Distributed team cohesion – not an oxymoron. The impact of information and communications technologies on teamness in globally distributed IT projects

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Abstract:
Globally distributed IT projects are common practice in today's globalized world. Typically, project team members work on interdependent tasks, with a common goal to be achieved as one team. However, being split between multiple locations impedes communication among team members and hampers the development of trust. Information and communications media enable communication between geographically distributed project team members and help to create and maintain trust within project units. Communication and trust are particularly significant for fostering a feeling of oneness among project team members. Oneness, also referred to as "teamness", is repeatedly mentioned as one of the challenges facing global project teams. However, prior literature on teamness is very scarce and its importance is underrepresented. This research contributes to the field in two ways. First, the theoretical study based on a systematic literature review examines available evidence of teamness in globally distributed projects. Secondly, an empirical study based on interviews conducted with global project managers fills the current gap in literature on the link between use of ICT and establishing a sense of team unity. This paper draws practitioners' attention to the importance of striving for teamness in spite of the geographical distance that exists between project team members.

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1. Introduction

Globally distributed information technology (IT) projects have emerged primarily due to outsourcing, globalization, and the ever increasing internationalization of companies. Furthermore, the rapid development of information and communications technologies (ICT) has facilitated communication between different project sites, which has additionally impacted the increasing use of dispersed project teams. Ever since then, globally distributed IT projects have expanded and become commonplace in today's business world.

Information and communications technologies enable project team members to better cope with various challenges. In practice, the features of this type of international collaborative work, which are frequently regarded as challenges, may have a positive impact on project performance. Different time zones enable organizations to work round the clock. Cultural diversity enriches project results as different points of view are reflected. Even different understandings of assignments do not necessarily lead to conflicts, but may instead result in better and more innovative task solutions [1]. Geographical dispersion enables the employment of highly skilled project members where they are available without the need for costly personnel transfers. Thus, even though globally distributed IT projects are more challenging than co-located projects, they offer organizations great opportunities and benefits.

However, in order to benefit from successful global projects, team members must trust each other to communicate and collaborate regardless of geographical, temporal, and cultural distance. Communication and trust are essential to every type of business setting but they certainly play a dominant role in virtual organizations, and for this reason also in globally distributed IT projects [2]. Regular face-to-face (F2F) communication among team members of co-located projects supports the building of trust and the sense of "teamness" [3]. As face-to-face communication is not always possible in globally distributed projects, information and communications technologies play a crucial role in communicating and developing trust within global project teams. Though companies extensively use ICT to enable and support communication in distributed project teams, communication is still recognized as one of the biggest challenges encountered in globally distributed IT projects [4]. Another challenge, strictly related to communication, is fostering a bond among geographically dispersed project team members. Project team members located at different sites are less likely to perceive themselves as part of the same team than members of a co-located project team [5]. As globally distributed projects rely heavily on communication media [1], it is important to ensure that project team members are able to use the available means effectively.

While effective communication and trust are among five of the most frequently identified challenges in the project management of distributed software development, fostering team spirit was identified in only five of 54 analyzed studies [6]. Though the frequency measured by da Silva et al. [6] only indicates the number of times a particular challenge was identified in different papers and not how significant this challenge could be, the author of this research believes that the issue of the sense of team unity is underrepresented in prior literature and requires further in-depth analysis.

The goal of this research is twofold. First, the author attempts to identify new trends toward ICT use in globally distributed IT projects. Secondly, the author aims to fill the gap in prior literature by analyzing how ICT can be used for developing this sense of teamness within globally dispersed project teams. In light of the increasing importance of globally distributed project teams, this study draws practitioners' attention to the importance of striving for teamness in globally distributed IT project teams.

The paper contains the results of two research methods: theoretical and empirical. After presenting a theoretical background related to the study, the theoretical part is continued with a structured literature review on the topic. Subsequently, the research method implemented in the empirical part of the study is justified, followed by the preliminary results of the semi-structured interviews with global project managers in India. The author concludes by evaluating the limitations of the current study, as well as suggesting possible directions for future research.

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2. Theoretical background

According to Binder (2007), global projects involve people distributed across various countries and organizations [7]. Likewise, DeSanctis and Monge (1999) define a virtual organization as "a collection of geographically distributed, functionally and/or culturally diverse entities that are linked by electronic forms of communication and rely on lateral, dynamic relationships for coordination" [2]. Available evidence indicates that while an IT project can be global – albeit conducted within a single organization – it cannot function without sufficient ICT involvement (e.g. a software development project at Motorola which involved engineers from Motorola's software development centers in six different countries [8]). ICT is used in many industry global projects, but this research focuses solely on globally distributed IT projects. IT projects (including software development projects) are perceived as being more challenging than other industry projects (e.g. construction projects) due to the following characteristics [9]:

- A higher level of uncertainty resulting from higher technological novelty;
- Low product visibility;
- High-speed pressures requiring more flexible project management;
- Changeability;
- Higher risk involvement.

The communication problems that global projects often face tend to arise from missing informal communication, which is a constant struggle for internationally distributed teams [10]. Past evidence indicates that communication in global software development (GSD) is less frequent [5] and less effective [11] than in traditional, co-located project teams. Thus, the ICT must strive to strengthen the effectiveness and efficiency of communication practices between geographically distributed team members. Furthermore, communication media should enable rapid information exchange and promote regular communication. Previous research results indicate that ICT reduces the negative effects of intercultural communication and supports the positive aspects of decision making in global virtual teams (GVT) [12].

On the one hand, ICT enables communication in distributed teams. On the other hand however, heavy use of ICT and a strong dependence of project team members on technology represent another reason for communication problems in globally dispersed projects [1]. An unforeseen technical problem, such as a sudden power outage at one location, can lead to temporary communication breakdown. This in turn can result in increased anxiety felt by team members at the other site. Furthermore, a high information load due to excessive volume of e-mails can lead to delays as well as increasing the risk of overlooking important information [13], [14]. In addition, slow or delayed feedback due to communication media has a negative impact on global project team performance. When using asynchronous communication tools, such as e-mail, discussion boards, shared documents, web logs, etc., for solving urgent issues, the lack of immediate response can delay the decision making process. Delayed response is perceived as an obstacle to the development of 'familiarity' and a sense of unity among dispersed project team members [15]. Thus, choosing the right communication media in particular situations is crucial.

Communication media differs according to the level of information richness [16]. The Media Richness Theory (MRT), proposed by Daft and Lengel (1986), is used to define the ability of different communication media to transfer information [17]. The communications medium with the highest level of richness is face-to-face communication, followed by video conferencing, phone, and online chat respectively. The lowest richness level is represented by e-mail, text messaging, and written documents [16]. A loss of communication richness is considered to be one of the major communication problems and one of the main collaboration challenges facing typical global software development projects [18], [19]. The ongoing research attempts to study the link between different communication tools and creating oneness in globally distributed IT projects.

The basic infrastructure that any organization conducting global projects must be equipped with consists of computer-mediated communication systems (CMCS) [20]. Rice (1987) described computer-mediated communication systems as those that "use computers to structure and process information and use telecommunications networks to facilitate its

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exchange" [21]. These systems include, among others, e-mail, voice messaging, and computer conferencing. The rapid development of technologies that support communication and facilitate the exchange of data and information, including the Internet, telephony, broadcast media, and all kinds of audio and video transmission technologies, improves teamwork undertaken by geographically distributed project team members.

Current trends demonstrate an increased use of social media by many organizations [22], [23]. Social media and related applications are used extensively in globally distributed projects, as they enable quick communication between project teams and stakeholders dispersed across the globe. Perpetual communication and the possibility of direct response plays an important role in global settings, particularly in conflict management [24] but also in relation to building up trust between project team members [14] and nurturing a sense of unity.

Cooperation between project team members is crucial for successful project team performance [14]. However, establishing a sense of unity, also referred to as "oneness" or "teamness", is recognized as one of the challenges facing global teams [25]. Teamness is characterized as an intangible feature of a team's performance [26]. It is the ability of individuals to collaborate and work effectively as a team [27]. Teamness can be identified by close relationships among team members, their strong commitment to the team's success, and a perceptible unity of team members. Teamness is a synonym of oneness which places more emphasis on the aspect of striving for a common team achievement.

Creating a sense of unity in globally distributed projects poses a challenge, in particular due to the distances that exist between project team members and a lack of regular face-to-face communication that would strengthen trust among team members. Distant project team members often feel less teamness and perceive their other colleagues to be less cooperative and helpful in the event of increased workloads [5]. While prior literature recognizes the need to reduce distance separating parts of globally distributed projects [11], [28], [29], to the author's knowledge there is no research indicating that a higher level of teamness can decrease a perceived distance between team members. The author found that previous research on the significance of teamness in global projects, as well as the literature on the impact of ICT on creating a sense of unity in geographically dispersed project teams, is scarce.

3. Review of teamness in prior research

One of the motivations for conducting a literature review on teamness is that different researchers employ different terminology to describe the same aspects. This poses a problem, as different terminology and definitions lead to discrepancies in the results [1]. This literature review aims at structuring the knowledge of teamness in globally distributed IT projects. Moreover, the author expects to identify a link between the use of ICT and developing teamness in distributed projects. To perform this systematic literature review (SLR), the author followed the SLR guidelines proposed by Kitchenham [30]. The review process involved several steps.

3.1 Methodological approach

In the first step, the need for a review was identified by recognizing the lack of structured knowledge about teamness in globally distributed IT projects. Moreover, the link between the use of ICT and teamness was not clear. To the author's knowledge, there is no research reviewing how ICT supports or interfere with developing the feeling of oneness in distributed project teams. Teamness is an important aspect for team performance and it becomes even more critical as team dispersion increases. However, teamwork quality is more difficult to achieve in distributed projects [31]. Thus, its meaning should be more stressed in the literature.

In the second step, the research questions were defined:

SLR Q1: What terminology is most commonly used when referring to teamness?

SLR Q2: What is the relationship between the use of ICT and unifying distributed project teams?

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Subsequently, the search process was conducted. The process involved five steps as presented in Fig. 1. First, several trial searches were conducted to determine the most appropriate keywords, resulting in the following Boolean search string:

Project AND
(global* or distribut* or dispers* or virtual*) AND
(IT project OR software project) AND
(teamness OR oneness OR team cohesion OR teamwork OR performance OR commitment) AND
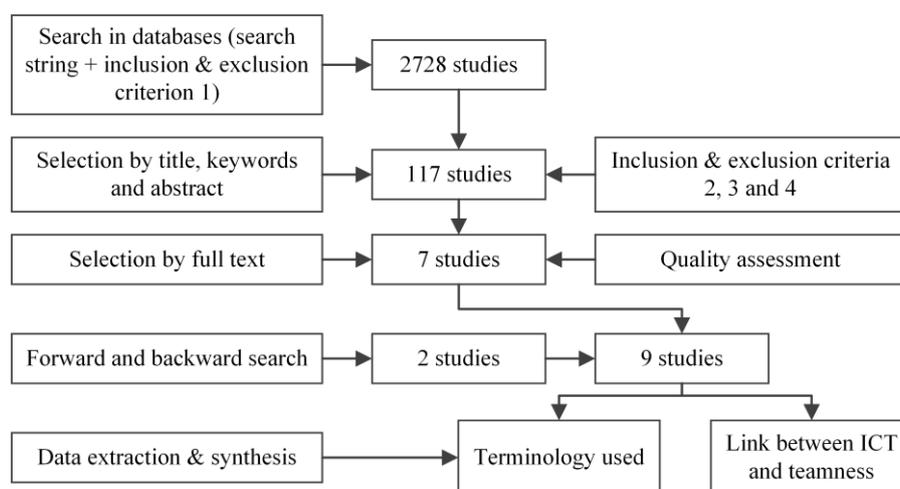*ICT.*

Fig. 1. Literature search process

The selected search string was adopted in three major scientific databases: EBSCO database; ScienceDirect; and AIS Electronic Library (AISeL). The database search included the full text of the papers, ensuring that no relevant study would be omitted. In order to limit the very broad scope, it was limited to the most recent articles and conferences or conference proceedings published between 2006 and 2014. The initial search resulted in 2728 studies. Subsequently, while studying the title and abstract, a few inclusion and exclusion criteria were considered ensuring that the primarily selected items:

1) Were studies published since 2006;
2) Were full research papers published in a scientific journal or conference proceedings;
3) Were theoretical (applying systematic literature review methods) or empirical studies;
4) Were related to globally distributed project teams.

117 unduplicated studies fulfilled the criteria and were examined in more detail. By analyzing the full text of the preselected articles, the following quality assessment criteria were taken into consideration:

- Is the study based on practitioners' experience or classroom research? (Studies derived from classroom analysis were excluded from the selection list);
- Is the study related to the IT industry? (Studies involving other industries, e.g. construction projects, were excluded from the selection list);
- Is the study related exclusively to project teams and not working teams? (Only temporary teams are relevant as it is more challenging to develop the feeling of oneness in project teams than in ongoing work teams, thus, researches on ongoing working teams were excluded from the selection list);

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- ▪ Is the study relevant for examining the link between ICT and the development of teamness in distributed teams? (Studies that focused solely on other issues, such as using ICT for knowledge sharing or conflict management, were excluded from the selection list).

The rigorous quality assessment resulted in seven articles. However, there are of course relevant articles that were published prior to 2006 or were included in other scientific databases. In order to ensure a high quality and completeness of the literature review, the limited research sources were expanded by backward and forward search as suggested by Webster and Watson [32]. Backward search is conducted by reviewing the references of the primarily selected studies, while forward search leads to other articles that cited the selected papers [32]. After conducting the search, two relevant articles (fulfilling the inclusion/exclusion as well as the quality assessment criteria) were additionally included in the selection list. In total, nine high quality studies were extensively reviewed and analyzed from the point of view of using ICT and developing teamness in globally distributed IT projects.

The quality of the selected papers was assured by including only full research studies published in scientific journals and conference proceedings, i.e. all papers have been peer-reviewed. The relevance of the selected papers was assured by including only those articles that fulfilled the quality assessment criteria of this research. Studies from the initial selection list that were not included in the final review were rejected frequently due to lack of focus on IT project teams. However, as expected by the author, the main reason for rejection was the missing input concerning teamness.

3.2 Relationship between ICT and teamness in globally distributed IT projects

Table 1 represents the complete list of reviewed articles along with the terminology related to teamness used in each paper. The last column of the table presents evidence of teamness in prior literature. It includes also evidence of the use of ICT that could impact the level of teamness in globally distributed IT project teams.

Table 1. Articles on the use of ICT and its impact on developing teamness in distributed projects

Authors	Year	Terminology	Evidence of teamness and ICT
J. Ahuja [33]	2010	Team participation; Teaming; Relationships; Ties; Sense of belonging; Group cohesiveness.	Ties connecting virtual team members are lateral but weak due to lack of face-to-face (F2F) interaction, the span across cultural and organizational boundaries, and lack of emotional support; Virtual teaming is a new way of managing and organizing work that allows people to work together even though they are geographically separated; Daily communication between members and team leader is a kind of glue that holds the team together; Teams that had relational link training show higher group cohesiveness.
L. Dube and D. Robey [34]	2009	Teamwork; Group cohesion; Belonging; Relationships; Team identification; Relational ties; Social ties.	Reliance on ICT can hinder the development of group cohesion; Occasional F2F contact is insufficient to establish team identification that is stronger than subgroup identification; Use ICT to break the isolation and get everyone's input; Use newsgroups to make team members "feel like [they] are part of the team, even if [they] don't see or talk to each other every day"; F2F exchanges include more social information and help to develop relational ties through nonverbal cues; Once established, social relationships could be maintained through ICT; Because ICT reduce the amount and richness of the information, establishing social relationships requires more effort; Increased frequency of communication helps to establish social relationships; Better relationships come from learning to use communication media differently: don't use e-mails only for task-related conversations, have a smile in your voice; Shared calendars help team members to maintain their virtual presence.

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R. Giuffrida and Y. Dittrich [35]	2013	Team spirit; Relationships; Team awareness; Group interrelations.	Social software supports social relations and team spirit; Instant messaging may encourage informal communication and relationship building; Facebook is used to build rapport and stronger working relationships; Organizational social networking sites are used for creating team awareness, and for fostering community building and group interactions.
H. Holmstrom, E. O. Conchur, P. J. Agerfalk and B. Fitzgerald [36]	2006	Teamness; Team cohesion; Feeling of belonging.	A major challenge is how to create a feeling of teamness among distributed project members; A mediator between sites may be helpful in developing the feeling of teamness; Keep photos on the website and a profile of everybody to realize that there is actually 'a human-being at the other side'; Have some co-located team building activities; Use team websites to foster the feeling of teamness.
B. Koehne, P. C. Shih and J. S. Olson [37]	2012	Team cohesion; Team awareness.	Awareness tools should be provided to increase a sense of presence across distributed teams; Remote team members should give the impression that they are available and easy to reach; Team managers can strive for higher team cohesion by promoting an open communication culture in the team; Implementing specific ICT that broadcasts activities and group interaction, such as instant messaging, document management systems and newsletters can increase team awareness.
J. Nabila and D. Mohamed [38]	2008	Collective awareness; Team cohesion.	In team having short life span and whose members work together for the first time, it is difficult to build collective awareness; The establishment of a mutual trust within the team and team cohesion supports and facilitates information exchanges and sharing.
I. Oshri, J. Kotlarski and L. P. Willcocks [39]	2007	Cohesion; Identity; "One-team" spirit; Belonging.	The norms, identity and cohesion between team members develop through socialization; Apart from regular and frequent communication – teleconferences, videoconferences – short visits to remote locations are organized to maintain a "one team" spirit; It was challenging to maintain a "one-team spirit" in the long term after a F2F meeting; A team-building exercise gave the entire team and each site a feeling of belonging; English language lessons positively affected the feeling of belonging; Occasional F2F meetings between certain individuals and a restricted use of rich media tools resulted in discontent among members of the global team.
P. Pinjani and P. Palvia [40]	2013	Team cohesion; Team commitment; Relationships.	Developing cohesion among global virtual team (GVT) members is a challenge; Communication and collaborative technologies serve as additional bonds linking the members of a GVT; An increase in electronic interaction between team members leads to an increased sense of trust and belonging; Training should be provided to help in the process of relationship building among team members; Greater diversity entails relationship building among team members and leads to increased team effectiveness.
J. S. Sidhu and H. W. Volberda [41]	2011	Oneness; One team; Team spirit.	Tangible, work-connected changes may have an influence on the development of a sense of oneness; Involving both onshore and offshore team members in a project from the very start generates a sense of onshore–offshore equality and team spirit.

The results of the systematic literature review indicate that very few researchers have analyzed both, the aspect of teamness and the use of ICT within a single research project. Furthermore, none of them defines the link between the use of ICT and the level of teamness in globally distributed IT projects. Moreover, a definition of teamness in relation to globally distributed IT projects is missing.

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4. Research objectives and research design

The research described in this paper attempts to examine the role of ICT in the creation of teamness in globally distributed IT projects. The following topic areas play an important role in the ongoing research: challenges related to culture and cross-cultural differences, conflict prevention and management, communication, trust, and a sense of unity in dispersed project teams. In each of these fields, information and communications technologies play a significant role. The scope of the paper as presented here is limited to the relation between ICT, communication, trust, and the one-team approach (teamness) in globally distributed IT projects
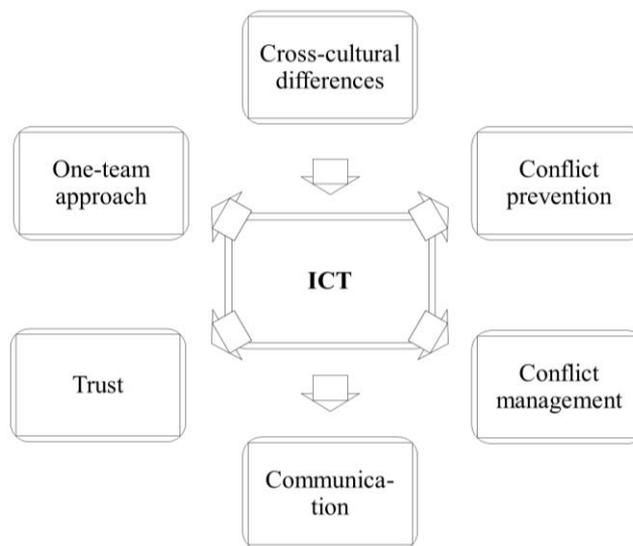

Fig. 2. The influence of ICT on global project related topics

This research has its basis in sociological orientations [42]. The empirical study follows explanatory research design based on a case study. Explanatory design aims at determining how events occur and which events may influence particular outcomes [43]. In addition, this research investigates the ways in which global project managers and team members use ICT tools in the communication process to improve the feeling of oneness within globally distributed projects. Yin (2008) distinguishes three types of case studies [44]: single; holistic; and multiple case studies. Since this research encompasses the analysis of responses offered by several project managers belonging to a single organization, this research is based on a single case with embedded units [44].

The data collection for this qualitative research was conducted by means of semi-structured interviews. The case study was conducted in India. The author spent two weeks visiting the case company's locations in three different cities, participating in the daily activities of project teams and conducting interviews with global project managers. The case company is a large, multinational enterprise, which has been providing IT services, business consultancy, and business process outsourcing for nearly two decades.

The case study contributes to the current literature by answering the following research questions:

Q1: How do information and communications technologies impact the fostering of teamness in distributed project teams?
Q2: What is the current trend toward ICT use in globally distributed projects?

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Examining the interviewees' responses, the author attempts to analyze the influence of ICT on fostering a sense of team unity in globally distributed projects. The importance of ICT to such projects has been widely recognized and investigated. However, as confirmed by the literature review results, the relationship between the use of ICT and the level of teamness in globally distributed IT projects has so far been widely ignored by other researchers.

Participants responded to a set of questions, conveyed to them beforehand. Any additional comments not strictly related to the question were allowed. The interviewer was able to ask follow-up questions during the interview. All participants involved in this study were informed of the purpose of the research and gave their permission for interviews to be recorded. During interviews, additional notes were taken which could afterward be compared to the audio recording in case of possible ambiguities arising from the recordings.

The initial interview set consisted of seven interviews with eight global project managers (six one-on-one interviews and one group interview with two respondents) as well as one interview with a global project team member. The interview with the project team member is excluded from the study as presented here, though it will be included in future research. Furthermore, two interviews with global project managers are not included in this analysis – one due to a missing permission slip for audio recording, and one due to insufficient quality of the audio recording. As a result, the answers of six experienced global project managers were transcribed. Each interview lasted between one and two hours. The possible length of the interview was communicated to the participants beforehand. The first interview set resulted in approximately six hours of audio record and a 79-page interview transcript.

All interviewees are Indian, male, and employed by a single organization. Taking the experience of the company into consideration, the author believes that the corporate culture and carefully developed global communication procedures at this company may have impacted the interview results. As the interviewed project managers were positioned in different locations, the interviews were conducted in three different cities in south and south-western parts of India. Each interviewee has several years of experience as a project manager of both globally distributed and co-located IT projects (a span of 8-23 years of experience, which is visualized in Table 2).

Table 2. Overview of study participants

	Interviewee 1	Interviewee 2	Interviewee 3	Interviewee 4	Interviewee 5	Interviewee 6
Current position	Director – Projects	Program Manager	Associate Director	Director – CRM	Senior Project Manager	Senior Consulting Manager
Years of IT work experience	21	16	16	23	18	8
Engineering background	n/a	Yes	Yes	Yes	Yes	n/a

In order to analyze the interviewees' responses, the audio recordings were transcribed and coded line by line. A matrix was created to categorize the responses of each study participant. The categories were based on the interview questions and consisted of a definition of 'globally distributed IT project', communication, trust, cross-cultural issues, one-team approach, conflicts, communication and collaboration tools, and other challenges globally distributed IT projects raise. Subsequently, the audio recordings transcriptions were carefully analyzed, key words were marked, the relevant quotations inserted into the matrix, and the responses compared and contrasted.

Due to the very limited number of respondents and the strong homogeneity of their profiles, only a few patterns could be observed. A few early observations are presented in the following section.

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5. Preliminary results

Research evidence has indicated that communication is still a dominant challenge for globally dispersed project teams. This was confirmed by all six interview partners. Furthermore, it is clearly stated that communication plays a major role in building trust and creating a sense of unity in distributed project teams (e.g. "The most important thing [in trust building] is that we consider a timely communication. It is very important!"; "Face-to-face meeting, regular communication and showing the importance to the customer build the confidence" [Interviewee 1]). Thus, these three factors – communication, trust, and teamness – are identified as salient factors influencing team performance in globally distributed projects. Due to the strong dependence of such teams on the use of information and communications technologies, all three aspects are heavily impacted by ICT (see Fig. 3).
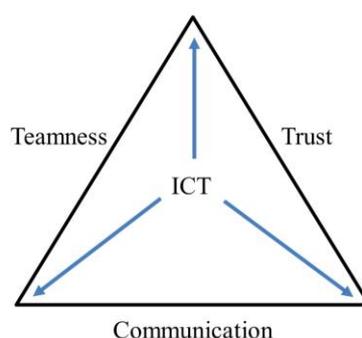

Fig. 3. The effective distributed teamwork triangle

The levels of trust and teamness depend on the quality or amount of communication. The better team members communicate, the stronger the bonds between them are and the higher the trust level in the project team is. As one participant stated, in a global project team "people do not see [each other] face-to-face, people talk on phone, but are not together. Sometimes the teams are so disposed that they [will never meet at one location]. But the management has to take conscious effort to bring them together because if they do not talk to each other, they do not feel each other, it will not work. The feeling of oneness is not there. Bonding is important, connecting is important, connection is important." This study participant indicated a substantial relationship between communication and the feeling of oneness. Since communication among distributed project team members is merely dependent on use of ICT, we can claim that an appropriate use of ICT positively impacts the level of teamness in distributed teams.

Interviewees were generally asked about typical challenges that they frequently face in their global projects and consider as crucial in global project management. After communication, the next notably challenging issue was fostering the feeling of oneness. Its significance was frequently highlighted by various interviewees, e.g. "Mostly this is the big challenge for me to make the whole team as one team." A lack of teamness and difficulties in establishing a feeling of belonging within teams has been also identified as one of the challenges revealed by several other researchers [25], [36], [45], [46]. Furthermore, Holmstrom et al. [47] revealed that due to geographical distance, establishing a feeling of trust and belonging, i.e. teamness, within global project teams is hampered. Despite the fact that the significance of teamness is generally neglected in prior literature on global project management, the interview results highlighted its role in globally distributed projects. The results demonstrate that project managers need to strive for a visible oneness in the project team in spite of its geographical dispersion.

Frequently, parts of the distributed teams become local teams during the project, but in relation to this team in another location they are disconnected. An interviewee emphasizes the problem the lack of teamness poses by stating: "That one-team approach is sometimes missing because distributed teams become local teams during that time and they do all this storming and performing and all that stuff within that team. But when it comes to this team in another location they

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are disconnected." Thus, the best way to unite the entire team is to use information and communications technologies, which is emphasized by one interviewee: "The only way we can bring them [team members] together is through the video conference (…) What we have is weekly calls, monthly calls and we have a senior management, which is also within the location so that we interact and share the information." As stated by several study participants, the on-site management visits additionally support developing trust and the sense of oneness.

Furthermore, companies require convenient communication technologies and a structured communication process, as confirmed by an interviewee stating: "When we have this cross-cultural team across various time zones, it is necessary that there is an established or a structured communication process that happens between these teams, so that the project objective is tracked and it is seen that there is fulfillment of this objective. So this communication is of most importance, if you have to really manage these global distributed teams." Additionally, communication should be encouraged. An appropriate means of encouraging project team members to communicate regularly is to make various information and communications technologies available on demand and accustoming team members to the communication process. By frequent communication, the feeling of unity is strengthened.

Moreover, modern companies frequently adapt ICT to their employees' preferences and communication habits. Some project teams require daily calls, nightly calls, weekly status reports, etc., but some teams also create a Facebook page dedicated to a particular project, where they are also able to "keep sharing some good memories, e.g. photographs" [Interviewee 4]. Sharing experiences and photographs certainly increases a sense of oneness within the project team. This practice of setting up a photo gallery to help team members get an imagination of those they were communicating with is also confirmed by Herbsleb et al. [48]. Moreover, project members using social media can post an inquiry to the community and receive a response from that community. As one participant concluded, organizations should encourage communication through social channels as it has several benefits to the project team work across borders [Interviewee 3]:

- It enables us to reach out to many people;
- It becomes instantaneous;
- It creates a body of knowledge;
- It assures that the knowledge that already exists is disseminated to multiple people.

In globally distributed projects, the identification of roles and responsibilities is hampered and the awareness of other team members' knowledge and experience is not often transparent to all members. Globally distributed IT projects frequently involve multiple organizations, people work with each other for the first time, and what is more, they are dispersed across various locations. These factors can effectively hinder awareness of who knows what in the project. Therefore, reaching out to many people through social media can significantly facilitate communication and knowledge sharing in distributed teams.

Since frequent communication increases the level of trust in distributed project teams, using social channels undeniably has a positive influence on the feeling of oneness as well. In particular due to the fact that computer-supported social networks have low limitation in regard to distance and time [29], they can considerably diminish the cognitive distance between project team members. This can strengthen the shared knowledge between project members by reducing temporal and geographical limits as they affect the motivation for sharing knowledge [49].

The so-called 'millennial generation', i.e. the generation of 1980-2000, in particular tends to use cell phones to communicate. Adopting mobile or social channels enables them to communicate faster. Writing an e-mail and waiting for a response is seen as time consuming. Thus, project team members often prefer using instant messenger, the company's internal communicator, or even short messaging service (SMS) to contact the manager. According to one interviewee, this way of communication is frequently more efficient because "whenever somebody sends you a message through a communicator, you tend to respond instantly." This trend toward ICT use is confirmed by several study participants.

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The same interviewee identified SMS as a tool that has recently started to be used for business communication. To offer an example, let us assume that a project manager is at a conference meeting and one of the team members requires his approval of a report he has prepared. As the global project manager stated: "I'm sure he might have sent an e-mail, [but] he wouldn't have gotten a response because we are in a meeting at this moment of time. In ten minutes he already sent me a message [SMS]" [Interviewee 6]. Thus, the recent trend toward ICT use is that "more tools are used for communication and tools where you get instant response are being used" [Interviewee 6].

Empirical evidence from prior literature confirms that tools such as instant messaging are important for project success. Casey and Richardson pointed out that instant messaging was not viewed as a business tool at the time of the projects under research [45]. This was perceived as one of the problems that challenged the project as an informal method of communication was quite clearly lacking.

Apart from instant messenger and social media, interviewees unanimously confirmed that phone calls, telephone conferences, forums, and video conferences belong to their major communication media used. Despite that, the most extensively used method is e-mail communication. E-mails are viewed as an official way of communicating as they are "standing in a court of law". However, project managers mention the problem of junk e-mails and the time required to screen the inbox every day, in particular when a person receives hundreds of e-mails. Another issue regarding e-mails is when "(…) the mail chain goes on and on and on… and it becomes too big and it is meaningless sometimes." [Interviewee 1]. Then the respondent takes the advantage of oral communication and clears the issue on phone. There are companies which introduced a "no e-mails" culture within the organization. Nonetheless, the study participants confidently claimed that the e-mail communication "is not going anywhere, anyway" [Interviewee 4]. It leaves a trail and is probably the most crucial means of communicating across geographical and time distance.

Global organizations have extensive communication platforms to support communication and information sharing, as well as to bridge cognitive distance within distributed project teams. As one interviewee concluded, "thanks to the network and the modern communication facilities, work can be done where there are people, who are skilled and [available] at the reasonable cost." However, especially in projects partially conducted in developing countries, it is important to pay additional attention to ensuring uninterrupted communication prospects. Sudden connection breakdown between the sites may have a negative impact on the feeling of oneness as unexpected silence on one site reflects the separateness of the team and cognitive distance.

In order to enable efficient and uninterrupted use of ICT, a backup power supply should be provided for. During the author's stay at the locations in India, the power supply was disconnected three times during one day. Each time, the company's backup power supply activated automatically, which enabled undisturbed work on running projects and continuous communication with other sites.

Silveira and Sbragia [50] studied communication practices in the global product development projects of Brazilian multinational firms and found a trend toward the use of more traditional ICT tools, such as telephone and e-mail, by companies that encourage formal communication. On the contrary, the companies that encourage informal communication foster among other things, instant messaging, which is perceived to be an informal communication practice [50]. The case study presented in this paper does not distinguish between formal and informal communication practices, but the interviews results confirm the trend toward the use of more instantaneous communication tools.

6. Conclusion and study limitations

Though a lack of teamness is occasionally mentioned in prior literature as one of the challenges facing global project teams, prior studies clearly undervalue this issue. Empirical study results indicated that developing a feeling of oneness appears to be particularly challenging to global project managers. Globally distributed project teams depend strongly on information and communication technologies. However, the link between the use of ICT and teamness in distributed

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projects was not clear. Thus, the main purpose of this paper was to investigate the phenomenon of using ICT to foster a feeling of teamness among globally dispersed project team members.

This paper describes a theoretical and an empirical research in the field. First, a systematic literature review was conducted. Secondly, initial interviews with Indian project managers were conducted and examined. The author transcribed the interview audio record available at present and analyzed the results. An initial literature review on ICT use in global projects encountered significant gaps in previous research. In particular, the author found that previous research on the impact of ICT on globally distributed project team performance as well as research on the significance of creating a sense of unity in such teams is scarce. This study contributes to the research on globally distributed project teams and their unity.

However, the current state of the research exposes some limitations. First of all, prior interviews involved six project managers from one multinational company. The future research work will need to ensure a greater range of respondents. The single case study will be expanded into multiple case studies research involving other companies from the IT sector in Germany, Poland, and India, which will provide more evidence.

Given that corporate culture has a strong impact on information and communications technologies usage [28], project managers from multiple organizations should be involved in the research. Furthermore, all previous interviewees are global project managers from India. Since culture influences the attitude toward trust and group association (collectivism *vs.* individualism), practitioners from other countries will be involved in future interviews. With more respondents, the author expects to cluster and classify the study fields into clearly distinguished categories as well as to find common patterns [51].

The author believes that using ICT may be easier for team members engaged in IT projects as they are assumed to have a better understanding of new technologies and are more familiar with using IT in their every-day work. However, proving this empirically was beyond the scope of this research. Also, the impact of teamness on project success has yet to be examined. This gap is expected to be filled in future research work.

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