. Two notable exceptions are IBM with Beehive (Steinfeld *et al.*, 2009) and HP with WaterCooler (Brzozowski, 2009), even if the second is mainly an aggregator of other platforms such as internal blogs. Integrated methodologies for exploring complete social network platforms are still few; moreover, the platform which is under scrutiny in our study – Taolin – has been released as open source and this can give our initial analysis more interest because the experience we report here can be easily replicated in other organizations and research findings compared.

The paper is structured as follows. Section 2 defined the organizational contexts in which the platform is created, deployed and tested, and the main features of the platform. Section 3 describes the networks we extracted from the usage logs, network of chat messages and network of profile views. Section 4 reports how these social features are used, with regard to the group the user belongs to. Section 5 analyzes differences in usage according to the length of stay of employees in FBK. Section 6 concludes and describes future works.

2.The Enterprise2.0 Taolin platform and its context

Technologies applied to work environments can help employees to exploit their knowledge and relations while at work and social networking websites and other IT based resources, in particular have proved to be quite effective in improving exchange of information and collaboration opportunities among employees (Kostakos & Little, 2005). The diffusion of more friendly and adaptive instruments which consent to perform activities within the tool itself such as with Web2.0 technologies, mainly user participation, is also creating the environment for the emergence of new forms of social interaction in the working environment. The transformation induced by advancements in communication instruments and specifically, the “the use of emergent social software platforms within companies, or between companies and their partners or customers” (McAfee, 2006) or the so called Enterprise2.0 phenomenon, is expected to induce valuable innovation in an organization for professionals, collaborators and employees.

Considering a typical knowledge worker of a large organization, McAfee (2007) turns to Granovetter's theory of the “strength of weak ties” (Granovetter, 1973) to explain how the use of Social Networking Sites is going to modify the way people interact at work. The author draws a picture of the different ties she can have: a small set of close collaborators, who can be referred to as her strong ties; a larger set of people and colleagues with whom she interacts periodically for several reasons, with whom she worked in past projects, or to whom she has been introduced in the context of her work (her “weak ties”). Besides this, there is an even larger group of people this prototypical knowledge worker does not know, but who could potentially be valuable to her if she was aware of their work, experience and skills (her “potential ties”). These are people who could be able to help her with some

urgent research questions, or who have been investigating similar problems in the past, or who could possibly help her to find a useful source of information or a good partner for her project. In the same way, this knowledge worker could potentially be valuable for other people, if her work, experience and abilities were known and visible to others. Social network sites could produce a benefit both for the organization and for the employees, inducing and favouring collaborative attitudes and supporting the current practices of work coordination.

According with this interpretation, in this working paper we report the ongoing creation of an open source Enterprise2.0 platform and its deployment inside Fondazione Bruno Kessler (FBK), and we describe initial findings about the usage and communication patterns of users within the platform. The Fondazione Bruno Kessler (FBK) is a research institute located in Italy, with around 400 employees among researchers, technologists, administrative staff but also post-docs, university students and trainees. The research areas are different and include Information Technology, Materials and Microsystems, Italo-Germanic studies, and Religious Sciences. FBK also conducts research in theoretical nuclear physics, networking and telecommunications, and public policy effectiveness. In this sense, there is a large variety of competences and research interests and this is a resource the Foundation wants to leverage on. However, employees are organized in different research groups (around 35) and there is little communication between groups. Given the fact current science is more and more interdisciplinary, one of the objectives of the management is to increase collaborations and knowledge sharing between researchers working in different research groups and areas. For this reason, FBK is a perfect playground for the deployment and analysis of Enterprise2.0 tools.

Two of the authors of this paper belong to the SoNet group, a group in FBK, whose research focus is to study the new phenomenon called Web2.0 and social networking site (Boyd & Ellison, 2007). The SoNet group started in April 2008 an internal project, named Taolin, whose goal was to test the viability of Enterprise2.0 tools inside FBK. The developers initially reviewed the available tools released under an open source license and so customizable to the specific FBK needs and peculiarities. None of them was considered mature enough to build on it, so the developers decided to start creating from scratch a Web Enterprise2.0 application, named Taolin. Taolin has been released as open source so that other researchers and organizations can build on it and adapt it. Taolin platform can be download and tried online at <http://taolin.fbk.eu>.

The goal of Taolin was to provide an internal platform for FBK employees acting as a central hub for all their daily job needs. The platform integrates internal services such as those for booking rooms for meetings or for checking personal timetables. One of the requirements was to made visible the other employees and their competences as it is typical in SNSs (Boyd & Ellison, 2007), so that for example collaborations could foster naturally. The strategy chosen for development is the one typical for Web2.0 applications: 'always in beta'. This means developers released a first working but minimal prototype in April 2008 and have been working on it continuously keeping incrementing the functionalities and improving the Web platform. Given the always in beta nature of the development, it was decided to restrict the use of the ongoing platform to a limited number of colleagues, called champions. Champions are involved in the creation loop and they are aware the Taolin platform is always in beta, meaning it is not a fully finished and polished product. First champions were chosen for their strategic position within the working environment or for their propensity to use and try new Web technologies. Moreover, champions were asked by developers to send bug reports and especially to provide any kind of suggestions so that developers could consider them for integration in the platform.

The choice to deploy always in beta and to introduce Taolin in FBK to an increasing number of champions is also motivated by the fact that Enterprise 2.0 should emerge from users and real requirements and not imposed top-down from the top management level. Practically, this means initially in June 2008 the first two champions were enabled to login and had access to the platform and this number has been growing ever since and, at June 2009, it now counts more than 120 employees, out of around 400 working for FBK) (see also Figure 2). After some months, the project started to become known in FBK and colleagues asked to become champions mainly out of curiosity. Moreover, later on we introduced the possibility for champions to invite in the platform colleagues who were not yet champions. In this sense the recruitment phase changed during the life of the project and has been implemented on a voluntary bases. The platform instance deployed within FBK is accessible with a web browser at the address <http://desktop.fbk.eu>. The served web page contains a form where users can enter their usual FBK login and passwords: champions have their logins enabled and are able to enter and use the platform, while non-champions receive as response a web page explaining the purposes of the platform and giving the opportunity of asking to be included as champions. Basic procedures for enhancing privacy and organizational fairness in the collection and

processing of data with social network analysis have been adopted (Borgatti & Molina, 2005) and users that decided not to carry on their participation have not been included in the study.

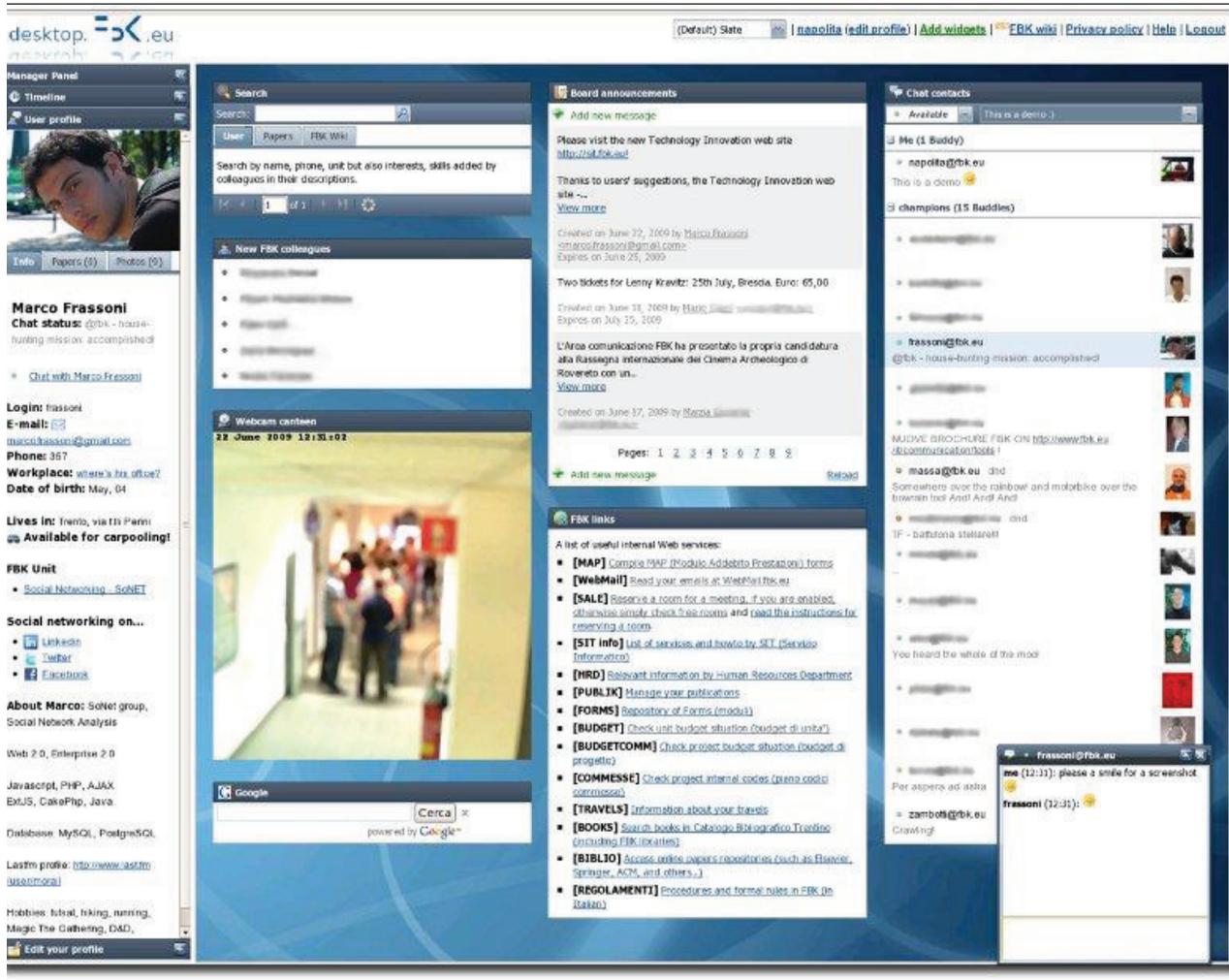


Figure 1: Taolin screenshot: note the central part, based on widgets; the left part showing the profile of a user and an open chat window (bottom left).

We now describe the interface of Taolin (see Figure 1) and the main functionalities available to champions. The main design choice in Taolin was to base it on the concept of mashup. Mashup is a common metaphor in Web2.0 applications: in this sense the interface of Taolin is similar to iGoogle and Netvibes.com. A mashup is a web application that combining data and functionalities from already existing external services into a single, central Web platform with a unifying interface. This design choice was strategic, especially because at the beginning of the development we wanted to integrate services already existent in the FBK intranet. Moreover a mashup interface allows the platform to grow incrementally in a smooth way.

The interface is composed by two main regions: the user and social region on the left and the widgets region on the centre (see Figure 1). The central region of the interface consists of a personal dashboard customizable by adding micro- applications called widgets. Each widget offers a different service that can be provided as a view over internal services or repositories (e.g. access to papers repository) or as a communication service (e.g. web chat) or as an external resource (e.g. Google search). Widgets are the way in which the mashup concept is implemented in

Taolin. A widget can be added, removed or even moved around the platform simply dragging and dropping it in the desired place.

The left part of the interface is devoted to user profiles and timeline. The visibility of user profiles is an important part in any social service and also in Enterprise2.0 platforms (Boyd & Ellison, 2007). Every champion can modify her user profile by adding photos, specifying her research interests, phone number and email, research group and other details. Once a champion has inserted at least some keywords in its profile, for example about her research interests, she can be found using a specific search widget. In this way, the Taolin platform wants to facilitate awareness and discovery of colleagues in order to foster collaboration, knowledge sharing and joint projects. Taolin platform software logs every time a certain user views the profile of another user. We will see in next section how we extract a networks of profile views out of these logs which embeds the "who views the profile of whom" pattern. In the left part, there is another sliding portion, the timeline. The timeline is simply an always updated list of the recent events happened on the social platform. Events include the fact a certain user added a certain widget to her interface or the fact she updated her profile, the insertion of new events in the platform, the change of the chat status message, but also automatically extracted information such as daily birthdays or the fact a new employee joined FBK.

Chatting is another feature worth mentioning, especially because it embeds a highly social activity. The chat feature was added following the suggestion of our first champions and it is one of the most used features. Basically it is possible to start a chat conversation with another champion simply clicking on her username in the interface, after a search or directly in her profile. New small windows appear in the bottom part of the interface for each chat conversation (see Figure 1).

As we mentioned before, the interesting aspect of Taolin is that the opportunities for users to perform actions are several, some more interactive (such as the chat option), while others more information oriented such as the profile view. Different collaboration and usage patterns are made available by the Taolin platform; in the analysis we will thus discuss separately the results concerning diverse data sources, all inserted in the same organizational context. In the next section, we detail the process of inclusion of new champions into the platform and describe the networks we have extracted from real usage patterns, respectively from chat messages and profile views.

3. Analyzing Taolin's networks of communication

The previous description of the Taolin collaborative platform suggests that the opportunities for analyzing data concerning the relationships between the users are different; moreover, these opportunities are part structured by the organizational environment (hierarchy and group organization of FBK Foundation) and part by the Taolin platform itself as is derived by the mashup and collaborative perspective of Web.2 technologies. This section describes the characteristics of the interaction networks we analyzed in this initial research, and specifically the chat network and profile views network and how we extracted and codify the original data from logs of user activity. It also describes the process of ongoing recruitment of new champions that is relevant for the choices we made about the data we analyze.

3.1. The recruitment process

To evaluate the effectiveness of the instruments implemented in Taolin one strategy is to analyze the changes in the activities of the champions while the platform evolves and then relate changes to those characteristics of the champions that are more relevant for collaborative expectations. Taolin collaborative space, in fact, is designed to promote collaborative attitudes among research colleagues, and favour contacts between members of different research disciplinary areas. Since Taolin is a on-going process it is important that we consider that every opportunity of communication is modified whenever a new champion access Taolin (new nodes and new virtual connections); in other terms, the recruitment process carried out for testing Taolin platform may interfere the interpretation of the data concerning activities on the platform. From a practical point of view, this means that the number of nodes in the network we can extract from logs are increasing with time, as new champions join the platform. Links can also be weak or strong depending on the intensity of relations that are established among the participants, who can freely choose the other nodes to connect to, for a chat or advice or simply to revise her/ his profile of activities.

The recruitment process of the users was activated few months after the starting activity of Taolin (April 2008); the first three months the users were mostly members of the developers of Taolin and only after an initial experimental phase the platform was opened to other users and to users with non technical background in IT (for a visual display of the champions acquisition process, see Figure 2). The number of champions after the first three months was 43 people and at the end of July 2009 the total number of users reached 116 champions (out of about 400 employees of the research institute).

Table 1 - Champion acquisition phases.

Phase description	Time period	# Champions
Phase 1 - experimental	June 2008 - Sep 2008	43
Phase 2 – platform open to champions	Oct 2008 - Jan 2009	74
Phase 3- development of platform	Feb 2009 – May 2009	106
Phase 4 – update situation	Jun 2009 – Jul 2009	116

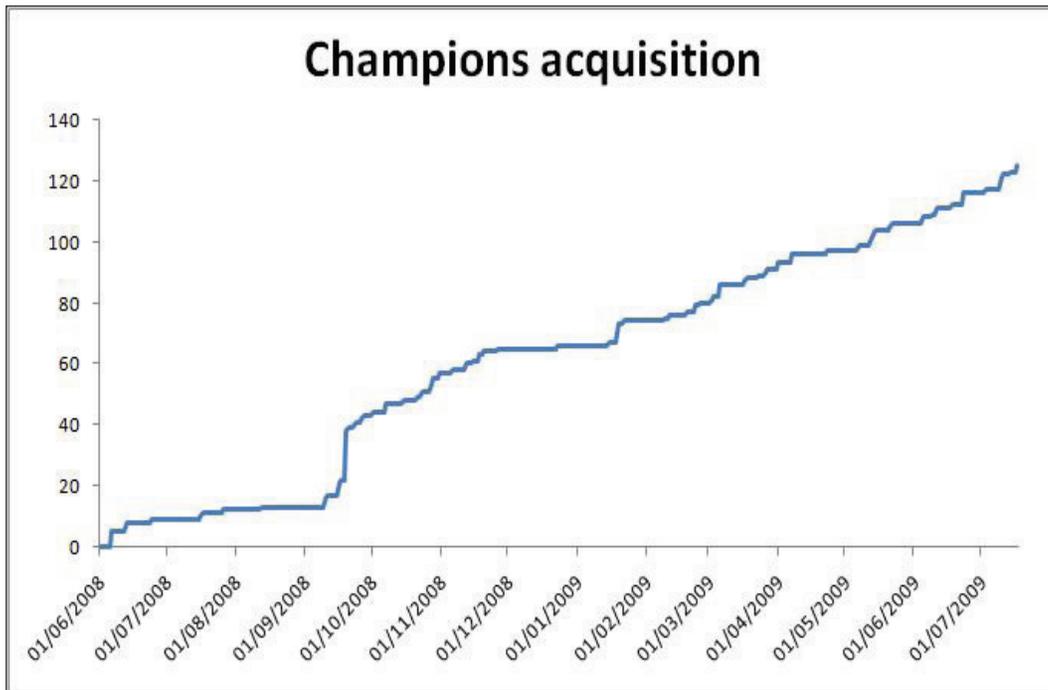


Figure 2: Champions acquisition (June 2008 - July 2009).

The activity rate on Taolin is thus connected to the evolution of the collaborative space. Also, as the users were initially recruited among the friends and colleagues of the programmers' group (an ordinary process of selection among this professional community) we cannot exclude some homophily effects in the very initial phase. When the recruitment process has been opened to other users with different disciplinary backgrounds (phase 2 and 3 of the acquisition process) it is plausible that social activity concentrate more among same-group users (selection effect), than between groups with users that may have less immediate reasons to collaborate on the platform.

This puts in evidence that the recruitment process is a process induced a) by recruitment criteria defined by the developers team (friends of friends as in the small world case), and b) by the social evolution of the platform itself, as result of intended and non intended connections associated to each new champion. These two criteria are influent

in a different way; recruitment is more powerful in the initial phase of the platform, while social ‘reproduction’ starts to be more and more influent as the number of champions increase and in accordance to their propensity to interact. However, to define our methodology and to limit the bias introduced by the recruitment criteria we decided to concentrate the analysis only on a limited time span period; in this paper we report the activity of two months (April and May 2009), which proved to be more stable in terms of champions composition. We consider only the users who were champion at the beginning of the period and not those who became champion during it, so that we can rely on the fact all the nodes of the network were able to perform activities for the entire two months. The number of champions active on Taolin at 1 April 2009 was 88 so the analysis presented in the following consider only those users. We plan to study in future different time windows and the evolution of the networks over time.

3.2. *Characteristics of the champions*

In the next sections we analyze social networks extracted from users activity according to their characteristics, putting in evidence some structural features of the interactions in the platform.

A relevant aspect of our analysis is the organizational role of the champions and their representativeness of the whole organization. Champions in fact are only a selected portion of the members of FBK and their attitudes and expectations may be different from the ones of the whole group.

In particular, the type of working relationship that members have with organization and the extension of their collaboration may influence the attitudes towards collaborative instruments and favour different patterns of activity in Taolin. For example, the opportunity to read other's researchers profile (self-edited in Taolin) may solicit a researcher to contact the member of a different research unit and ask for advice of specific issues that are mentioned in her profile. Moreover, those champions that have been for a shorter period of time in the organization may have more incentive in adopting such a pro-active attitude and in exploiting Taolin features for expanding their personal networks of colleagues. So, we consider both research group affiliation and seniority (length of time a person has been employed in the foundation) as characteristics of the users that may influence activity on Taolin. Precisely, for group affiliation, we rely on the description of the formal organizational structure (personnel enrolled in each research group). Groups in FBK are expressions of large units of researchers, working on overlapping projects inside a similar set of macro-disciplines and may vary in dimensions from 36 members to 3. After one year of activity of Taolin the reported total was of 8 different research groups active on the platform, most of them working in the IT, engineering and cognitive sciences and on average 7 members for each group were participating to the Taolin experiment.

For the seniority aspect, since we don't have precise data about when a FBK employee first joined the organization, we rely on the following criteria. Every employee is associated, at the time of her first contract, with a Unique Identifier Number (ID), assigned incrementally to each person (employed, stagier or collaborator) involved in a formal working relationship; so, people in FBK since long time have small numbers as IDs, while a new arrived has larger numbers. Note that we refer to members of FBK as employees even if there is no contract, for example students collaborating to research activities or doing their stage, as they also are given Unique Identifier Number (ID).

Finally, for performing our analysis we re-coded Unique Identifier Numbers of the champions and divide them in 3 seniority classes according to the length of stay in the Foundation (see table 2). Seniority class 2 includes those members which have a smaller ID, meaning that their length of stay in the organization is larger (approx. more than 8 years); Seniority class 1 and 0 include those members that have joined the organization more recently (class 1) or are classified as newly arrived (class 0). The sample of champions is thus non statistically representative of the personnel of the Foundation, their subdivision in classes of seniority being a computational strategy to test the presence of a relationship between retention (length of stay in the organization) and activity rate on Taolin (chat and profile view use).

4. Use of chat and profile view features and relation with personal research group

In this section we investigate relationships between activities performed on Taolin platform and groups to which the champions belong to. First, we describe the networks we have extracted from activity logs: chat network and profile views network and evaluate their effective use inside the platform.

As explained in Section 2, every champion can start a chat conversation with another champion. The Taolin software logs these interactions so that we could build a network of chat messages. The network is weighted and directed so that the nodes are the champions and on the edge from A to B there is the number of messages sent by A to B. Another “social” feature is the profile view: a champion can click on another username in order to see her profile, with photos, telephone number, research papers and interests. Taolin software logs also these interactions: the network constructed in this way embeds information about who viewed the profile of whom, assuming this is an interest for connection. Just as the chat network, the profile views network is weighted and directed. As stated previously, we restricted this analysis to activity performed during 2 months (April – May 2009) and adopted specific privacy-protection procedures in data collection and retrieval such as ‘obscuring’ the contents of the messages and identifying with a two digit ID each champion logged in the platform.

In order to understand if in-group networking or out-group networking is dominant among platform users, we adopt a descriptive measure that allows to investigate to which extent relations are concentrated inside a group, rather than toward the external network (as recommended by (Bock & Husain (1950)), and compute it according to Wasserman and Faust (1994, p. 271) indications.

Table 2 – Profile view and chat messages activity

Group	Profile view			Chat messages		
	Internal messages (average)	External messages (average)	More external than internal?	Internal messages (average)	External messages (average)	More external than internal?
37	0.1667	0.0844	False	0.0238	0.1660	True
44	0.7500	0.0991	False	0.5500	0.5047	False
46	0.1250	0.0345	False	0.0972	0.0065	False
80	3.5000	0.4692	False	38.2500	1.9121	False
49	0.3500	0.0710	False	0.0000	0.0019	True
18	0.0333	0.0467	True	0.1619	0.0674	False
19	0.1500	0.0953	False	0.0000	0.0748	True
25	0.2500	0.0505	False	0.2000	0.2187	True

As we are focusing on the association between group membership and intensity of activity on the platform analyzing valued relations, for each group A we consider as internal messages the sum of the weights on the edges that go from a user in group A to another user in group A. We consider as outgoing messages the sum of the weights on the edges that go from a user in group A to an outsider, namely a user that does not belong to group A. If there are N champions in the whole network and n champions in group A, the number of possible target nodes for internal messages is $n-1$, while the possible number of target nodes for outgoing messages is $N-n$. We normalized these measures by dividing the amount of messages by the amount of possible edges: for internal messages this is $n*(n-1)$, while for outgoing messages this is $n*(N-n)$. In this way we obtain the ratio between the average strength of ties within group A and the average strength of ties from group A members to outsiders. We calculated the ratios for two different networks (weighted directed chat networks and weighted directed profile views network) to have a clue of the extent to which ties are focused inside a group than toward colleagues in the external network. Groups with 4

members or less were removed from the analysis because they performed very reduced activity on the platform. For testing purposes, we decided to include the group of Taolin developers (group #80, in Table 2), even if they used the platform's features much more than the other groups.

The analysis was carried on as such: we first analyze profile views in order to understand if the target of this activity is more towards users of the same group or of other groups (second column). Champions in general tend to view profiles of members associated to the same group. The groups who sees more frequently the profile of colleagues are those of Taolin developers (group #80): developers did 70 internal profile views and 251 external profile views in the 2 months period while group 25 (the least active) did 5 internal profile views and 27 external ones. The prevalence of internal interest is also present in groups 44, 46 and 80. Some groups (37, 49 and 25) tend to view profiles of champions associated to other groups more than their own. When we concentrate on results from the chat network (first column), we observe a more stable situation. In all groups but one (group 18), champions tend to chat more with users of the same group, so with a prevalence of internal communications. The higher rate of internal networking is expressed by group #80, Taolin developers, (with 765 internal chat messages and 1023 external chat messages).

From this initial analysis, we can derive that Taolin platform is used primary as a medium for keeping in contact with and investigating users of your own group. In interpreting these results we suggest that the specific social context - Taolin virtual features - may activate imitation dynamics or social control inside one's own group, i.e., especially in this initial phase it is common for a champion to look at the profile of her group colleagues in order to see how they describe themselves and possibly adopt a similar pattern and keywords. Also, we foresee that the increase of interactions among participants may facilitate instrumental expertise and trust building among users, who can see the evolution of shared norms about advice exchange, tips and curiosities concerning their work activity.

5. Seniority and organizational centrality

While previous section focused on research group affiliation, this section takes into account seniority levels of champions, as defined in Section 3, and its relationships with activities within the platform. In interpreting such results it is important to remember that our analysis is a preliminary one, with data referred to a limited period life time of the platform; also the evolution of the platform is related to an incremental heterogeneity of users and groups.

As mentioned in Section 3, we divided champions into 3 groups depending on their seniority level (length of stay in FBK). For each group we computed an average betweenness centrality index of the users of that group, on data from chat and profile view networks using a weighting procedure. Since the networks are weighted, we considered distances as the inverse of weights in the betweenness centrality computation (Boccaletti *et al.*, 2006 (p. 199)). We assume this average betweenness centrality index represent the centrality of the users of each seniority class.

We decided to compute betweenness because, even if all the users are reachable within the organization, it is more likely that a new tie is established through the introduction of someone who is already in contact with the target user (for example, this is represented by the fact they chat already a lot for keeping up with their daily job needs). We decided to compute betweenness centrality also over the network of profile views, even if there is no evidence of transitivity of profile views, for comparative purposes.

Table 3 – Chat and profile view networks betweenness indexes by seniority class.

Organizational position	Chat messages	Profile view
seniority class 0 (new arrived)	68.0344	131.217
seniority class 1(middle)	51.0459	93.405
seniority class 2 (senior)	34.6833	66.080

Results show that the index increases as the length of stay in the organization diminishes (Table 3); specifically, people who recently joined the FBK organization are more central both in chat and profile view networks. The interpretation of such results requires that we focus on the time and social evolution of participation to the platform.

First, newly arrived have more incentive in testing and using Taolin social features in order to get net connections and to get a feeling of the working environment (making sense of their presence and experiencing their role). Second, senior staff tend to have their own established interaction, have already built personal networks aside of Taolin space and have less need to "find new people" or connect with newly arrived. These observations are held truth for chat interaction, while for the profile views network, the evidence is less obvious and need a short explanation. It could have been expected that the most frequent targets of the profile views would have been the senior staff. Instead the personnel who receive most of the profile views are again the newly arrived ones. The reason for this is the timeline feature: the timeline shows to every user of Taolin the arrival of a new user and in fact many champions click on the new name out of curiosity and desire to check the research interests and group of the new arrived and in doing this they generate a profile view. Looking at the newly arrived profile is a sort of *entrée* strategy for getting involved in more intense activity of communication such as the chat, to find communality of interests and experiences and finally, as we previously mentioned to get involved in the organizational dimension of the FBK Foundation. This explanation is based on our preliminary data and may require a more extensive observation of the evolution of Taolin's virtual social networks at FBK to validate it. In this sense our interpretation of them as a social network is heavily influenced by the interface (Taolin platform) and the technological system (Web2.0); the evolution process and the merging of social and organizational features, however may also provide the condition for a more complex structuring of social relations.

6. Conclusions and future work

The introduction of a social software platform inside an organization can provide a new opportunity of understanding the usage and communication patterns within this kind of tools, and the potential value of such an instrument for the knowledge sharing and collaboration among employees. As our study of Taolin's platform implementation show the main current usage and communication patterns performed by users may vary as effect of time and organizational dynamics, such as group membership. Nevertheless, social interactions tend to evolve according to specific features; as discussed in this contribution, it seems that champions in general tend to view personal profiles of members of their own group and this pattern could be related to imitation dynamics. The results also suggest that champions tend to use the chat widget as a medium for communication internal to the research group more than for external reach; in this sense the collaborative aspects that are induced by the platform are for this initial phase still passive, and the exploration of the evolution process of Taolin's will be informative about the development of integrative or innovative dynamics among the champions. A great advantage of the Taolin platform is that it is released as open source so that other organizations and researchers can deploy it, study it and build on our research, so we expect to be able to have in the future also comparative cases.

In order to identify which aspects of the platform can be improved to increase the probability of new valuable connections among employees, are revealing the results of the second part of our analysis, investigating the possible relation between the activity on the platform and the organizational positions of the champions, modelled on the duration of permanence at work in the foundation. In particular, considering the betweenness centrality index distribution, we found that people who recently joined the FBK organization are more central both in the chat network and in the profile views network. Unlike related research carried out by DiMicco and collaborators (2008) on the application of a similar social network platform in an organizational context, our preliminary results suggest that employees tend to use the platform to keep up with close colleagues, giving preference to 'strong' ties connections. This usage pattern would be similar to those already unveiled in relation to other general Internet social network sites, such as Facebook.

However, further research is needed to confirm this initial analysis. First, we need to expand the dataset to a larger temporal span, in order to collect more meaningful information about the activities patterns on the platform. Second, we need to consider different kinds of networks besides the chat and the profile views ones and the possibility that specific interactions are developed as innovations according to different social rules. For example, one of the many networks that can be drawn from the users activities on the platform is based on who added a new widget following whom, and represents patterns of cascading adoption of technological tools. Third, we should investigate social networking aspects in relation to other types of attributes, some of which that can be automatically extracted from the organizational records, such as age and gender of employees, their physical location in the foundation, the interests they mentioned in their personal profiles, and their co-authoring index, showing which

employees have already collaborated and published together, while other features could be derived from the champions' self descriptions (work profile). As Taolin is continuously growing, and as new features are developed, we plan to keep on investigating the usage and communication patterns, exploring in more depth its impact on employees' communication and the relation between actors' attributes and their use of the platform.

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