Social Technologies for the Workplace: Metrics Proposal for Adoption Assessment

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ABSTRACT

As Web 2.0 technologies are increasingly being implemented for business purpose, they offer a wide range of opportunities and potential benefits for the enterprises that internally adopt digital social platforms. However, enterprises usually are not able to correctly and effectively evaluate their investments along this direction. To fill this gap, in this paper we propose two metrics to assess adoption and performance of enterprise social platforms, namely users (Total and Active) Participation Rate and Return on Effort and apply them on data gathered from two companies that recently adopted digital platforms including social tools for collaboration and communication among employees.

CCS CONCEPTS

• **Human-centered computing**~Social network analysis • **Human-centered computing**~Social networking sites • **Human-centered computing**~Empirical studies in collaborative and social computing

KEYWORDS

Enterprise Social Software, Social Media, Adoption, Analysis, Workplace

1 Introduction

In the last few years, Web 2.0 technologies have represented both the driving force and the implementation tools for a growing digitization of business processes [1, 2, 3, 4], with a major impact registered in the areas of communication with external players, such as public relations, customer relationship management, marketing and sales [5], and higher benefits observed when enterprises are "fully (externally and internally) networked" [3]. Fully networked enterprises use Web 2.0 technologies not only to interact with customers and partners, but also to improve communication and collaboration between employees. In particular, the most used Web 2.0 technologies in companies are blogs, wikis, communities, social networking sites and document sharing tools, referred in general terms as internal social tools. Leonardi et al. [6] give a definition of enterprise social tools from a communicative point of view, especially focus on their peculiar function of channel through which communicative interactions flow involving both external (e.g., customers) and internal (e.g., employees) entities. These tools provide people visibility into the communicative actions of others and the visible traces of those communicative actions persist over time. As a consequence, they expand the range of people and resources from which people can learn across the organization, thus increasing and improving social learning and knowledge sharing, that may potentially and positively impact on business performance.

According to Gartner, "many large companies are embracing internal social networks, but for the most part, they're not getting much from them" [7]. This is the reason why, after the growing interest for social tools registered over the last few years and their subsequent implementation within the workplace, it becomes now necessary to identify new metrics that allow leaders, executives and decision makers to evaluate and measure the impact of such technologies, to understand how they are perceived within the company and which ones are more effective in triggering the interest and the participation of the employees. Traditional metrics, proposed by literature and deriving from sophisticated and advanced application of various techniques [8, 9, 10, 11], like network analysis [12, 13], have been only recently applied to this context, but there is the need for innovative analyses and metrics to better support decision makers in evaluating the adoption of Web 2.0 technologies and social tools while they are at their first stage of implementation within the company. In this paper, we propose two metrics to be applied with the final aim to evaluate the adoption and potential benefits of social tools within digital platforms. Specifically, we consider Participation Rate (PR) in social tools as a measure of technologies adoption, discerning between total, active and passive user participation, and a new metric namely Return on Effort (RoE) to evaluate the spreading benefit of these tools, based on how many people actually access and benefit from resources produced by other users. Two case studies are presented where the proposed metrics are applied to real data coming from enterprises that recently adopted internal

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digital platforms. The application of the proposed metrics highlights significant differences among the social tools being part of the platforms and provide the management level with insights about their potential effectiveness in terms of adoption and benefits.

The rest of this paper is organized as follows. Section 2 presents the related work. Section 3 describes the metrics we propose to evaluate the potential benefits of social tools adoption within enterprises. Section 4 describes the two case studies considered in this paper and presents the results of the evaluation. Section 5 concludes the paper with some final remarks.

2 Related Work

Digitalization of companies is a step further the mere automation of existing processes in an organization, since it implies the complete redesign of some processes, together with related roles, skills, structures and even business models [1]. Digitalization is also characterized by the generation of great amounts of data that can be automatically gathered for further analysis and mining, and that can provide with useful and real-time insights on a wide range of aspects, from consumers' behavior to employees' satisfaction, knowledge sharing, process performance, evaluation of costs or risks and so on.

Literature on the topic underlines the positive impact and the opportunities of Web 2.0 technologies for business: as an example, McKinsey surveys show a high percentage of companies affirming they do benefit in various ways by implementing such technologies. Some listed benefits include improvements in marketing and sales strategies, lower costs, better communication and knowledge sharing, higher customer satisfaction and consequently also higher revenues. In [14], Turban et al. specifically focus on enterprise social networking, intended both as company's presence on public social networking sites (Facebook or LinkedIn) and internal adoption of tools for the exclusive use of employees (i.e. IBM Lotus Connections) and identify related opportunities in terms of better communication, improved dissemination of information and knowledge, enhanced collaboration, innovation and mutual learning.

Although various studies, including [15], proved that the implementation of social media increased participation in the knowledge sharing and decision-making processes, consequently boosting job performance, some other studies warn about the fact that, while investments in Web 2.0 technologies are increasing, still there aren't so many demonstrations that these technologies add value to enterprise operations or do have a positive ROI [7]. Moreover, enterprises complain about the general difficulty in measuring the effectiveness of their investments in these technologies. To overcome this need for insights, authors in [8] developed a specific tool for community leaders that provides actionable analytics on business communities, based on interviews with leaders about their needs. They expressed interest in evaluating three different community aspects (people, content and participation) and specific metrics have been developed to assess community health, such as post value, top contributors, overall activity, etc.

The study in [9] defines an index for assessing community health using parameters that refer to community growth, usefulness, popularity, reactivity, interactivity and vitality. While particularly important for communities of interaction with customers, these metrics are less applicable to business internal communities in which, for example, a growing membership has less or no sense when the access is restricted to company employees. Parameters and metrics to consider may vary considerably depending on the type of community, but also and primarily on business goals. [10] observed, indeed, that same metrics, lead to different results in term of Human, Intellectual and Relational Capital depending on the type of community (i.e. Community on Practice, Team, Technical Support, Idea Lab, Recreation).

When considering blog tools, Efimova and Grudin [16] show that the use of internal blogs can improve the individual employee performance by accelerating the information flow and can also improve company reputation and customer engagement; these results are confirmed by further studies by Huh et al. [17] and Jackson et al. [18] on IBM's internal blogging system.

Using survey data about intra-organizational microblogging systems, Sun and Shang [19] confirm that social-related use of enterprise social media can attract employees to use a platform, thus increasing at the same time their adoption for work-related purpose. Conversely, since employees may feel frustrated if they invested time in social media and received little or no perceived return [20], [21] suggested a ROC (Return On Contribution) metric to measure the performance of several types of social media where ROI is more difficult to calculate: ROC is the ratio of the number of people who benefit from a resource divided by the number of people who contribute to that resource. In this paper, we propose a variant of this metric, called Return on Effort (RoE), focusing more on the actual return of each contribution in terms of content fruition.

3 Proposed Metrics

Our study builds upon the experience of two different companies that recently adopted two of the most used [23] social softwares for internal use and collaboration among employees: IBM Connections [24] and Jive Community [25], both offering various services like profile management, wikis, communities, blogs, forums, and files management. In both cases, from interviews with Internal Communication Chief Officers – persons in charge of the implementation and monitoring of the digital platforms – emerged that their main unresolved questions were "How much do employees use the social tools?" and "Do they find them useful?". Hence, the proposed analysis of the data produced by the platforms focuses on assessing the level of adoption of implemented technologies and their importance and value as perceived by the employees.

In this paper, we choose to focus on four main social tools that cover most of the activities performed on the internal digital platforms:

- **communities** - groups of people with a common interest that interact with each other;
- **file sharing** – tool enabling users to collaborate with others on single document. (files can be uploaded, shared, tagged, organized in folders, recommended);
- **blogs** – spaces where users can express ideas or opinions, share announcements or updates and get community feedback;
- **forums** – tools allowing users to share information, brainstorm ideas, ask and answer questions, and discuss topics of mutual interest.

We first consider the adoption of these tools, as the successful integration of the platform into the employees' workflow [2] that is, the use of the platform in their everyday work activities. As main measure of adoption, we calculate users' Participation Rate to the platform, distinguishing between Total and Active Participation.

The **Total Participation Rate (TPR)** is calculated as the number of unique users that use a social tool by performing at least one action on it, divided by the total number of unique users having registered a profile on the enterprise social platform.

$$TPR = \frac{UniqueUsersPerformingAtLeastOneAction}{TotalUsersRegisteredOnThePlatform}$$

It is worth to consider that various types of actions can be performed on each single tool as they are by definition devoted to different aims and functionalities. Moreover, differences can be noticed between actions available on the two social platforms (IBM Connections and Jive Community); however, there are some actions that are common to both platforms across the considered social tools and made it possible to compare results. Table 1 shows examples of actions performed within the four considered tools on both digital platforms.

Table 1: Examples of actions performed on the digital platforms

Tools	Actions
Community	Post creation, View, Comment, Like
File Sharing	File Upload, Download, Like
Blog	Post creation, View, Comment, Like
Forum	Thread creation, View, Comment, Like

In order to correctly evaluate the actual adoption of a tool, an important distinction has to be made between active and passive participation of the employees: the latter, indeed, tends to greatly prevail in social tools and identifies a less valuable kind of contribution, as underlined in [22]. To this aim, we consider also the **Active Participation Rate (APR)** metric, that takes into account the different contribution of "active participants who initiate discussions" versus "passive participants who exclusively or almost always read content created by others without contributing content of their own" [22]. APR has been calculated by considering only unique users that have performed at least one creation activity (specifically, post creation in a Community, file upload in File Sharing, post creation on a Blog and thread creation in a Forum) divided by the number of total unique users that registered a profile on the enterprise social platform.

$$APR = \frac{UniqueUsersPerformingAtLeastOneCreation}{TotalUsersRegisteredOnThePlatform}$$

Also, we consider important to calculate separate TPR and APR for Managers and Collaborators. With "Managers" we classify all those employees that have a role of responsibility and decision-making compared to their colleagues, defined "Collaborators", that is, employees that do not have a responsibility role towards other colleagues and report to Managers in the organization hierarchy.

Building on theory and findings highlighted by [21], where Return on Contribution is considered a measure of benefits divided by costs, we proposed a new metric that grounds on the same concept of benefit-cost ratio and contributes in measuring how much value each tool is able to generate independently from the Active participation to it. While ROC's units of measure are users that produce and consume resources, the proposed **Return on Effort (RoE)** metric considers actions on the platforms as units of measure: in particular, actions implying resource fruition (views, as a measure of content popularity [27]) are divided by actions involving a creative effort (resource creation).

$$RoE = \frac{totalviews}{totalcreations}$$

The RoE basically aims to measure the return, in terms of dissemination and popularity, of the effort put in content creation, being able to measure in some way the "human benefit" achieved through a social tool adopted within a company.

4 Case Study Evaluation

In this section we present the results of the application of the proposed metrics to two real case studies

4.1 Case Study Description

For this study we consider two enterprises, from here on namely *Company A* and *Company B*, that in the last two years adopted internal digital platforms with social tools. The two companies are quite different in terms of structure and organization, but present very similar needs about the analysis of the impact of recently adopted social software.

Company A is a large enterprise that operates in the financial sector at national level in Italy, with branches evenly distributed on the whole territory. In 2016 the company digitalized a big part of its processes by introducing a new Intranet Portal, based on the IBM Connections technology, where employees can keep themselves updated on news about the company itself, check and complete their daily tasks, share documents and files, connect each other through personalized profiles and access to online communities dedicated to specific topics. Concomitantly with the

launch of the Intranet portal, all 12000 employees have been guided through a registration procedure that automatically generated their profile on the linked social platform, thus giving them the possibility – with no further obligations or constraints – to participate in the social tools. Table 2 shows the composition of the sample in terms of job position (showing a prevalence of collaborators with respect to managers) and gender (showing a prevalence of men).

Company B is a big international group that manages chain stores worldwide in the home & DIY sector. In 2015 the company launched a test about the implementation of social collaboration tools in the workplace. Among all the employees, a sample of 107 people has been selected: their data have been registered during their use of Jive social software. Table 3 shows the composition of the sample in terms of gender and job position: similarly to Company A, also here we observe a prevalence of collaborators; on the other hand, as regards gender we observe a prevalence of women in Company B. The interesting point is that, despite the differences in sample size and gender prevalence between company A and B, the percentage of Managers and Collaborators are similar in both companies - around 65% for Collaborators and 35% for Managers.

Table 2: Sample Composition for Company A

Company A			
Job Position	Managers	4180	34,17%
	Collaborators	8053	65,83%
Gender	Male	7002	57,24%
	Female	5231	42,76%

Table 3: Sample Composition for Company B

Company B			
Job Position	Managers	39	36,45%
	Collaborators	68	63,55%
Gender	Male	44	41,12%
	Female	63	58,88%

In both cases, the adopted platforms provide the employees with functionalities supporting communities, file sharing, blogs and forums tools. Data gathered for both companies refer to one year of activities, from January to December 2016.

Before analyzing the data, a preliminary series of interviews have been conducted with Internal Communication Chief Officers of both companies and their assistants, in order to better understand the process that led to social software implementation and adoption, their actions to promote it among their colleagues, and their needs and expectations in terms of analytics. Interviews were informal, non-structured, conducted in-person and were resumed in two main questions that led to the proposal of the two metrics described before (see Section 3).

4.2 Evaluation Results

As already anticipated, from a preliminary quantitative analysis of all different activities performed in one year on the platforms, it has been assessed that the main tools used by the employees are Communities, File Sharing, Blogs and Forums. Other tools, like Wikis, were hardly used and data was not enough to compare Company A and B. Total and Active Participation Rates for the four social tools are resumed in Table 4.

Even though the two companies are different in business sector, size and organization of their processes, we observe some meaningful similarities:

1) Most used tools are, in decreasing order of total participation, Community, File sharing, Forum and Blog;
2) Generally, for all tools, Total PRs are higher for Managers than for Collaborators (except for Company A, Forum tool, Total PR);
3) It seems that Active PR for Blog remains quite low, regardless of the percentage of Total PR reached.

Table 4: Participation Rates

Community

	Company A		Company B	
TPR	47,43%		100%	
APR	3,05%		38,32%	
	Managers	Collaborators	Managers	Collaborators
TPR	64,50%	37,19%	100%	100%
APR	3,66%	2,64%	35,90%	38,24%

File Sharing

	Company A		Company B	
TPR	36,99%		100%	
APR	4,16%		41,12%	
	Managers	Collaborators	Managers	Collaborators
TPR	42,30%	33,17%	42,30%	33,17%
APR	4,28%	3,97%	56,41%	32,35%

Blog

	Company A		Company B	
TPR	4,17%		65,42%	
APR	2,11%		3,74%	
	Managers	Collaborators	Managers	Collaborators
TPR	4,55%	3,85%	87,18%	52,94%
APR	2,11%	2,05%	2,56%	4,41%

Forum

	Company A		Company B	
TPR	6,53%		96,26%	
APR	1,50%		24,30%	
	Managers	Collaborators	Managers	Collaborators
TPR	5,24%	6,25%	97,44%	95,59%
APR	1,29%	1,56%	25,64%	23,53%

The observed similarities will be better analyzed and explained in the following paragraphs.

1) Both Companies use the social tools in the same order of preference, but it can be noted that Company B registers higher TPR and APR compared to Company A, probably due to two main motivations:

the earlier adoption of the enterprise social media (the platform has been implemented during 2015), gave employees of Company B more time to gradually include it in their workflow;

employees of Company B whose data have been observed and analyzed represent a subsample of the whole workforce and were aware of the registration of their social actions, thus they may have experienced more motivation to participate in the platform.

2) Table 4 shows the difference between the participation of Managers and Collaborators. We observe that in Company A usually Managers have higher PRs, both Total and Active, for all tools with exception of Forums, where collaborators are more present and active. It is worth to note that higher PRs for Managers are an important confirmation of a desired result of social tools adoption: indeed, in early phases of implementation, Managers should represent with their behavior a leading example for their colleagues, to encourage them towards participating in enterprise social media [26]. On the other hand, it is very interesting the case of Forum for Company A, where the predominance of activities comes from Collaborators, most probably because they perceive Forums as a space where they can interact more freely without any hierarchy concern, which is one of the main motives for passive participation – as highlighted in [22] – and also a predominant characteristic in an organization like Company A.

3) Blogs seem to be the least used tool. In company A, Active PR is quite low but, being Total PR low as well, it could be fair to conclude that this is due to a slower adoption of the tool or to an earlier phase of adoption. Conversely, Company B has high levels of Total PR on blogs, but Active PR is low (3.74%). Similar values for Active PR are measured at Company A (around 2%): this could suggest the presence of a very low ratio of "active" users that generate contents over a wider total of "reading" users that just consume content. We anticipate that results from RoE calculations commented in the next paragraphs provide a different perspective on the use of this specific tool.

For what concerns the RoE calculations, it has been possible to apply it only to data from Company B, for which actions about resource creation and resource views were available for all the considered tools. We recall that this metric aims to measure the spreading benefit of a social tool by evaluating the diffusion of a created content on it.

Table 5: RoE of social tools in Company B

Tools	Views	Creations	ROE
Community	32346	746	43,36
File Sharing	41857	1242	33,70
Blog	630	12	52,50
Forum	6911	340	20,33

The RoE values for Company B are shown in Table 5: it is interesting to note that the RoE gives different insights about the considered tools. For example, what emerges from Table 5 is that, although the Blog tool is the one with lowest Participation Rates, it is also the tool with the greatest Return on Effort, where the few created resources are accessed and consumed many times/from many users. Moreover, we observe a different ranking between Community and File Sharing tools with respect to the TPR and APR. Indeed, Community is characterized by a higher RoE than File Sharing, while File Sharing has the same TPR and a higher APR with respect to Community in Company B.

These results confirm the importance of measuring social tools performance with different metrics in order to have a complete view of how they are perceived and used within the company. Indeed, measuring the simple and traditional adoption of a social tool, intended as its Total Participation Rate, may give very different results with respect to considering the attitude of employees towards more active and valuable forms of participation to the tool. Moreover, employees at different levels of the company's hierarchy may show different attitudes in the use of a social tool depending on its nature and communication mechanisms, like in the case of the Forum tool for Company A.

Finally, the new metric RoE allows us to have an interesting insight into the spreading benefit of the content creation on a specific social tool, not measurable through traditional participation rates.

5 Conclusions

Digitalization of business processes and implementation of Web 2.0 technologies offer enterprises the opportunity for a potential improvement of the workplace: internal social tools can facilitate communication and collaboration between employees, promote organizational change and have a positive impact on performance. However, companies still have some difficulties in measuring how these tools are used and perceived by employees. We propose metrics, namely (Total and Active) Participation Rate and Return on Effort, and apply them to real data about social activities within two companies over the period of one year in 2016.

Data from our case studies show that adoption is higher for Community and File Sharing tools, but Blog tools register the highest RoE. Active Participation is generally much lower than Total Participation, confirming the theory that passive participation is a non-negligible phenomenon on social media, and a generally higher Participation for Managers confirms their role of leading example for colleagues in early phases of adoption. Moreover, the interesting case of higher Participation for Collaborators in Forum highlights how different tools may give opportunities of expression to employees at different levels or job positions, overcoming hierarchy concerns.

Together, the proposed metrics provide simple but effective evaluation parameters for those people in charge of assessing the goodness and usefulness of investments in social technologies for the workplace.

Looking towards the future, we envision to apply these metrics to other case studies including different companies to evaluate whether or not further similarities exist in the use of social tools within different business environments and organizational structures.

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