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Effective communication within project teams: the role of social media

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Abstract— **Despite the anecdotal evidence on the importance of social media for projects, as well as the growing interest by practitioners in the potential benefits of social media for their projects, the benefits of social media in the workplace remains controversial. This paper examines the effects of social media use on communication. The positive effects of social media can be moderated by social media use motivations and the leadership style.**

Keywords- social media; project team; communication

I. INTRODUCTION

Social media are considered an effective approach to communication and collaboration among individuals and groups both within and outside the firm [1] [2]. Most companies use social media to communicate with external parties and employ multipronged strategies that cross various social media platforms [3]. Organizations may also employ social media for internal communications and social interaction within their enterprises. Reference [4] calls social media in work environments "enterprise social media, which they define as "a web-based platforms that allow workers to communicate messages with specific coworkers or broadcast messages to everyone in the organization, articulate a list of coworkers with whom they share a connection, post, edit, and sort text and files linked to themselves or others, and view the messages, connections, text, and files communicated, articulated, posted, edited and sorted by anyone else in the organization at any time of their choosing".

Some authors therefore view social media as valuable for project management [5] [6] [7]. For instance, Reference [6] suggests that social media can enhance effective communication in temporary organizations by addressing specific project-based needs. Reference [7] emphasizes that project managers must understand the relationships between communication practices and trust development, and how they are affected by social media. According to [5]'study on social media in project environments, over two thirds of 181 project managers surveyed across 32 countries believed that social media are a key issue for their industry. Others studies mention the work-related advantages focusing on strengthening professional and personal ties, promoting knowledge sharing and resource locating [8]. However, despite the anecdotal evidence on the importance of social media for projects, as well as the growing interest by practitioners in the potential benefits of social media for their projects, the benefits of social media in the workplace remains controversial. Social media have gained the reputation of reducing productivity and increasing disturbance [9]. Further, yet despite the potential advantages of social media for projects [10], these applications are rarely used. In fact, [19] notes that social media use in the workplace is actually declining. In an empirical study based on the opinions of experts and professionals in Europe and Australia on social media use in projects, [7] finds that temporary organizations continue to prefer traditional modes for direct communication, tending to stick to combinations of emails and phone calls. Only one third of the respondents used an intranet. This low use of social media tools in temporary organizations suggests the presence of restraining factors that may discourage temporary organizations from using them.

While previous research has predominantly focused on a specific social media application [1] [11], the rationales that facilitates of their use (e.g. [12]) and the synthesized impact of social media [13], the effect of particular used on performance has been ignored, particularly in project context. In order to address the above challenges, we examine the following questions: What are the consequences of social media use? To what extent social media can help achieve the presumed benefits and improve communication within project team?

II. UNDERSTANDING SOCIAL MEDIA USE IN PROJECTS

The development of complex products, services, and processes with very short time-to-market combined with needs for cross-functional expertise have compelled increasing numbers of organizations to implement their business operations as projects [14]. Projects have been described as temporary organizations that are strongly focused on a defined task, and therefore very agile. Successful project management requires forming and maintaining relationships between and among project team members and various stakeholders. Therefore, it is critical to ensure good-quality communication among team members as well as the capacity to capture, retain, and index project-related information and knowledge [15]. Communication is the most elementary component of the

project team, and has long been considered one of the critical process skills for project success (e.g., [16])

The use of social media is considered an effective approach to communication and collaboration among individuals and groups both within and outside the firm [1] [2]. Furthermore, social media generally come with tools that capture and retain information for later retrieval [17]. Some project management practitioners therefore see similarities between project management and social media: both are strongly focused on communication and commitment [18].

Consequently,

H1. Social media use increase communication quality.

III. Effective Conditions of Social Media Use

Several authors underscore social media benefits considering that social media related behaviors may help employees increase their work performance. Social media is considered as an important part of corporate performance [9]. Indeed, the emergence of social media technologies have enabled new communication capabilities in various aspects, such as data source and date flow through interactions, technologies support internal and external oriented connections [21], meta-knowledge, or knowledge of who knows what and who knows whom [23]. Social media use at work should indirectly enhance performance through network ties, shared vision, and trust among employees [13], improving communication processes. For some, social media adoption improved neither the ease of internal information sharing nor operational efficiency [9]. Others underscore that the performance of social media may depend on the quality of knowledge exchanged. According to [24], the quality of knowledge exchanged through social media stems from the knowledge seekers' social presence -Social presence [25] is widely believed to be rooted in the social psychological mechanisms that have evolved to enable unmediated human interactions [26]. According to [1] social media tools can work well within a company and be ineffective in another. They show that executives whose social media initiatives had increased emotional capital for their company reported that social media made it easier to communicate both across hierarchical levels (vertical communication) and functional units (horizontal communication).

Consequently, researchers have suggested that technologies alone rarely provide direct value to firms, and, instead, these technologies are most effective when combined with other firm resources and processes (e.g., [27]).

A. Social media and shared leadership

It has been shown that leadership affects the overall behavior and thinking of any organization's personnel. Shared leadership has been defined as "a dynamic, interactive influence process among individuals in groups for which the objective is to lead one another to the achievement of group or organizational goals or both" [28]. According to [11, shared leadership may depend on the overall team environment comprised of shared purpose, social support and voice. Team internal environment can be changed by the communication tools that lead to new and different ways to control. Social media create a universe in which the technology applications and their functionalities are available to all members who can use them autonomously, moderately, and appropriately, according to communication needs. Indeed as members of focus group interviews in [29]'s study mention: "the problem with social media is that project managers can feel like there's a loss of control […] not sure if their role should be as head of the orchestra or as controller." Social media would therefore fit into an open leadership strategy that shared leadership allows. Consequently, shared leadership may strengthen the positive effect of social media on communication. Thus,

H2. Social media strengthen communication quality in a shared leadership environment.

B. Social media and Team Members Competencies

Social media tools make expertise and individual capabilities and competencies transparent, accessible and useable for the overall organization [17]. Competencies describe work-relevant human behavior in a variety of contexts [17]. A team can also be competent. According to [31], team competencies start with a shared language. Case study by [29] provides an illustration of the role of social media in developing share language "I recently read that the key to making headway on a project is to find a shared language. […] I was very comfortable when we started using social media at work. [...] I am completely sure that chat, microblogs, blogs, and so on, because they make us write simply and specifically, allow us to create a common language, and […] also allow us to share specific project management terms with anyone else who doesn't have this culture within the team". This suggests that social media tools can improve team competencies [32]. Nevertheless, as it has been shown social media can also be seen as a diversion, a "productivity killer!" [33]: employees may tend to use social media excessively, to communicate.

According to [34], competent teams are able to alter their coordination strategy and reduce the amount of communication needed to perform the task. Social media may therefore increase the quality of communication when the team gets sufficient expertise and competences. Consequently, team competencies strengthen the positive effect of social media on communication. Thus,

H3. Social media strengthen communication when team members' competences are high

IV. Methodology

To investigate the impact of social media in team communication, we collected data from project managers and members. A web questionnaire was distributed by a polling organization whose goal was to collect at least 400 completed questionnaires by professional team members or managers in their organizations.

TABLE I. MEASUREMENT INSTRUMENTS

Variables	Measurement	Cronbach alpha
Communication	1. Horizontal communication between all team members circulated freely 2. Communication between employees, team members and line managers circulated freely 3. I received timely information to do my job 4. Communications have allowed me to have a sense of belonging to the team 5. People in the immediate vicinity of the project were excellent communicators	.89
Social Media use at the organization level	Dummy variable coded as 1 if the organization uses social media and 0 otherwise	
Competencies	1. The officers had the skills needed for the project 2. The members dedicated to the project had all the skills needed for the project 3. Skills and resources match with project requirements	.88
Shared leadership	1. Team members had a say in decisions 2. Project managers were able to share the leadership properly	.73
Social media use at project level	I have used social media daily in this project in order to: 1. Discover opportunity 2. Facilitate co-operation 3. Identify expertise 4. Make feedback 5. Take knowledge by drawing on previous projects 6. Develop talents	Composite scale[a].
Control variables		
Organization type	Categorical variable with 2 categories: 1. Private, 2. Public.	
Organization Size	Ordinal variable with 8 levels: 1) Less than 10, 2) 10 to 19. 3) 20 to 49, 4) 50 to 99; 5) 100 to 249; 6) 250 to 499; 7) 500 to 999; 8) 1000 to 2499; 9) More than 2500	
Internal Environment	1. Most employees are satisfied with their jobs 2. The success of the employees are always recognized	.73
External environment	1. The change in our sector is very fast compared to other sectors 2. Our industry is undergoing significant developments that nobody can expect 3. Technological change is very fast in our industry 4. Unpredictable external factors forcing changes in our sector	.77

a. Items -exhibited a relatively high intercorrelation (r = 0.87, the highest intercorrelation, the lowest at r = 0.79), and in the interest of parsimony, were summed

After data screening 724 questionnaires were used. While we believe our sample is without response bias, there remains a potential problem of sample selection bias [35]. The intuition is that the estimates in the communication model need to be corrected by controlling for the propensity of the firm to use social media. Indeed, the use of social media within a particular firm is determined by organizational and managerial support [32] and organizational characteristics [12]. Thus, the effects of social media can be different even amplified when management encourages the use of social media in the organization. Calculating and including an inverse Mills ratio is a common method for correcting sample selection bias in regression models. Using Heckman's two-stage procedure, the inverse Mills ratio was calculated using a Probit model to specify a selection equation -whether the organization has adopted social media or not- (Table III). We then introduce the inverse Mills ratio as a control variable in our models. Incorporating this correction term yields unbiased estimates of the predictors in the performance model [36]. Omnibus test revealed misspecification concerns that strongly reject OLS models. To address these issues, we decided to implement robust regression estimation techniques [37], using the STATA 'rreg' procedure to test our multivariate regression models: rreg not only produces robust estimates of the standard errors, required given some heteroscedasticity in the data, but also produces better estimates of the model coefficients when there are a few extreme outliers and which would otherwise dominate the estimation.

A. Measurements

Questionnaire items were measured using a 5-point Likert scale. Table I presents all variables and their measures.

V. RESULTS

Table II presents the means and correlations for each of the measures in the study. Only 26% of participants indicated their company had adopted social media and supports its use in the organization. 61% of companies are private companies. 56% are Small and Medium Enterprises.

Table III presents the results from the Probit model utilized in the first step. The results from the first-stage social media adoption model are partly consistent with expectations and results published in the literature. The positive coefficients

TABLE II. DESCRIPTIVE STATISTIQUES AND CORRELATIONS

	1	2	3	4	5	6	7	8	9
1.Communication									
2.Organization type	-0.123*								
3. Organization size	-0.107*	0.177*							
4. Internal Environment	0.345*	-0.152*	-0.200*						
5. External Environment	0.173*	-0.053	-0.022	0.241*					
6. Competences	0.733*	-0.067	-0.106*	0.264*	0.1517*				
7. Shared leadership	0.812*	-0.083*	-0.123*	0.318*	0.1647*	0.724*			
8.Social media adoption (organization level)	0.232*	-0.142*	-0.219*	0.305*	0.3435*	0.161*	0.213*		
9.Social media use (project level)	0.401*	-0.082*	-0.211*	0.266*	0.2628*	0.283*	0.381*	0.459*	
Mean	16.73		767.55	6.82	14.41	10.53	6.74	3.26	43.57
s.d.	4.28		993.20	1.86	3.32	2.74	1.81	1.42	38.26

N = 724, p < 0.05*

associated with internal environment are compatible with evidence and observations regarding the use of social media in the working place. For instance [1] stress that social media adoption may depend on the development of emotional capital, which they define as the aggregate feelings of goodwill toward a company and the way it operates. Nevertheless, contrary with [12]'s results, organization size negatively influence social media adoption.

The results of the second stage regressions are shown in Table IV. Communication is the dependent variable: Model 2a presents a baseline specification that consists of an intercept term, the correction for self-selection - the estimated coefficient remains restricted to be equivalent across adoption and not adoption of social media-, control variables (organization type, organization size, internal environment, external environment) and direct effects of the main independent variables (Competencies, Shared leadership). Model 2b introduces interaction terms to test the moderating effects. Collinearity levels were well under the thresholds supported by [38] (VIF < 30).

TABLE III. RESULTS FOR THE PROBIT MODEL

	Model 1
Organization size	-.000***
	(.000)
Organization type	-.075
	(.098)
Internal environment	.143***
	(.027)
External environment	.107
	(.015)
Log likelihood	-488.808
Wald Chi2	116.75***
Pseudo R^2	.12

Coefficients are unstandardized. Standard errors are in parentheses.
† p < 0.10; *p < 0.05 ; **p < 0.01; ***p < 0.001

Hypothesis 1 suggests that social media use increases communication quality in projects. This hypothesis is supported.

Hypothesis 2 suggests that the effectiveness of social media as a communication tool depends on the leadership style. Shared leadership should increase the effectiveness of social media as a communication tool. Results do not support hypothesis 2. The interaction term is negative and significant.

Hypothesis 3 suggests that team competences should increase the effectiveness of social media as a communication tool. Hypothesis 3 is not supported. Results show that the interaction term between competencies and social media use is positive and significant. We plotted the regression slopes for communication on social media use differences according to the level of competencies and shared leadership. We split the independent variable into two groups: low and high shared leadership (H2) and low and high competencies and estimated the effects of social media use on communication for the two groups. As shown in Fig. 1, social media show no impact on

TABLE IV. ROBUST REGRESSION MODELS-DEPENDENT VARIABLE : COMMUNICATION

	Model 2a	**Model 2b**
Organization type	-.260	-.303
	(.213)	(.194)
Organization size	-.001†	.000
	(.000)	(.000)
Internal environment	-.085	-.0342
	(.182)	(.190)
External environment	-.176	-.092
	(.143)	(.142)
Inverse Mills ratio	-2.567	-1.467
	(2.029)	(1.998)
Competences	.478***	.577***
	(.059)	(.143)
Shared leadership	1.297***	1.256***
	(.089)	(.068)
Social media intensity use (Project level) – SMP-	.010***	.010***
	(.002)	(.003)
SMP * competences		.004**
		(.001)
SMP * Shared leadership		-.007***
		(.001)
Intercept	5.939	19.977***
	(4.621)	(4.752)
F	296.28***	241.61***

No R-squared. adjusted R-squared or root MSE from rreg output
*N= 724, † p < 0.10; *p < 0.05, **p < 0.01; ***p < 0.001*

communication when the level of competencies and the level of shared leadership is high. Fig. 1 also shows that social media have a positive impact on communication when the level of shared leadership is low and decreases communication quality when the level of competencies is high.

VI. Discussion and Conclusion

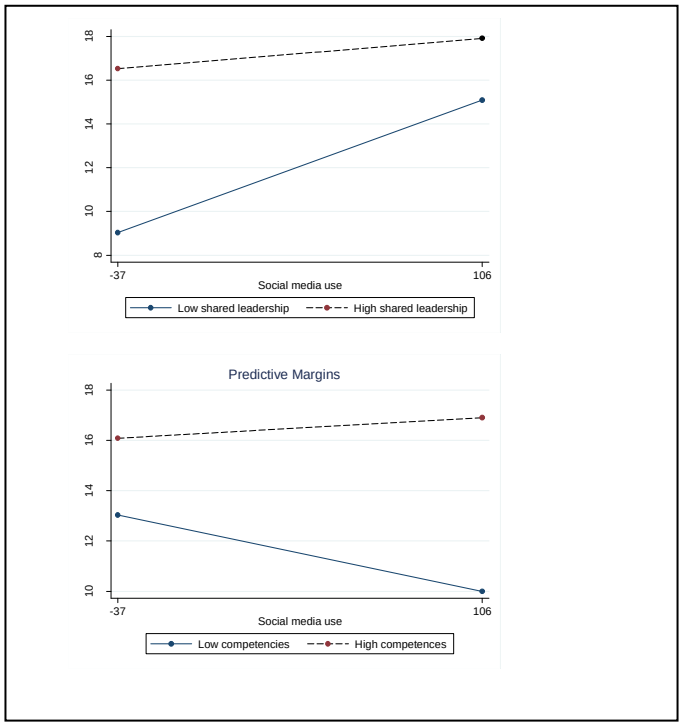

Fig. 1: Analysis of interaction term

As social media were tools for marketing and external communication, they have started to be used within organization by project teams. As emerging technologies, social media seem to have a direct impact on the quality of communication. Nevertheless, social media effectiveness depends on leadership style. When leadership is not shared between team members, social media increases communication quality. When the team skills level is high, social media have a negative effect on communication quality. The benefits that can bring social media therefore depend on the organizational context and team skills. Some researcher has suggested that surfing social networking sites has often been seen as a major distraction for some employees, as it can pull their attention away from work tasks and, in turn, damage the productivity of a firm [40]. Information sharing via social media becomes ineffective when the team members have the necessary skills to perform their task. In this view, project team performance is therefore determined by the extent to which a team can cope efficiently and effectively with problems as they arise [41] as well as the team's capacity to share and transfer knowledge across domains when needed [41]. Social media offer potential solutions for improving communication in case of vertical leadership. They promote decentralization and information dissemination in more traditional structures. When leadership is shared, the use of collaborative tools appears less relevant. Several authors have already pointed out the contradictory effects of social media use at work place. For instance, [42] show that while intensity of SM use contribute to the positive behaviors of task-oriented and relationship-building behaviors, it contributed most strongly to the negative behavior of SM deviance.

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