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Opportunities and threats presented by social media in project management

Beata Hysa, Seweryn Spalek*

Faculty of Organization and Management, Silesian University of Technology, 44-100, Gliwice, Poland

* Corresponding author.

E-mail address: Spalek@Polsl.pl (S. Spalek).

Abstract

The application of new technologies is rapidly increasing, not only in private but also in professional spheres, including project management. However, the use of social media (SM) may be both beneficial and dangerous. Therefore, the goal of the article is to investigate in which areas it is possible to use social media in project management and what the opportunities and threats surrounding it are. In order to reach the goal of the article and obtain answers to the research questions, the methods of diagnostic survey and questionnaire technique were used. The research was carried out on a sample of 108 respondents involved in the project's implementation. To complement the obtained data, additional qualitative research using unstructured interviews was conducted. The presented research indicates that managers who work in an Agile or Hybrid way are more likely to use SM than managers who work in a traditional way. A significant dependency between the use of SM and the way the project team works was confirmed, but no age differences were found. Moreover, the results of the study show that social media usually supports project managers and team members in such areas as communication, cooperation, engagement, knowledge management, work productivity, promotion of the project and employee development. Threats concerning the use of social media in project management are noted in relation to the security of the project and loss of sensitive project data. Analysis of the study and interviews resulted in a broad set of principles of SM usage within

projects. Future research could provide further confirmation of these findings by using larger samples.

Keywords: Business, Economics, Industry, Information science, Psychology, Sociology

1. Introduction

The development of information technology has significantly changed the functioning of contemporary organizations in different areas (Ngai et al., 2015). This applies not only to such spheres of the organization's activities as marketing (Agresta and Bonin, 2010; Berthon et al., 2012), advertising (Okazaki and Taylor, 2013), logistics (Pierce, 2013), sales or banking (Bonsóna et al., 2012; Bonsóna and Flores, 2012) but also in the scope of work organization (Confetto and Siano, 2018; Dreher, 2014) or project management (Delerue and Sicotte, 2017; Harrin, 2012). Thanks to mobile technology and social media (SM), the way of communication between members of project teams and the style of managing them have changed. In particular, this applies to teams operating under remote working conditions (Popescul and Georgescu, 2013) or composed of people representing the younger generation (Ruth et al., 2013) where SM options have become their natural channel of communication and cooperation (Bennett et al., 2008). Nevertheless, the use of SM in the discipline of project management is relatively low compared to the overall development of SM, especially in Poland. The Deloitte Shift Index (Deloitte University Press, 2013) showed that only 10% of respondents used SM in project management. Generally, researchers indicate that SM is not in widespread use in project management (Fichtner, 2015). The number of available tools and techniques designed to be used as part of project management has not increased significantly. The reason may be that the phenomenon of using SM to support project management is relatively new. There are no models or strategies to guide our understanding of the important factors connected with this practice or how these factors influence project success (Remidez and Jones, 2012). Therefore, project managers are concerned about the lack of overarching strategy, the lack of support from management staff, security issues, information overload and the blurring of lines between professional and private information in order to realize the benefits of using social media in project management (Perera et al., 2017).

The purpose of this paper is to present some possibilities of using SM in project management (from the project team members point of view), considering the opportunities and threats. The conducted questionnaire survey and in-depth interviews among project team members allow us to identify the most important benefits and threats related to the use of SM in specific areas of project management.

The paper is structured as follows. First, it will present the literature review on project management and SM and then consider the opportunities that SM provides in different aspects of project management. Furthermore, the conducted survey will be presented which will be the basis for presenting the opportunities and threats of using SM in project management. Lastly, recommendations for practitioners on how to define the policy of using SM in project management will be introduced.

2. Background

At the very beginning of the scientific approach to project management (started in the 1960's), major problems in managing projects were associated with technical aspects of the tangible results of projects (Engwall, 2003). That was so as the projects were mostly single, long-lasting endeavors run in a static environment (Spalek, 2014). The outcomes of projects were very often limited to construction and military areas, with the usage of different tools and techniques to support single project management. With the increasing number of projects run by companies worldwide, new threats and opportunities appeared (Donmez and Grote, 2018; Hofman et al., 2017). They were mostly associated with the rapid development of new tools and techniques over time (Spalek, 2016). Nowadays, we discuss the issues related to multi-project environments (Aritua et al., 2009), distributed project teams (Gilson et al., 2015) and the dynamic environment resulting in aggressively changing requirements (Shafiq et al., 2018). Moreover, the importance of project management has been increasing in the face of the changing environment, new challenges, globalization and specialization in the global economy (Pastuszak et al., 2013). However, the biggest influence on the way we manage projects nowadays has been the rapid development of Information Communication Technologies (ICT) (Kuo, 2009). With the significant increase in the number of projects run globally (Kokkonen and Vaagaasar, 2018), project teams are formed more often than ever and thanks to ICT, can work in the virtual world (Rimkuniene and Zinkeviciute, 2014). Moreover, with the upcoming industry 4.0 era, project management needs to adapt to the newest trends in perceiving the new technologies (Xu et al., 2018). It is not only limited to cloud computing (Ooi et al., 2018) and artificial intelligence (Wauters and Vanhoucke, 2016), but to many other aspects as well (Jafarzadeh et al., 2018). For example, Jiang et al. (2015) discuss the increasing involvement of public opinion in feasibility studies, construction, final assessment of large hydro projects. They give recommendations for using SM on how to manage the project stakeholders and public relations, as non-compliance of local communities may cause overruns, delays, or even project failure.

One of them is definitely the use of SM. However, there are limited works on the application of SM while managing projects (Mesquita et al., 2016; Winter and Chaves, 2017) and they mostly focus on the early, conceptualization stage

([Vadhanasin et al., 2017](#)) or they relate to specific areas associated with projects, e.g. according to [Bashir et al. (2017)](#), social media can be useful as an informal source of information about competitors, customer preferences, as well as providing opinions about products and market trends. The literature review shows that, with regards to project management, we are starting off on the road to understanding how we can apply the newest technologies in order to enhance our opportunities and limit the threats.

SM can be described as a modern technology, comprising of both hardware and software, that facilitates content creation and interaction by online users ([Bonsóna et al., 2012](#)). SM can also be described as *"a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of user-generated content"*([Kaplan and Haenlein, 2009](#)). In general, SM can be defined as information channels enabling interaction between users (exchange of information, knowledge, expressing opinions, comments, etc.). A typical classification of SM includes collaborative projects (e.g. Wikipedia), blogs, user-generated content communities (e.g. Flickr; YouTube), social networking sites (e.g. Facebook; Twitter), virtual game worlds (e.g. EverQuest), and virtual social worlds (e.g. Second Life). There are also typical social network and enterprise tools assigned which support communication and collaboration in project management. These tools are, for example: Microsoft Project, Yammer, Skype for Business, Redmine, TeamViewer, Trello, Slack. Yammer is something akin to the Facebook of the corporate world, where replacing friends with colleagues, advertisements with corporate reminders and where updates pertain to events, problems and questions that colleagues are trying to solve.

The impact of SM on the workplace is indisputable. This is a new reality in the world of work and it leads to the following features and trends constituting specific challenges for organizations and project managers ([Jędrych, 2015](#)):

− barriers that separate the professional sphere from the private one disappear. People are more and more often in a state of readiness to constantly communicate work-related matters through new technologies;

− communication tools, such as Linked-in, Facebook allow the monitoring of the labour market in search of new development opportunities;

− information on the organizational culture of companies is easily available, potential employees can easily get knowledge concerning a particular organization;

− employees are working more and more in multicultural (also virtual) teams operating in different parts of the world;

− there is a growing number of qualified part-time employees in flexible forms of employment, which entails the need to develop new rules for cooperation with them, creating opportunities for them to develop professionally;

−demographic changes are taking place, generation Y is already more than half of all employees; their expectations towards employers and work are different from the expectations of previous generations and require the use of other management instruments.

Companies and organizations should be conscious of the power of SM and increasingly incorporate these new tools into their management processes. It is especially important for project team managers because projects are a crucial part of innovative organizations. Therefore, executives and project managers must be aware of what SM is and how it can strengthen their projects.

The researchers indicate that SM can support project managers in their work, in the following areas: communication (Müller and Turner, 2005), collaboration (Harrin, 2012), engagement (Harrin, 2016), management of knowledge (Reich, 2007; Perera et al., 2017) and work productivity fields (Delerue and Cronje, 2017), as is shown in Table 1.

2.1. Communication

The importance of effective communication to the success of projects is well described in the literature (Remidez and Jones, 2012). Müller and Turner (2005) in his research, focused on organizational issues and said that effective communication within the project team depends on timely and efficacious information exchange between project managers and sponsors. Moreover, he found that effective project managers communicated in ways that promoted cordial relationships and kept key personnel informed regarding project status while adapting the communication style to the project's characteristics. A project manager increases his chances of delivering a successful project through good communication with project stakeholders and by being informed on project issues on time. Nowadays, more and more communication takes place online with SM tools which provide constant communication between project managers, participants and owners. Therefore, SM provides an opportunity for supporting efficient and effective team communication in different project teams (Silvius, 2016).

2.2. Collaboration

In the past, project managers and project teams worked together being in a single office location. Project management software was installed on a desktop workstation and status reports were delivered at weekly meetings. The projects were subjected to a monthly executive review. Today, thanks to new technology and SM, collaboration and management of team projects have changed dramatically. In contemporary project management, at least one team member could be physically separated for some part of time but project sponsors expect real time access to project data. In

Table 1. Using SM in project management.

Areas of usage SM	Opportunities	Threats
Communication	Effective and instant information exchange between all members of the project team. Conducting teleconferences and videoconferences while working on projects, Establishing contacts with potential clients and contractors	Disclosure of confidential project data by the employee The occurrence of various technical problems, Acquisition of confidential data of project Hacking an account,
Collaboration	Virtual meetings are a tool for connecting interest groups. It creates areas of cooperation for the departments of companies, individuals and for work in the implementation of projects, exchange of experience	Risks of wasting time on private conversations and non-project related matters
Engagement	Tool that builds and sustains involvement in various business matters. Motivate employees to participate more in corporate events.	The boundary between free time and work disappears, which leads to occupational burnout and decreasing productivity and engagement
Management of knowledge	Appropriate use of social media by the employee in the organization raises his creativity. Thanks to greater creativity, the employee improves his own qualifications and more effectively supports the activities of the organization in which he works.	Disclosure of project data and confidential information.
Work productivity	Improvement of efficiency is related to the way of communication, access to resources (data, expertise). It gives the opportunity to create projec groups, quickly exchange information in a group, regardless of the place of work, submit ideas, etc	Work productivity decreases due to wasting valuable time by browsing private accounts Barriers between the professional and private spheres disappear, instant and continuous communication leads to a lack of rest and distance

Source: From Müller and Turner, 2005; Reich (2007); Harrin (2012); Delerue and Cronje (2017); Perera et al., 2017.

addition, international project teams are increasingly working around the clock (Harrin, 2012). Using SM can reduce travelling expenses and help document best practices and project learning. Moreover, SM portals enable virtual meetings to be held, of the creation of areas of cooperation for the departments of companies, individuals and for work in the implementation of projects, exchange of experience. SM are effective enablers of project collaboration. They ensure a high level of cooperation between project team members, stakeholders and managers. SM has all the features of a project collaboration tool.

2.3. Engagement

What is very important and underestimated among project managers is the fact that social networking sites work well in regards to tool building and supporting the

engagement of project employees in the success of the project and various company matters. It can motivate employees to participate more in corporate events - or to create them. Furthermore, Harrin (2016) claims that project managers are primarily focused on creating participation in projects and, for that reason, it is important to know how to engage people. One way to achieve this is to make use of SM.

2.4. Management of knowledge

SM can be viewed as informal knowledge management systems (Cao et al., 2012), as well as "second-generation knowledge management" systems that can facilitate the creation of new knowledge by the community (Delerue and Sicotte, 2017). In fact, recent studies have found that developing close relations with others facilitates knowledge sharing and creation (Perera et al., 2017). Therefore, the greater the social interaction ties between users, the more the knowledge-sharing activities within SM environments (Nord et al., 2014). Using social technologies for a competitive advantage: impact on organizations and higher education. Projects require interdisciplinary collaboration, as well as knowledge sharing and transfer between business and technology experts. SM offers potential solutions for sharing information quickly, globally, and among large numbers of individuals, and for supporting organizational knowledge flow. Therefore, social networks are used to acquire, share and disseminate information and knowledge about specific issues they have, thus affecting the development and success of the project (Reich, 2007). One of the biggest advantages of social networking is the exchange of knowledge in real time.

2.5. Work productivity

Social networks can help to get better results from members of the project. Performance improvement is related to the way of communication, access to resources (data, expertise). It provides the opportunity to create virtual project groups quickly exchange information in a group, regardless of the place of work, submit ideas, instant feedback, etc. Virtual teams also contribute to the increase of cost efficiency (Gibson and Cohen, 2003). Looking at this trend, it is not surprising that virtual teams are now widely used in project management. In addition, SM can be used for knowledge sharing & project visibility and can also be used to identify, organize, and deploy project teams. Linky (Van der Merwe, 2016) gives practical recommendations concerning the most popular and frequently employed social media software programs and tools in projects. The platforms that are discussed from management project management standpoint are: LinkedIn, Facebook, Twitter, Yammer, Google+, Blogs, YouTube, Webinars, SlideShare, Podcasts, Vodcasts.

The consequences of using SM by project managers and organizations can bring not only opportunities but also some disadvantages (Beier and Wagner, 2016). SM can

have a negative influence on workers' productivity. Employees may waste valuable time using SM sites such as Facebook and Twitter. They can also use SM to attack the company's reputation. Rude, unwelcome and negative comments made by a company's employees can really generate a negative image for the company and their brand.

Practically, the risks involved by SM are divided into three main categories (Harrin, 2016): reputational, work productivity and information security. Starting from the use of personal accounts to communicate information related to the project, posting photographs or information, destroy the company's reputation and security issues (Popescul and Georgescu, 2013). Damm and Schindler (2002) argue that when project partners start to develop a cooperation strategy, special attention should be paid to security issues. They examined important security issues in project work with problems arising from various security policies for compliance purposes and content authentication.

In her studies, Sarbu (2017) showed that the use of SM in the management of the project is associated with benefits and also with some threats. In the case-study, Perera et al (2017) identified, obstacles to social media implementation in organisations, such as reduced productivity, conflict of interest, lack of encouragement and control, cost of resources and restricted Internet usage. Whereas, according to Bughin et al. (2011) survey, SM increases speedy access to knowledge, contains internal/external experts and reduces communication costs (Bughin et al., 2011). Remidez and Jones (2012) suggested efficiency and trust as potential benefits of using SM, as well as facilitating access to tacit knowledge exchange. However, they did not formulate hypotheses and test them. Van der Merwe (2016) states that SM is transforming communication in projects because it provides instant access to a broader audience than was previously possible through conventional communication means. Harrin (2012) explains why project managers should become involved with SM and offers practical advice to practitioners. Practitioners such as Van der Merwe (2016), Harrin (2012) and Hollingsworth (2010) provide some advice on how SM can be used in a project environment. However, such suggestions are limited (Thompson, 2017). According to Van der Merwe (2016) for example, we should focus on virtual teams. Practitioners views are influenced by the communication practices and norms of specific organisations and their perceptions pertaining to the use of SM are influenced by traditional concepts of project management (Thompson, 2017). Critics suggest that SM may fundamentally change project management for the worse by encouraging project managers to stop planning and to focus on individual issues, and wasting time by members of the project team (APM, 2014).

3. Hypothesis

The literature review reveals the existence of a knowledge gap regarding the identification of the general impact of using SM in project management. There are no research outcomes where project management practitioners would identify areas in which SM could be used and what benefits these applications would bring.

Therefore, the main research problem is to investigate areas of using SM in project management and associated benefits and risks based on the literature review, the following hypotheses have been developed:

H1: There is a positive relationship between the organisation's approach to project management and use of SM in project management.

H2: There is a significant dependency between the use of SM and the way the project team works

H3: The use of SM positively affects communication, collaboration, engagement and knowledge management of project employees, and work productivity in project management.

H4: Using SM in project management decreases the security of information and sensitive project data.

The research model with hypothesis is shown in Fig. 1.

4. Methods

In order to explore the impact of SM on project management, an online survey was conducted among project managers, members of projects and others who are involved in project management. The questionnaire consisted of 12 closed-ended questions, with the option of open-ended comment and metrics. Seven questions pertained to the knowledge, skill and experience of respondents in the field of project management in which they have been or have recently been involved. Five questions' responses were measured using a 5- point Likert scale and inquired into the ways of communication through SM, the influence of using SM in project management in different fields and also policy and security whilst using SM during the project. Non-parametric tests of significance were used in the analysis. These tests do not require standard distribution of measurable indicators. The following coefficients and correlation analysis were applied[1]: independence test x2, U Mann-Whitney Test.: C-Pearson's, Spearman's rank R correlation.
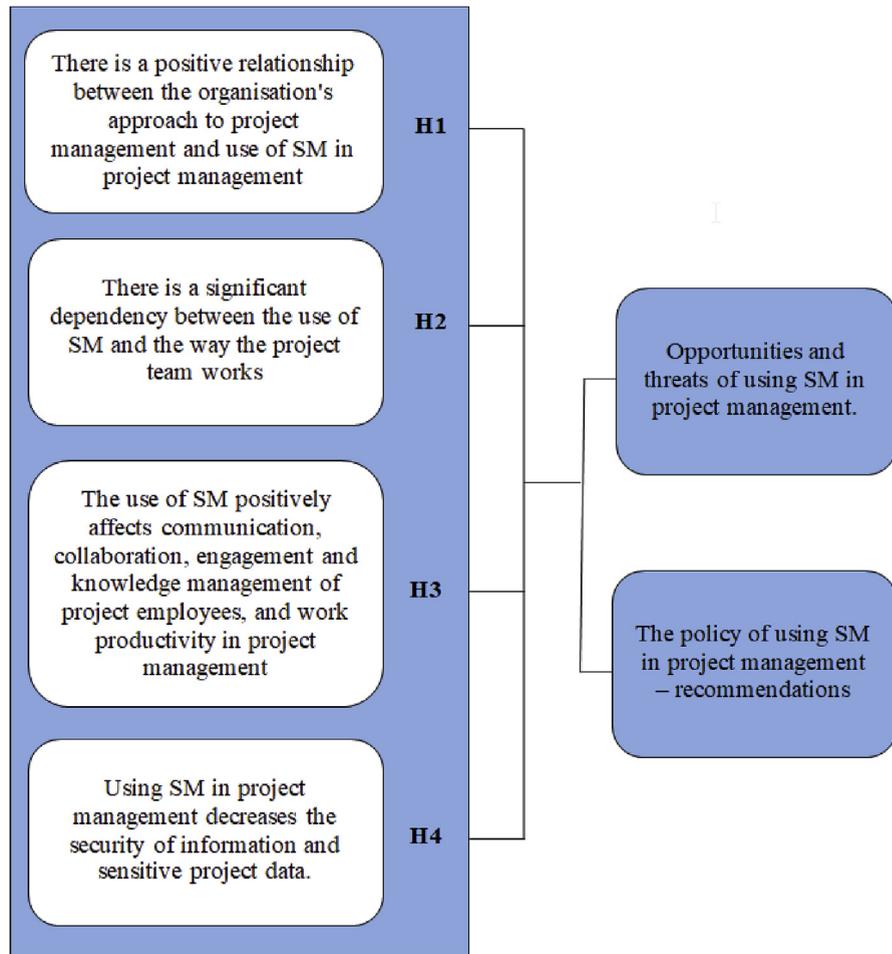
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[1] Correlation significant at: $p < 0.05$.

Fig. 1. Research model.

Invitations to the survey were distributed by 1154 e-mails from June to September 2018. The target of this study was members of the International Project Management Association and experts from the National Research and Development Center. The online questionnaire was completed by 108 participants (9%). The research framework includes positive and negative facets of using social media in the context of project management. The interviewees were asked to evaluate potential opportunities and threats of social media use.

5. Results & discussion

More than half of the respondents (56%) were between 37 and 50 years old. One quarter of respondents (27%) were between 25 and 36 years old. Every tenth (11%) respondent was between 51 and 65 years old. The rest of the respondents were more than 65 years old. Experience in projects up to 5 years was declared by 20% of respondents. 21% of respondents had experience in projects between 6

to 10 years, 23% of participants declared experience of between 11 to 15 years and also 25% of participants had experience in projects between 16 to 25. Over 25 years of work in projects was declared by 11% of respondents.

Respondents who attended the study have various certificates in the field of Project Management like PMI (Project Management Institute), IPMA (International Project Management Association), Prince 2 Foundation, Prince 2 Practitioner and others. 31% of them have at least two certificates in this field. Respondents played different roles in the last/current project. 57% of respondents were project managers and 45% were attending as a Project Team Member.

There were different types of projects in which respondents attended, for example: research/science projects (46%), European Union (EU) projects (16%), innovative projects (18%), projects regarding activities of the public sphere (8%), IT projects (6%) and other.

A high percentage of respondents adopt standard project management (63%), hybrid methodologies (19%), the Agile approach (9%) or combine multiple approaches and others set by the company (9%) (Fig. 2).

The use of SM in projects depends on the methods and approach of organizations to management in the project team. For example, a significant relationship was found between the organisation's approach to project management and use of SM in the field: management of the project team ($p = 0,001$ $R = 0,67$), project communication management ($p = 0,004$, $R = 0,49$), management of subcontractors and project co-operators ($p = 0.01$, $R = 0,61$. Managers working in an Agile or Hybrid way are more likely to use SM at work than managers who work in a traditional way, thus giving support for Hypothesis 1. The project team, in which the respondents

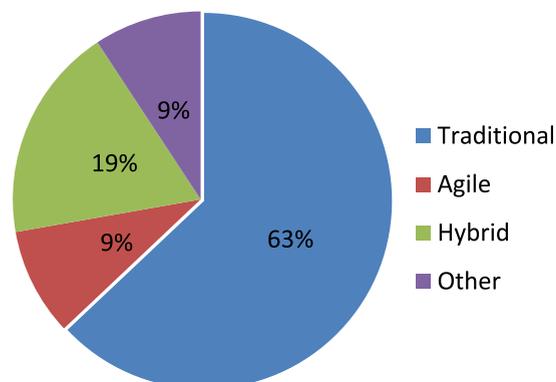## Approach to project management within the organisation

Fig. 2. Survey answer of the statement: The project team, in which I have recently participated, represents the approach to project management.

participated, worked in a traditional (51%), remote/virtual (22%), mixed/combine (23%) or different way (4%) (Fig. 3).

A significant dependency between the use of SM and the way the project team works was also noticed. From among people who worked in a virtual or mixed way, half of them (51%) indicated that in the last project, SM was used in areas like: management of the project team (p = 0,003), communication management (p = 0,001). Thus, lending support for Hypothesis 2. However, regardless of the way of work, respondents indicated (60% working in a traditional way, 43% working in virtual, remote way, 48% working in a mixed way) that the use of SM has a positive effect on mutual cooperation between team members. Comparing the answer to this question and way of working (traditional, virtual) by age group, one can see that there is no significant or meaningful difference based on age.

Table 2 shows different types of SM used by project managers/members of projects. 41% of respondents admitted that they used social networks (e.g. Facebook) at work and in private. However, the answers were significantly dependent on the age of the respondents. Younger respondents, especially from Generation X[2] Generation Y and beyond, often had their own profiles and half of the respondents, aged over 65, admitted that they did not use social networks at all. The situation was similar with the number of respondents claiming to use video sharing (e.g. YouTube), 46% of respondents used that tool privately, 34% used both at work and in private.
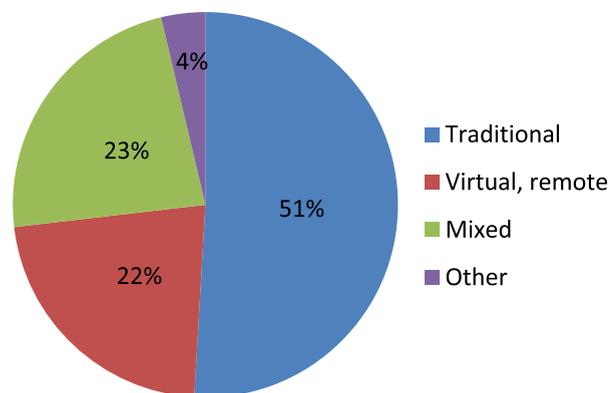
Way the project team works

Fig. 3. Survey answer of the statement: The project team in which I have been working/doing recently works in this way.

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[2] The birth dates of individual generations were selected: the Silent Generation (1925−1945), the Baby Boomers (1946−1960), Generation X (1961−1981) and Generation Y (1981−1999), Generation Z (Ruth et al., 2013).

Table 2. Types of SM used by project managers/members of project.

Social media	Used privately	Used at work	Used both at work and in private	Do not use at all
Social networks (e.g. Facebook)	33%	2%	**41**	24%
Services for professionally active people (e.g. LinkedIn, Golden-Line)	18%	20%	37%	25%
Video sharing (e.g. YouTube)	**46%**	2%	34%	18%
Photo sharing (e.g. Pinterest, Flickr)	20%	3%	15%	**62%**
Blogs and micro-blogs (e.g. Twitter)	15%	3%	12%	**70%**
Synchronous communication tools, videoconferencing (e.g. Skype, Net2Phone, Yahoo! Messenger, Google Talk)	17%	10%	**57%**	16%
Asynchronous communication tools (e.g. e-mail, forums, shared calendars, groups and mailing lists)	2%	10%	**85%**	3%
Data cloud applications (e.g. Dropbox, OneDrive, Google Drive)	11%	10%	**73%**	6%
Dedicated applications for project work (e.g. Slack, Trello, Redmine, TeamViewer, Meduzo)	7%	20%	28%	**45%**

Results confirmed global trends indicated in literature that the younger generation more often use social networks in the workplace (Bennett et al., 2008; Ruth et al., 2013; Hysa, 2018).

According to the survey, the most frequently used types of SM used by respondents in projects were synchronous communication tools (57%), asynchronous communication tools (85%), data cloud applications (73%). Additionally, it can be noted that people with less experience in projects are more likely to use these tools. Dedicated applications for project work were not used at all by 43% of respondents, which was a big surprise. People using these tools had less experience in projects than people who did not use them at all. This means that younger people are more open to new technologies and new working methods, so use of SM significantly changes depending on age. The study found that the least-used SM tools were photo sharing (e.g. Pinterest, Flickr) (62% do not use at all) and blogs, micro-blogs (e.g. Twitter) (70% do not use at all).

In the survey, respondents were asked to indicate in which areas SM application had been used in the last/current project.

Project members and project managers use SM mostly for communication (77%), promotion of projects (77%) and for the management of the project team (66%) or management of project stakeholders. Communication is one of the most difficult things in the project, so the use of SM technology is one of the ways to improve communication and collaboration on the project. The use of SM in projects depends on the way of work. For example, 64% of respondents working in a virtual, remote way, indicated that SM was definitely used in project communication management. In contrast, only 33% of respondents, working in the traditional way, marked this option. These results confirmed earlier findings (Reed &Knight, 2010) that SM is most often used as a communication tool for a virtual team or projects and also for international projects consisting of various experts from different parts of the world. Project teams composed of members from different countries are becoming commonplace.

The basic questions of the survey focused on the issue of whether project team members were aware of the benefits and dangers of using SM in projects. The participants answered the question to what extent — in their opinion — the use of SM affects individual areas in project management. They could choose five options: it affects strongly positively, it affects positively, it has no effect, it affects negatively, it affects strongly negatively (Fig. 4). The greatest benefits and a positive effect regarding the use of SM were noted in the areas: communication between employees, business partners and shareholders (50%- positively,18%-strongly positively), the coordination of distributed project teams (52%- positively, 32%-strongly positively), the work efficiency of project team members (57%-positively, 23%-strongly positively), knowledge management (acquiring, sharing knowledge, disseminating information)
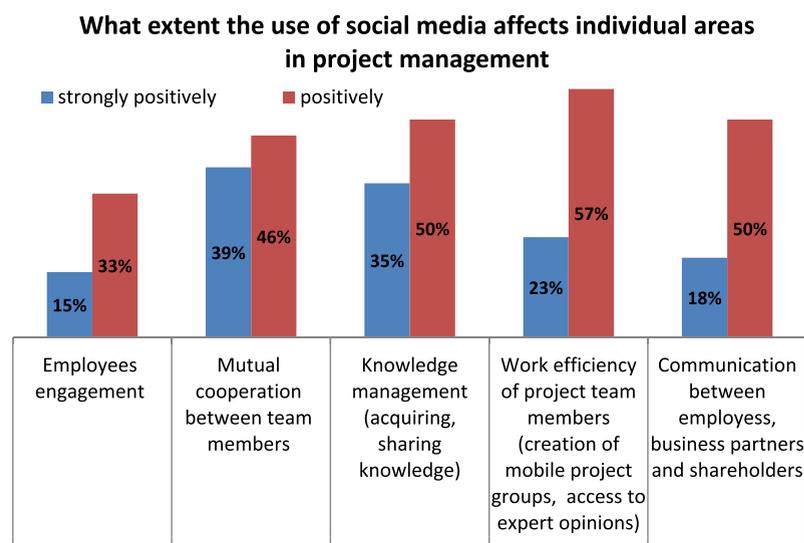

Fig. 4. Survey answer of the statement: in which areas SM application had been used in the last/current project.

(50%- positively 35%-strongly positively), mutual cooperation between team members (virtual meetings, exchange of experiences) (46%- positively 39%-strongly positively). The indications of the respondents confirm Hypothesis 3. These results are consistent with the findings of Amade (2017), who confirmed that the use of social media positively affects effective communication in construction project delivery in Owerri, Nigeria. Furthermore, the findings support other established research stated by Perera et al. (2017) concerning the benefits of using social media in knowledge management, advertising, communication between partners and shareholders in construction industry projects.

Moreover, there was also a significant dependency between the respondents who indicated the option-definitely positive SM affects individual areas -and the age of respondents ($p = 0,0044$). For example, from among the people who stated that SM affects them strongly/positively in the area of knowledge management, 57% of respondents were between 37-50 years old (Generation X), 26% were between 25-36 (Generation Y), while only 6% of respondents were between 51-65 (Baby Boomers) and 11% were above 65 (Silent Generation).

These responses also support other established research (Delerue and Cronje, 2017; Harrin, 2016) into how SM can enhance effective communication in project management and engagement. The use of SM enables effective communication and collaboration among individuals and groups, both within and outside of the firm. Our findings are similar to the results of Lin et al. (2015) who showed that projects require interdisciplinary collaboration, as well as knowledge sharing and transfer between business and technology experts. In addition, the use of SM in the creation of mobile project groups, fast information exchange, access to expert opinions, definitely affects the working efficiency of projects. Furthermore, research indicated that SM is also used as a marketing tool to promote the project (43%-positively, 28%-strongly positively). More importantly, managers associated with projects regarding the activities of the public sphere more often emphasized (72%) the importance of using social media in the promotion of projects. That point of view is similar to Ninan et al. (2019) findings where they researched the use of social media for promoting a metro rail mega-project. Additionally, results showed that SM is used as a tool for training and employee development (43%-positively, 22%-strongly positively), which has not been previously indicated in literature studies (Fig. 5).

Moreover, the negative and very strongly negatively impact of the use of SM in project management was noted in the security aspect of the project. However, it was surprising that 35% of respondents indicated that the use of SM in project management would have no impact (neutral option) on the safety of the project and on employees' engagement (37%). Project members, in contrast to project managers, more often indicated a neutral opinion (62%). This may show a lack of respondents' awareness of the risks associated with the use of social media. Many more respondents

What extent the use of social media affects individual areas in project management
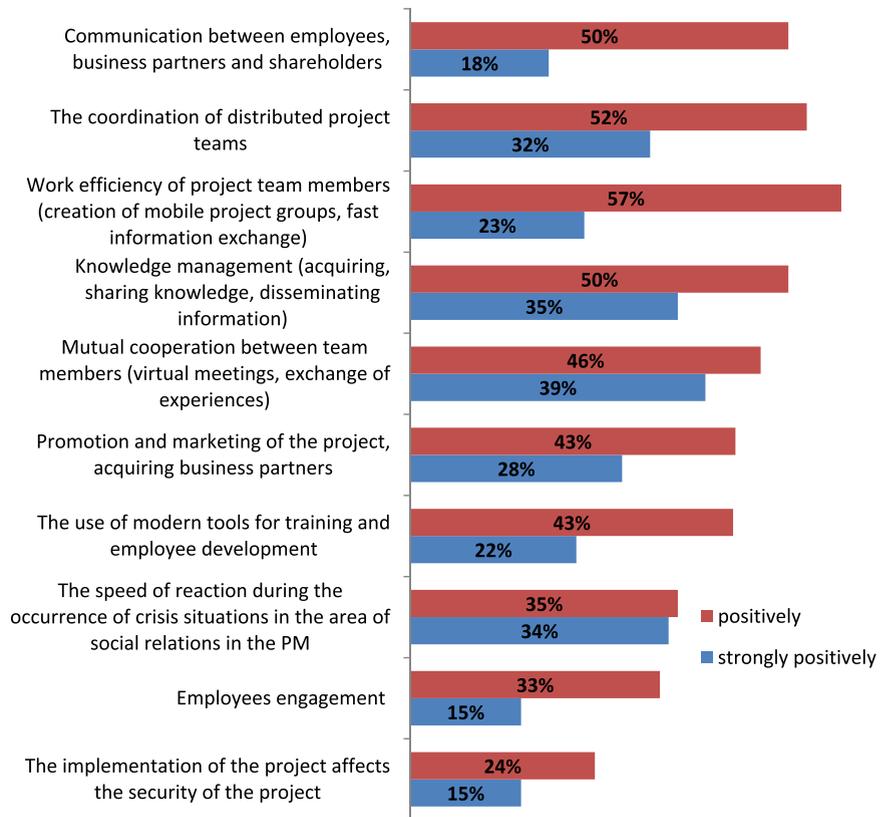

Fig. 5. Survey answer of the statement: What extent the use of social media affects individual areas in project management.

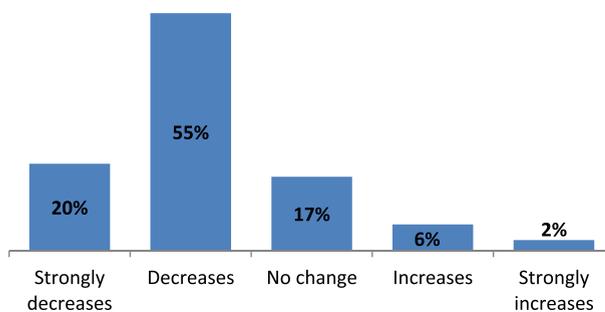## Information security in the project while using SM changes

Fig. 6. Impact of the use of social media in project management — Information security.

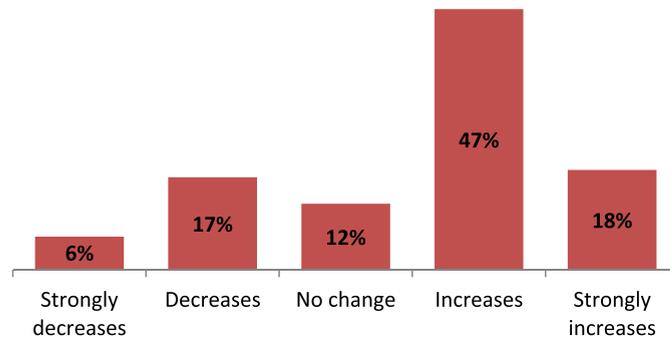### The risk of hacking an organization's IT system, data loss while using SM change

Fig. 7. Impact of the use of social media in project management − the risk of hacking an organization's IT system and data loss.

indicated (Fig. 6, Fig. 7) that information security of the project while using SM is reduced (55%) and the risk of hacking an organization's IT system (data loss while using SM) increases (50%). Thus, the indications of the respondents confirm Hypothesis 4.

Security issues have become increasingly serious (Damm and Schindler, 2002), especially for virtual, remote projects (Zhang &Gupta, 2018). The security risks grow when managers use social network and enterprise tools which support communication and collaboration in project management. The risk of data interception, information fraudulence and privacy spying are increasing in those kinds of projects.

Although social networks can contribute to better employee productivity, the study showed that employee productivity didn't change (39%) and also that it is blurring the boundary between private and professional use, which leads to a decrease in the productivity of project employees (32%) as shown in Fig. 8. In additional interviews conducted among respondents, most project managers were afraid of a decrease in the productivity of their employees (62%), especially when younger generations

Employee productivity using SM (blurring the boundary between private and professional use)
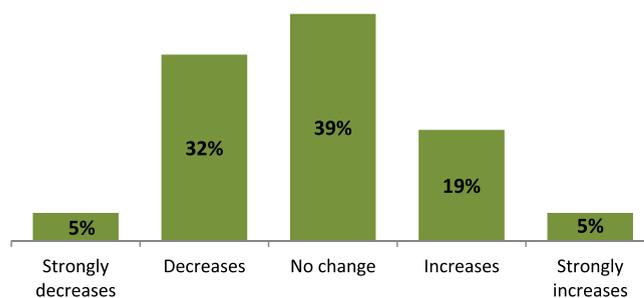

Fig. 8. Impact of the use of social media in project management − employee productivity.

take part in the project because they are often permanently connected to the social network.

Nowadays, where project leaders are faced with tight deadlines and limited resources, SM is a great idea. Using SM in project management enables instant information exchange during cooperation of team members, which increases the attainment of immediate results. However, it is important to know the rules of conduct on social networks to make sure that it is safe for project management. The necessity to set security rules and the policy of using social media in projects are indicated by Azhar et al. (2018) and Perera et al. (2017) in the study of the construction industry. Therefore, the respondents were asked to indicate which procedures are needed for using SM in project management (Fig. 9).

According to the results, some actions and procedures are needed for using SM in project management. The most frequent activities indicated were: conducting

What extent actions and procedures are needed for using social media in project management
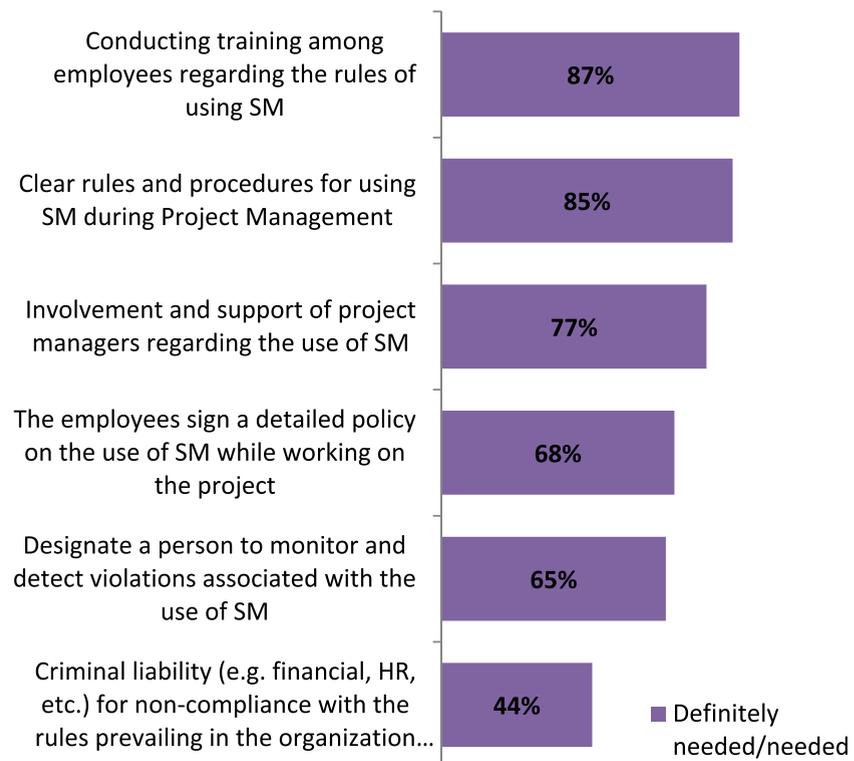

Fig. 9. Survey answer of the statement: Which procedures are needed for using social media in project management.

training among employees regarding the rules of using SM (87%), clear rules and procedures for using SM during Project Management (85%), involvement and support of project managers regarding the use of SM (77%).

Many executives and project managers were concerned about the potential risks involved in the use of SM but the risks can be mitigated or avoided by setting an appropriate strategy or policy for the use of SM in project management. There was a significant dependency between the respondents who indicated the need to implement the procedures and whether they were project managers or only project members (p = 0,0064). Project managers more often indicated the options-definitely needed − to mostly statement. The organization's SM policy should be documented, written in plain language, in a comprehensible way.
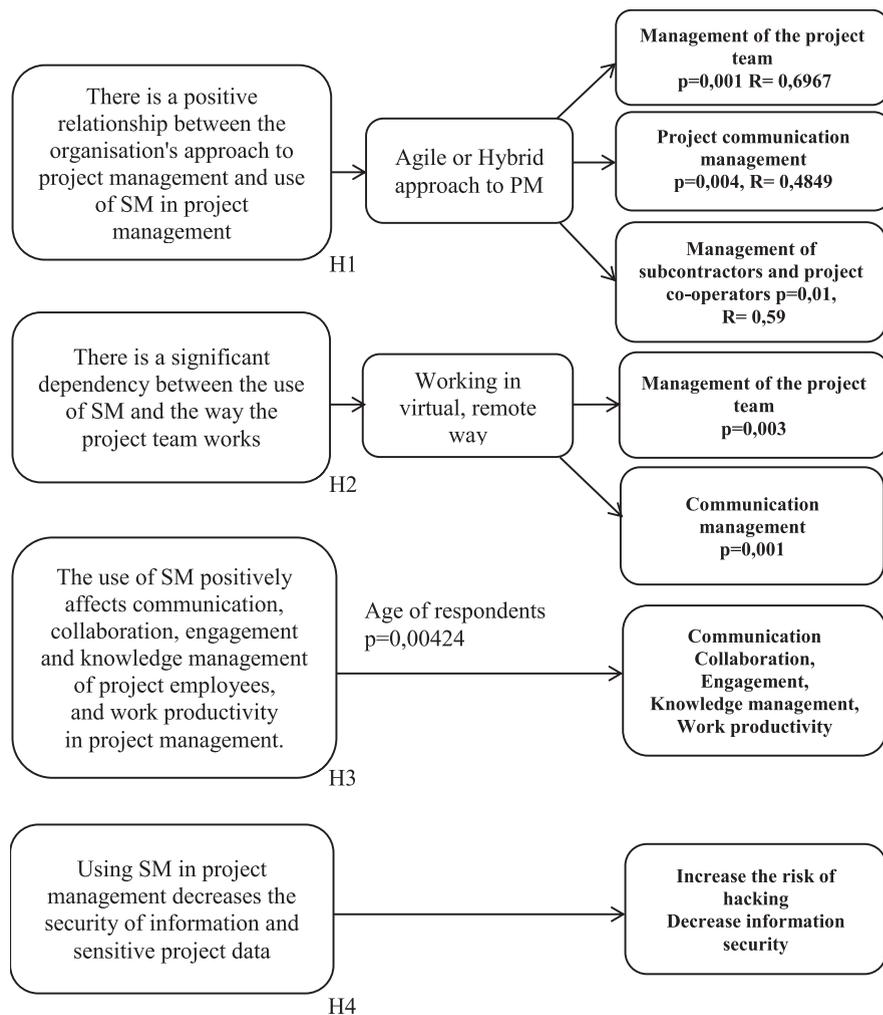

Fig. 10. Results of the research concerning opportunities and threats of using SM in project management.

The overall results with hypothesis verification of the research concerning opportunities and threats of using SM in project management are shown in Fig. 10.

6. Conclusions

The article presents the results of the research concerning opportunities and threats of using SM in project management. SM usually supports project managers and their members in such areas as communication, cooperation, engagement, knowledge management, work productivity and promotion of the project, employees development. These results are in line with Piveca and Maček (2019) and Van der Merwe (2016) study, where the importance of social media for project-related work and communication is proven. Results confirmed literature findings on the potential benefits of using social media in a project to improve communication (Harrin, 2012), cooperation (Remidez and Jones, 2012), engagement (Harrin, 2016), knowledge management (Perera et al., 2017; Reed &Knight, 2010), work productivity (Delerue and Cronje, 2017). The present research additionally shows a significant dependency ($p = 0,00424$) between the indicated benefits of using SM in different areas and the age of respondents. Mainly younger respondents, especially from Generations X and Y, more often use social networks in project management.

Successful project management requires forming and maintaining relationships between and among project team members and various stakeholders. Communication is the most elementary component of the project team and has been considered one of the critical process skills for project success. High-quality communication takes place when team members spend sufficient time communicating with each other, exchanging information both formally and informally. Therefore, it is critical to ensure good-quality communication among team members, which is easier to achieve through using different tools of SM. This is particularly salient when project members are experts from various fields and different countries. Social media can also enhance communication because it reduces the time required for meetings. Both offline and online environments are integral components of project management. Survey data shows also that SM is mostly used by respondents in synchronous communication tools (57%), asynchronous communication tools (83%) and data cloud applications (73%). Furthermore, it is also important to highlight that the results of the study indicated that dedicated applications for project work were not used at all by 43% of respondents.

Based on the responses received, project members and project managers with less experience in projects are more likely to use SM in various fields. Additionally, the results of the study indicate that SM in projects is mostly used for communication (77%), promotion of projects (77%) and to manage the project team (66%), management of project stakeholders. These results are consistent with the findings of Amade

(2017) and Silvius (2016) regarding the usage of social media in effective communication and also with Perera et al.'s (2017) findings on the benefits of using social media in knowledge management, advertising, communication between partners and shareholders. Generally, respondents are aware of the benefits and dangers of using SM in projects. The greatest benefits connected with using SM are in the following areas: communication between business partners and shareholders (54%), the coordination of distributed project teams (52%), the work efficiency of project team members (52), knowledge management (50%), the promotion and marketing of the project (46%), mutual cooperation between team members (46%). The consequences of using SM by project managers and the organization can also bring some disadvantages and threats. The negative impact of the use of SM in project management was noted in relation to the security of the project, lack of the boundary between free time and work, which leads to occupational burnout and decrease in productivity and engagement. SM is less used in organisations where the project team works in the traditional way. According to the results of the research, SM is more widely used in organisations with the agile or mixed approach to project management.

Although new forms of information and communications technology (ICT) are increasingly available to project managers and project team members, they have not yet been universally embraced. One of the barriers to understanding the value of SM in project management is the worry that people will waste time on SM sites which will cause their productivity to drop. Moreover, much of the resistance to project management SM deployments is about the fear of losing control of information and security.

Therefore, some policies/procedures for using SM in project management are needed. According to the results, respondents noted, for example: conducting training among employees regarding the rules of using SM (SM) (85%), clear rules and procedures for using SM during Project Management (83%), involvement and support of project managers regarding the use of SM (77%). These responses are supported by other established studies (Harrin, 2016; Damm and Schindler, 2002) as to the required conditions for the implementation of SM in project management.

According to a broad swathe of literature and empirical research, it is necessary to point out best practice recommendations regarding the usage of social media in the area of project management:

1. When organizations are weighing up the use of social media as a communication tool in projects, one of the first decisions they have to make is choosing the right software that should be included in the existing project management information system. Principles of SM usage within projects should be established in a special policy of the organisation, including such elements as:

- the purpose and form of communication in SM as one of the elements of the project's strategy – communication, collaboration, management of knowledge, promotion and recruitment,

- project members should be aware of the ban on publishing proprietary or confidential materials and information concerning the projects,

- responsibility – every person from an organization publishing materials on SM should know the scope of responsibility for improper online behaviour,

- members of the projects must strike a balance between their private and professional presence in SM.

2. It is necessary to set security rules, especially for virtual or remote projects because the risk of data interception, information fraudulence and privacy spying is increasing in those kinds of projects.

In summary, the use of SM in projects cannot replace face-to-face meetings. Instead, SM can complement traditional communication modes in projects, particularly when large numbers of individuals are involved. SM can also enhance communication because it reduces the time required for meetings. Both offline and online environments are integral components of project management. Linky Van der Merwe (2016), the founder of Virtual Project Consulting, pointed out that: *"Social media is reshaping the way we manage projects, by changing the way we connect and communicate with our teams and stakeholders"*. SM appears to be used optimally when a team is multicultural (also virtual), with people of Generation X and Generation Y for whom SM is a natural communication channel.

The review of literature and results of the studies clearly indicate the need for further research on the issue. Being aware of the limitations of the studies, especially the sample size, the results should be evaluated by using larger samples. Moreover, as the importance of using the newest ICT technologies will soar in the coming years, follow-up studies in the area of SM in project management should be conducted.

Declarations

Author contribution statement

Beata Hysa, Seweryn Spalek: Conceived and designed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

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