Nomadic Knowledge Sharing Practices and Challenges: Findings From a Long-Term Case Study

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ABSTRACT In this paper, we explore a specialized type of knowledge, namely, nomadic knowledge, to understand its implications in knowledge sharing. Nomadic knowledge is enacted in a discontinuous pattern with a changing set of actors and further flows on a defined trajectory. This knowledge is quite important but is required sporadically, so it has a varying level of importance for stakeholders at different instances of time. The limited interest of knowledge holders after the creation of this type of knowledge makes its sharing process complex. Furthermore, new sets of actors overloaded with tasks often ignore the knowledge sharing aspect of nomadic knowledge due to the urgency of the tasks at hand. Using a long-term field study, we illustrate practices concerning the sharing of nomadic knowledge, which, we argue, are to date not yet well supported technologically. The objective of this contribution is, therefore, to outline the concept of nomadic knowledge and associated implications, so that respective knowledge sharing practices can be supported by the knowledge management community with appropriate technology. The underlying complexity of knowledge sharing practices highlighted in this paper stresses the need for appropriate technological and social processes to facilitate the sharing of nomadic knowledge.

INDEX TERMS Knowledge management, knowledge sharing, international collaboration, knowledge engineering, organizational aspects.

I. INTRODUCTION

Knowledge in general is a contested concept in the literature and, to date, there is no agreement on what is the optimal strategy or technology to support its sharing among human actors [1]–[7]. Recent literature suggests a shift in focus, moving from the establishment of knowledge bases towards the establishment of informal and formal knowledge exchange channels between stakeholders [8]. As a result, the role of technology has also been extended from knowledge storage to mechanisms to foster knowledge sharing among people, insofar as knowledge sharing practices become an important input for technology design [9]–[11].

In this article we analyze the phenomenon of sharing "nomadic knowledge." This type of knowledge is inherent

in: the organization of events that happen sporadically at different locations, after variable time breaks and are usually organized by different actors; and in the handling of exceptional events [12]. Natural disasters and the organization of academic conferences are hence examples of such events.

Nomadic knowledge sharing emerges as it is required recurrently on different junctures but by a different set of actors often beyond geographic, temporal, organizational and cultural boundaries, and as is usual in nomadic practices, it unfolds through the enactment of an ecology of practices to mobilize the resources to new workplaces [13]. On each juncture knowledge remains present for a specific time and supports different tasks performed by actors currently. The interesting issue is how knowledge can "travel," or can be shared, under these very particular conditions.

Following the underlying assumptions of the community of practice (CoP) discourse, Knowledge Management

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(KM), Computer-Supported Collaborative Work (CSCW) and Human-Computer-Interaction (HCI) literature focuses on stable sets of human actors being included in the knowledge sharing process on an ongoing basis [14]. Nomadic knowledge, on the contrary, refers to changing sets of actors operating at mutually exclusive time periods [12]. This often happens in emergent environments, which usually lack stability [15].

Taking account of the CSCW discourse, which aims at supporting cooperative work rather than automating formal procedures [16], it can be argued that the handling of nomadic knowledge sharing is of great relevant to the field. Indeed, considerable attention has been paid at issues of knowledge and expertise in the CSCW literature across the years (see e.g. [8], [10], [19], [21], [78], [79]). This article contributes to this body of literature, by illustrating practices concerning the sharing of nomadic knowledge, which, we argue, are to date not yet well supported technologically.

In order to get insights on issues concerning the use of the nomadic knowledge and its sharing, we have carried out a longitudinal study of the organization process of the European Social Forum (ESF). This is an open space for social activists adhering to anti-globalization agenda of the World Social Forum (WSF) [17]. The biannual event requires many knowledge intensive activities such as organizing efforts to finalize agenda, mobilize public, raise fund and logistics. Each time an ESF is organized, a new organizing committee in the host country takes over. This, we claim, makes an interesting case of nomadic knowledge, as we will show across the article. The fragile organizational structure of ESF poses a specific challenge, specifically with regard to the design of technical support. We are specifically interested to get answers of the following questions: What are the characteristics of nomadic knowledge? What are current challenges in nomadic knowledge sharing practices? And how can these practices be technologically mediated?

The remainder of the article is structured as follows: after discussing the related literature (section 2), we elaborate on the notion of nomadic knowledge (section 3). We follow by introducing the field of application and our research methods (section 4). Section 5 presents our empirical results: 5.1 provides an overview of practices of knowledge sharing from the Athens event to the Malmo event, followed by an analysis of organizational problems in the Malmo event (section 5.2). Section 5.3 focuses on the practices of knowledge sharing from Malmo to Istanbul and section 5.4 highlights organizational problems during the ESF in Istanbul. Section 6 derives design issues with regard to ICT support for nomadic knowledge, finally followed by a conclusion (section 7).

II. RELATED WORK
Related work to our research problem can be classified in two different discourses. Firstly, dealing with knowledge and expertise sharing and second related to technology support for social organizations.

Knowledge management processes in stable organizational settings have been heavily explored in KM, CSCW and HCI literature [18]–[22]. However, there has been a recent interest in understanding the knowledge management processes in mobile organizational structures. The KM success model suggests that infrastructure issues such as using a common network structure are keys to building KM [23]. Orr's seminal study on service technicians described the way they pass the knowledge within their occupational community [24]. Fagrell had investigated into knowledge sharing practices of mobile workers, such as electricians and journalists [25], [26]. The complexity of mobile work made knowledge sharing quite a challenge, also with regard to an appropriate design for fitting ICT artifacts. Lyytinen and Yoo suggested the term "nomadic knowledge work" to describe mobile workers' activities of managing, organizing, and sharing information on four levels (individual, team, organizational and inter-organizational level) [27]. While their dislocation made knowledge sharing a challenge, nomadic workers belonged to rather stable occupational communities who interact on an ongoing basis. Ens *et al.* have highlighted that technology can benefit as well as deteriorate the quality of the work, so they categorize digital workers in four classes and discuss the opportunities and challenges of technological adoption by each class of digital workers [28]. Ryberg *et al.*, have investigated group of students to understand the nomadic collaborative learning process. They found that this complex process involves not only technology selection but is also dependent on relevance of technology to appropriate spaces and activities [29]. Rossitto *et al.* described that nomadic culture is dependent on complex interplay of social, economic, cultural and technological practices [30]. Ciolfi and de Carvalho have discussed the mediational role of technologies in mobilizing the work place, so that work activities can be accomplished in and across different locations [31]. Jarrahi & Thomson carried an empirical study of information practices of mobile knowledge workers and found that their work practices continuously evolve based on social, temporal, spatial and material contexts [32]. Bødker *et al.*, have looked at a volunteer based community and documented their technology appropriation practices by using free technologies. They refer their practices of using diverse artifacts as community artifact ecology [33]. Wang et al., have carried out a literature review of digital work practice by mobile workers and highlighted the future research directions in this discourse [34]. Hussenot and Sergi, argue that constant shifting of roles is challenging for temporary organizations and, as a result, organizations need to change from traditional forms of work [35]. Nash *et al.* have discussed how the digital nomads are going to change future work practices [36]. Ojala and Pyöriä have compared the practices of traditional and knowledge mobile workers and described that knowledge workers have more flexibility in working offline as compared to traditional mobile workers [37]. The term "nomadic knowledge" occasionally has been used to describe the phenomenon that workers change organizations

or work places frequently ("nomadic workers") while their know-how is moving with them. For instance, Pittinsky and Shih call workers who change their organizations frequently "knowledge nomads" [38]. Miller attributed the indigenous knowledge possessed by nomads in China's rangelands as "nomadic knowledge" [39]. In nomadic work, employees may travel out of office settings for majority of work time to carry out work with members from within or outside of the organizations [40]. However, there are also micro-mobility aspects which should be considered for the notion [13], [58]. There is a small but growing literature that traces emergent socio-technical practices of nomadic work [41]. While nomadic workers move together with their know-how, nomadic knowledge, to a large extent, needs to be recreated by a new set of actors.

In the second thread of literature, social organizations have also recently gotten the attention of research and there are some action research projects focusing on supporting voluntary organizations [42]–[44]. But knowledge sharing in community organizations has not been explored in depth. There are only a few studies which have focused on knowledge sharing practices in civil society organizations. Smith and Lumba investigated an international non-governmental organization network (One World International) to identify knowledge sharing practices and inherent challenges [45]. Similarly, Rohde supported Iranian NGOs in fostering their social capital by means of a shared workspace application and its introduction process [46]. Furthermore, Klein et al. have helped NGOs working for child rights in Africa by designing a learning environment for sharing ideas and best practices [47]. Matschke *et al.* have chalked out requirements to optimally use web 2.0 technologies for knowledge exchange process in non-governmental organizations [48]. Greenaway and Vuong outline that the voluntary service not-for-profit sector "preclude[s] [the] direct importation of KM approaches developed for the for-profit sector" [49]. These research findings highlighted the benefits of adopting technological artifacts in the organizational settings of civil society organizations. However, none of these studies have looked at the phenomenon of nomadic knowledge.

There has been some research on the Social Forum movement and its ICT usage, especially by political scientists. Kavada investigated the role of mailing lists in the organizing process of the European Social Forum held in London in 2004 [50]. Juris *et al.* have analyzed the role of open source software applications for the World Social Forum (WSF), European Social Forum (ESF) and United States Social Forum (USSF) [51]. Morell has investigated into user participation with regard to the collaborative platform of the ESF [52]. In earlier work the role of ICT infrastructure used for the ESF organizing [53], [54], usage of a collaborative application by ESF activists for preparing the Malmo meeting [55] and mailing list usage [56] have been analyzed. However, a clear research focus on knowledge sharing practices in heterogeneous civil society networks is still missing.

Saeed *et al.* established the concept of nomadic knowledge based on the knowledge sharing practices from ESF Athens to ESF Malmo [12]. But in order to fully understand the challenges involved in knowledge transition among ESF organizing committee members, there was a need of a long-term study of this process. In this contribution we explore the factors which make the sharing of nomadic knowledge difficult based on studying two different transition cycles of ESF (Athens-Malmo and Malmo-Istanbul) in our 3 years long term study. The additional data allows for a more differentiated and deeper understanding of the phenomenon.

III. DEFINING NOMADIC KNOWLEDGE
The concept of nomadic knowledge is constituted by the following characteristics [12]:

A. COMMUNITY-BOUND NATURE
The knowledge has a purpose that is constituted by a community of practice (e.g. organizing an event).

B. URGENCY TO ACT
The knowledge is necessary to master a specific situation or condition of importance. The practices upon which the knowledge is based and within which it will be used in a later instance, require the full attention of the actors involved and imply typically time-critical decision making (urgency).

C. DISRUPTIONS AND DISCONTINUITIES IN PRACTICE
Knowledge providers and knowledge seekers come from different communities of practice, operate at different locations and have interest in the knowledge at significantly different points in time. The knowledge is of little interest for those people acting in that situation once the occasion is over, and, as a consequence, actors easily forget about the details and there is little interest in investing additional work to conserve that knowledge.

It is the tension between the urgency to act and the diverging interests and attention patterns of knowledge providers and knowledge consumers that make this knowledge a complex phenomenon. These challenges make it so interesting to look at the practices of sharing nomadic knowledge, and to discuss implications for the design of technical support.

The discontinuity of organizational cultures, local settings, and communities of practice when moving from one instance to the next affects the knowledge share process. Furthermore, the disruption on the time dimension does not enable direct person-to-person knowledge share. While current actors assimilate knowledge, the next set of actors does not participate in this process. Furthermore, changing sets of actors have a disruptive effect on the use of artifacts. Every set of actors will have a different level of technology adoption and usage of artifacts which also hampers a smooth flow of knowledge. Moreover, the ESF actors are non-professionals and the practice of organizing an event is discontinuous. This is not the case with mobile workers, nomadic workers, or traditional organizational settings.

Furthermore; knowledge generated in conventional network organizations very often is focused on efficiency, best practices, optimization and continuous improvement of business processes, while, in our ESF case, knowledge is neither continually present in one location nor applied by the same actors. Instead, it is instantiated to particular settings (i.e. one ESF summit) and then this knowledge becomes important for another set of actors at a different place (i.e. the next ESF summit). These characteristics of nomadic knowledge, we argue, make externalization and codification of this type of knowledge difficult. As a result, transition of nomadic knowledge requires well defined procedures and supporting technologies.

Table 1 clarifies the differences between traditional and nomadic knowledge sharing practices. The collective of actors involved in knowledge sharing within and between traditional organizations, remain typically rather stable, even in case their work is mobile – i.e. is accomplished while the worker is moving [57]. In the case of nomadic work settings, the actors move to and accomplish work in different locations, as they set up temporary workplaces with the resources they mobilize, still the knowledge continuously stays with them [58], [59]. This is distinct from our case of 'nomadic knowledge' settings where neither the actors, nor the spatial setting of the knowledge enactment remain the same. This is the case of a new set of actors dealing with the organization of a moving event, whose particularities have already been defined in the past.

TABLE 1. Properties of knowledge sharing.

Organizational Settings	Spatial setting of knowledge enactment	Temporal structure of knowledge enactment	Collective of actors enacting knowledge
Traditional and networked organizations	Stable	Continuous	Stable
Mobile work settings	(Partly) Mobile	Continuous	Stable
Nomadic work settings	Changing	Continuous	Changing
Nomadic knowledge settings	Changing	Discontinuous	Changing

IV. CASE STUDY

In order to understand the dynamics of the nomadic knowledge sharing process, we opted for case study approach, in which a particular case of a phenomenon is explored in detail, for the development conceptual and theoretical constructs. For that, different sorts of data collection and data analysis methods are used, as for example, in-depth interviews, observations, focus groups, among others [60], [61].

A. SETTINGS

We selected the anti-globalization movement as an empirical case for our study. This movement was selected as a case not only due to its societal relevance but also because we believed that it would provide us with insights on the phenomenon we term as sharing of nomadic knowledge. The grounds for our belief lie on the fact that organizing a social forum is a complex task that requires considerable knowledge. In addition to that, changing the set of organizers means that the new set of actors need to acquire knowledge from older organizers. It is sensible to think that at least part of this knowledge would be transferable for the new initiative and would be invaluable to guarantee that right decisions are maintained and past mistakes are avoided. Notwithstanding the value concerning the organization of past events might have, due to its periodic occurrence organizers initially have limited interest. Nevertheless, as the forum date approaches urgency comes into play. Furthermore, traditional characteristics of volunteer work such as high turnover, limited organizational memory and lack of professional actors pose further challenge in knowledge sharing.

The movement selected for our case study deals with the problems caused by economic and political globalization [62]. It gained popularity after the 1999 Seattle WTO protests and combines diverse civil society networks, organizations and activists [50]. The World Social Forum (WSF) is a global gathering of community workers, trade unions, social movements, academics, and activists to discuss strategies for a more democratic society, which started in 2001 [17]. After the success of the WSF, different regional, national, and thematic social fora emerged, building upon their specific organizing processes. We investigated into the European Social Forum (ESF), which is a central event of civil society organizations and activists all across Europe. The social forum initiative is gaining popularity at the global level, but the ESF is getting weaker at the same time; ESF '08 attracted some 12,000 people whereas in 2010 the ESF event in Istanbul attracted mere 3,000 activists.

Organizing a social forum requires provision of logistics to activists for carrying out their activities which could be a seminar, workshop, thematic assembly, demonstration, protest march or any cultural activity. Initially the responsible organizing committee asks for activity proposals; ESF '08 attracted around 800 proposals whereas ESF '10 attracted nearly 300 proposals. Usually the next step in the organizing process is to reduce the number of activities according to available logistics. Other organizational tasks include finding donors to finance the forum, arranging logistical support (rooms, translation equipment, translators, interpreters, ICT infrastructure etc.), and large-scale mobilization to ensure maximum participation. To organize an event of such magnitude, extensive planning, management, and implementation activities are required. European Preparatory Assembly meetings (EPAs) are held 3-4 times a year, where any activists can join in and involve in the process. The mandate of these

TABLE 2. Difference in ESF '08 and ESF '10.

Characteristics	ESF '08	ESF '10
Member organizations of organizing committee	139	70
No of working groups	11	6
Mobilization efforts	2 dedicated working groups	Mostly individual initiatives
No. of proposals submitted	800	300
Babels presence	Yes	No
ALIS presence	Yes	No
Budget	600,000 Euros	100,000 Euros
Website developer in organizing team	Outsourced to a Greek developer	None
Presence of preceding organizers in EPA meetings	Active Presence	Inactive
Prior participation of organizers in ESF process	Low	Good
Number of interpreters	380	130
Information access/response to activists	Timely	Delayed
Number of participants	12,000	3,000
Number of participants in demonstration	15,000	5,000
Number of volunteers	350	30-40
Number of activities in final program	272	225
Program venues	Distributed	Central (2 places)
Merging process	Two phased (voluntary and managed	Only voluntary
Simultaneous interpretation during seminars	Mainly not working	Mainly not working
Documentation of seminar proceedings	No	No

gatherings is to chalk out ESF political process. However, the organizing of ESF is carried out by relevant organizing committee. ESF '08 was organized by the Nordic Organizing Committee (NOC) and in case of ESF '10 the relevant body was the Organizing Committee of Turkey (TOC).

There are some other relevant groups and collectives which are European networks, Babels, Webteam and ALIS. The European networks are self-constituted groups of activists and organizations in a specific thematic area. These thematic networks attract activists interested in a specialized theme with the intention of planning joint activities. Since these themes are related to ESF debates, the participants of these networks are also actively involved in shaping the program of a social forum. Usually, there is a meeting of these networks one day before the EPA meetings. Babels is a group of interpreters who volunteer with their translation services at the fora, whereas ALIS is a radio-based interpretation system developed by Greek activists. For the first time this system was used during the ESF '06 in Athens and after these Greek activists helped setting up the ALIS system in different ESF meetings (e.g., for ESF '08 as well). The Webteam is a group of volunteers interested in the ESF's ICT setup and they report to EPA, instead of a specific organizing committee. Nevertheless, there were remarkable differences with regard to this division of labor in the organizational processes in 2008 and 2010: During ESF '08 Babels and ALIS volunteers helped NOC (Nordic Organization Committee) to prepare and setup interpreting equipment. Due to some problems with the interpretation system at Malmo and other logistical problems with TOC, these two groups (Babels and ALIS) did not participate in the ESF '10. Similarly, the Webteam was active in the organizing process of ESF '08 but those volunteers did not show up in the organizing process of ESF '10, as shown in Table 2.

B. RESEARCH METHODS

The findings herein presented are part of a long-term field study of the European Social Forum process. The study started in January 2008 and lasted until October 2010. In this study different qualitative research methods are used for data collection: qualitative content analysis [63], participant observation, and interviewing. For the participant observation, we carried out seven field visits. Among them there was one field visit at the European Social Forum event held in Malmo, Sweden during September 17th till September 21st in 2008 and another at the European Social Forum held in Istanbul during 30th June until 4th July in 2010. Each of the other six field visits were carried out during the European Preparatory Assembly (EPA) meetings in Berlin (Germany), Athens (Greece), Vienna (Austria), Berlin (Germany), Istanbul (Turkey) and Paris (France) in February 2008, March 2009, June 2009, January 2010, May 2010 and October 2010 respectively. The field notes were taken during these visits to document the information.

A total of 31 activists were interviewed. Since not always face-to-face interviews were feasible, our interviews were a mix of telephonic and face-to-face interviews. The total time of the recorded content was approximately 16 hours of telephone interviews and four hours of face-to-face interviews. The interviewees were attached to ESF in different roles, i.e. participant, member of organizing committee or volunteer interested in ICT setup. In order to cover multi-cultural backgrounds, the interviewees were also geographically distributed, stemming from different countries and cultures. There were six interviewees from Greece, five from Italy, four each from France, Germany and Sweden, two each from Turkey and UK and one person each from Norway, Czech, Austria, and Hungry. The interviews were semi-structured and the focus of the questions was on knowledge sharing,

collaborative practices, technology implication, and problems in the organizing process. Due to language implications, another four activists offered to send the information by email questionnaires. In order to perform our analysis, records of the interviews were transcribed and the written material was coded. Rather than focusing on pre-conceived hypothesis, we wanted to ground our concepts in empirical data so the analysis was based on a Grounded Theory approach [64], not testing specific hypotheses but deducing assumptions from empirical observations instead. In order to understand the specific problems and issues, related data was clustered together to find patterns and to derive assumptions from these observations. Open coding was used on the transcribed data and respondent's statements were categorized in line with the Grounded Theory's concept of theoretical sampling [65].

This contribution has mainly emerged from a long term study [66]. In earlier publications, the involvement of technology in the organizing process was analyzed [53], [54] and the usage of a collaborative application [55] and mailing list usage [56] by this network of activists. Saeed *et al.* developed the concept of nomadic knowledge only on the basis of empirical evidences of the analysis of the knowledge sharing process from ESF event in Athens (2006) to the event in Malmo (2008) [12]. In this article we refer to an extended perspective in the analysis, stretching the observation time until the Istanbul event in 2010. This longer-term study allows for a deeper insight in knowledge sharing processes and practices, ''following'' the ''travelling'' nomadic knowledge from Greek to Sweden to Turkey (Please note that we did not analyze the ESF event in Athens 2006 itself, but we investigated about the sharing process from Athens to Malmo, starting from January 2008).

V. EMPIRICAL RESULTS
A. KNOWLEDGE SHARING FROM ATHENS TO MALMO ('06-'08)

In the absence of a structured knowledge sharing mechanism, NOC members had different perceptions about knowledge sharing from Athens to Malmo. The NOC members who were new to ESF process did not have enough contacts with previous TOC (Turkish Organization Committee) members to get important knowledge from previous ESF organizing experiences. However, NOC members able to connect with previous organizers were very positive about the knowledge they received. Nevertheless, information distribution was not uniform among them. NOC members regularly coming to EPA meetings had more contacts and more information as activists not coming to EPA meetings. The lack of documented knowledge also created mistrust among them at times [12].

During our field visits it was observed that although the participants at the EPA meetings always inquired about the preparation status from NOC activists, they never tried to get involved in knowledge sharing. Instead activists present at the EPA meetings were the ones to provide suggestions

and feedback in their individual capacity. Since EPA meetings mainly focused on political aspects rather than on organizing tasks, there was only a specific European level working group looking after the program building process. This European level presence of activists enabled knowledge sharing based on previous experiences of present activists.

B. ORGANIZATIONAL PROBLEMS IN THE MALMO FORUM ('08)

As we went on with our investigation, we were able to observe a variety of problems emerging during the organization of an even. In this section we focus on some important problems which occurred during the organization process of the Malmo event.

1) FINANCIAL DEFICIT

At the conclusion of ESF event, NOC financial board announced its bankruptcy due to a financial deficit of about 180,000 Euros [67]. Some respondents attributed that the number of ESF '06 attendees reported by previous organizers seemed unrealistic and expected revenues were based on those estimates contributing to this deficit [12].

2) FAILURE OF THE TRANSLATION SYSTEM

Lack of English language proficiency among ESF activists make language translation systems a necessity at ESF gatherings. ESF activists have developed their own interpreting system (ALIS), which worked efficiently at ESF 06, however, it was a failure at ESF '08. During our interviews, some members of the Greek organizing committee described that keeping in view the organization practices of NOC, they already had a feeling that there would be issues with the translation system.

3) SCATTERED VENUES

The event was held at many different locations in Malmo city, which resulted in difficulties for activists to attend the activities of their choice. ESF '06 organizers communicated to NOC that a similar problem had already occurred with the organization of the second ESF in Paris but unfortunately that was not sufficient to prevent the same mistake from happening.

4) PROBLEMS IN SETTING UP THE WEBSITE

One of the tools used by ESF forums organizers to keep a web presence and announce the plans and activities of the forthcoming forum is to maintain a website. For the ESF '08, a development company offered NOC to develop the forum's website for free. Conversely, the Greek organizers offered NOC the ESF '06 website, which they could appropriate and extend accordingly for ESF '08. ESF '06 website had been developed using PLONE content management system. Since the Swedish developers in the company had not the necessary skills to deal with the PLONE system, they decided starting developing a new website from the scratch. This website was used initially to post information about the event but

later on there were delays in extending the features necessary to support the organization of the event. Therefore, NOC decided to hire the Greek developer, who have worked on the development of ESF '06 website, to extend the Athens ESF website for the Malmo event. This changing of websites also resulted in some information loss about proposed activities. As a result, NOC members had to resubmit the missing data into the new website.

C. KNOWLEDGE SHARING FROM MALMO TO ISTANBUL ('08-'10)

After the ESF in Malmo, the next EPA meeting was held in Istanbul where members of NOC were present to make a balance of the Malmo forum. One Turkish activist described his hopes for this meeting with the following words:

> "At these meetings we will try to exchange information, as you know all the decisions in the ESF are taken by the EPA and there will be people from NOC and even before that Greek organizing committee so you will have the chance to exchange information."

However, our analysis shows that due to the discrete nature of the organizing practice, the knowledge sharing process can suffer from lacking awareness of the problem domain, a significant need for learning, and under-specified responsibilities within the newly constituted organizing team. Thus, when the new Turkish organizers really needed the information, NOC members were no longer attending EPA meetings. As a consequence, the Turks used their own experiences as participants in previous fora and had some discussions with members of the Greek Organizing Committee. One activist from the Turkish Organizing Committee described this as follows:

> "Actually we don't have much information about what happened in Malmo and also we don't get too much information about Malmo."

After the ESF '08, activists involved in NOC were not active in the ESF process anymore and these knowledge holders were not accessible anymore. This was described by one Turkish committee member with the following words:

> "There is no contact and also right now there are not many people from NOC around, they dissolve the committee (NOC), but we talked with the people from the Greek Social Forum and we have some experiences from Athens ESF etc."

One Norwegian activist described this situation as follows:

> "One of the reasons [for that], I think, is because when the ESF is moved to the next country then there is no good information between the old organizing committee and the new one and there should be because the ones who had the last ESF they know a lot about how do we have to do things, which mistakes did we do and how can we start with and everything which are worth transferring to the new organizing committee and they would spend less

time on making mistakes. But I don't know it is just like when a new ESF is about to happen then a new organization is committee is so focused upon their task that maybe they just forget."

Situated basic conditions (like availability of financial and human resources) change from one ESF organizing process to the next, what also makes learning from available knowledge difficult. The Turkish activists further said that they had less human and financial resources than Malmo; thus, even if they had access to former experiences it would have been difficult to replicate them, so they tried to organize the event in their own way. Unlike the Nordic organizers, the Turkish organizers were quite active in ESF processes already before hosting the event. As a result they had acquired some organizing knowledge by participating in the previous ESFs as participants. One Turkish activist described this in the following way:

> "I guess it is a bit easier if we had more information about the previous ESF but it is not a big problem I guess. We are doing it in our own way, we don't have too much budget, we don't have too much resources etc. like Malmo anyway."

Similarly to previous ESF European level joint group was formed to make the final program. In this joint working group, not only the activists from the host country are present but also the activists involved in organizing of previous fora, thus providing a means of active knowledge sharing. The Turkish organizer described his experience in as follows:

> "If there had been more European wide working groups on different organizational issues it would be more helpful, right now it is very good to have European working groups like program working group because [the involved activists] always know every issue [from the past] and we need someone to tell us if it is going right or wrong, not of course like a teacher but someone to guide us."

Learning from the organizing problems in previous ESF, EPA tried to get more involved in the organizing process of ESF '10 as well. This active involvement in EPA was observable at different instances. Firstly, to make sure that all the venues are in close proximity, instead of just agreeing to TOC that venues are very close, a group of EPA activists physically visited the place and presented their report in EPA. When these venues were changed the EPA planned to visit the new locations as well but they didn't have the time to do so. Similarly when the Turkish organizers set up a moderation committee consisting of five trade unions, huge discussions at the EPA meeting started. Several other European activists and organizations were concerned that this union dominated structure would cause problems for an open process. At another instance when initially Turkish organizers planned to use a commercial interpretation system, EPA activists told them that for budget reasons it would be better to try the ALIS system. So later it was decided that the ALIS system should be used. In order to avoid the

translation problems of ESF '08, in last EPA meeting before the Istanbul ESF event, the issue of translations was heavily discussed and the Turkish organizers promised to hand over the radio-based system in the forthcoming week. But the representative from Babels insisted that they had been hearing this ''next week'' for some months and they did not believe in such promises anymore. Finally, because they did not think that the interpreting system would be ready for the forum, the Babels members had decided not to participate in the preparation process and the ESF event 2010 any longer. This active involvement by EPA sometimes created confusions and tensions, too. This was evident when in an EPA meeting some members of the TOC did not know the role of the EPA and the structure of the EPA meetings. There were discussions on the format of the opening ceremony and TOC proposed at the EPA meeting that there should be two speakers: one Turkish and one Greek. During the EPA meeting there were many suggestions about this and one of the Turkish members announced that they would decide on this question in their next Turkish meeting. That was before some activists told them that the EPA meeting is the decision making body for the ESF planning, being a European process.

At the end, TOC was severely affected by lack of human resources to carry out organizing work. Though there were different working groups in NOC, mainly one person was taking care of all the organizing tasks. In the last month before the ESF event he was supported by eight additional people. This shortage of human resources also hampered TOC to acquire knowledge about problems in previous ESFs and to plan accordingly. As a result they only focused on basic mandatory organizing tasks which were manageable by those with limited human and financial resources rather than optimally carrying out these tasks. They had to perform the tasks without knowing about the history behind the development and just working with the sparse resources and information available. Some of the people in the organizing committee were new to the process and did not really know how the process works.

D. PROBLEMS IN ISTANBUL (ESF '10)

To analyze the effects of successful or lacking knowledge sharing, we were interested in the particular organizational problems that could be observed during the ESF '10 event in Istanbul.

1) FAILURE OF THE TRANSLATION SYSTEM

Due to the failures in the simultaneous interpretation support of ESF '08, translation support became an important organizational issue for ESF '10. In November 2008 at the EPA meeting in Istanbul the Turkish organizers stated that the ALIS system would not work in Istanbul due to missing available radio frequencies: there were, according to the organizers, too many radio stations around, which were likely to create interference. As a result, they were discussing to use a private translation system. The participants at the EPA meeting insisted that it would be better to use the cheap

ALIS system instead of any expensive private system. Thus, two people from the Greek ALIS team visited the venues, performed some technical tests and found out that the system would work fine. However, as already mentioned, TOC could not afford the required radio equipment in time. Therefore, the ALIS volunteers backed out of the preparation process.

Similarly, the Babels group refused to participate in the ESF '10 organization after a bad experience during the ESF '08 event in Malmo. Due to budget problems in Malmo many interpreters form Babels were not reimbursed their travel costs and this created a huge de-motivation among them, although they got the money from European activists after more than a year. Babels offered that TOC could use their mailing list and make personal calls to interpreters. This increased the task of TOC because they had to manage the interpreters as well which in previous fora were managed by Babels. This problem was mentioned by a Turkish activist in the following words:

> *"We are having the problem in organizing the translations because in previous situations we have a Babels network but now they are not going to take part because of the previous problems, that's one of the problems and also at the previous ESF's there was an ALIS working group in Greece so instead of using it they say that they wouldn't be able to help us on technical development of ALIS equipment."*

Thus, at last a Turkish company offered to develop translation equipment, but it was too late. Therefore, at the ESF event in Istanbul translation equipment was missing. Furthermore, there were only few interpreter volunteers available for support. Only some Turkish organizations managed to bring some private conference translation systems in their seminars. The Turkish activist described the problem as follows:

> *"There was translation equipment and actually it was working but the problem was the radios actually. So, we did not have enough radios to distribute to the people, we helped them to buy their own radios, we should have bought them beforehand and should have distributed them to the people actually."*

The interpretation was a failure again at ESF '10 but it was observed that due to active involvement of EPA there were many efforts to resolve this issue. Firstly, to avoid costs the usage of ALIS system was proposed. Secondly, to avoid the payment issues of Babels EPA played its part and made sure that interpreters were paid their dues before the ESF '10, but these steps proved insufficient.

2) PROBLEMS IN SETTING UP THE ICT INFRASTRUCTURE

In the first stance, the Turkish organizers wanted to (re-)use the website of ESF '08. One person from the Turkish committee had already been in contact with the responsible persons before the 2008 Malmo forum. For necessary adaptations of the website, the source code was transferred to the TOC members by the developers. It was decided that the website

should be hosted for free on a German University server and that the German research group on Information Systems and New media would help TOC with the adaptation of the website.

One main feature of this website is the electronic submission function for activity proposals. Specifically, after collecting all proposals, a "merging" function on the website should allow for sorting proposals according to similarity and merging different activities into one to reduce the number of activities, according to the available resources (rooms etc.). However, although the submission function was working, the merging function did not. Due to a complex and somewhat sloppy coding style of the original programmer and because of a missing technical documentation it was impossible to accomplish necessary adaptations of the merging function in time. The Turkish organizers therefore mostly sent all information to a European mailing list where nearly 900 people are registered, instead of publishing this important information on the official website. Some German activists noticed this lack of public information and took the data from the mailing list to publish it on their own blog and on a Facebook group. Later on, TOC set up another website to publish the program for the ESF event, instead of using the already existing official one. The responsible Turkish activist did not know the Plone content management system in which the official website was realized and he had problems in updating the website. He felt it easier to setup another Joomla-based website and he described that it was much easier to make changes on this website. One German activist commented on the situation by saying:

> "In Malmo, information access was much better than before Istanbul. I thought questions got answered and information on websites was published more quickly."

3) LIMITED PARTICIPANTS

The total number of people attending the Istanbul ESF event in 2010 was approximately 3,000, which is four times less than the Malmo event (though that Malmo event was already small in comparison to former ESF events). One organizational reason for the low participation might be found in lacking mobilization activities. Mobilization has been an important activity for former ESF events, but there were no large scale mobilization activities for the ESF '10 event in Turkey. Although it was many times reiterated during the EPA meetings, that the ESF program should be finalized well before the event, which should guarantee enough time for mobilization, the overall delay in the planning process impeded a timely completion. Therefore, the program was finalized just a week before the event itself. As a result not many mobilization efforts could be carried out in the different European countries before the event. Due to limited financial means, Eastern European participants are usually paid back their travel costs during ESF events and EPA meetings, too. TOC could not guarantee funding for travel costs

of Eastern European participants; as a result there was not major mobilization in eastern European countries. To support Turkish organizers, a group of European activists started to carry out European level mobilization and was able to find some funding as well to make travel arrangements for some eastern Europeans. TOC did not have any working group for mobilization and there was no communication with the mobilization groups which were previously engaged in the fora.

VI. DISCUSSION

Modern information technology tools can support the KM and sharing processes significantly [68]–[72]. CSCW literature highlights two main approaches for knowledge sharing: a purely repository-based approach and an approach focusing on communication, communities of practice and expertise [18]. Focusing on a repository-based approach, Bieber *et al.* presented a community knowledge evolution system [74]. KM researchers have extensively looked into KM processes of professionally well-organized sets of actors [75]. However, KM processes in fragile and discontinuous settings with changing sets of actors pose new challenges for KM researchers, which are in line with the findings of Rathi *et al.* [76] that conclude that knowledge sharing practices in nonprofit settings are unique. Our investigation has shown that the weak organizing process of ESF events often hampers the efficient organization of the fora. For instance, the number of participants at the ESF '10 was much less than ESF '08 which was itself a smaller one, compared to previous ESF events. The complexity of nomadic knowledge sharing affects the learning process of ESF organizers (esp. the Organizing Committee). The importance of this knowledge sharing has been acknowledged by the Turkish and Nordic members alike.

While analyzing the KM practices at ESF, a three category framework can be devised. According to this framework, the knowledge sharing processes could be classified into three categories which are: (i) active actor-based sharing, (ii) artifact-based sharing and (iii) passive actor-based sharing. *Active actor-based knowledge* sharing process requires willingness form knowledge seekers and knowledge holders and a possibility to get in contact to engage in the sharing process. In the case of ESF the active knowledge sharing could take place among new and old organizing committee members as well as the EPA members. In the case of *artifact-based knowledge sharing*, knowledge seekers and knowledge holders may not directly get in contact with each other but instead the (shared) artifacts could be a source of knowledge sharing. If the artifacts are prepared with the intention that they will be used as a tool for knowledge exchange later on, this could be termed as *knowledge push* and if the knowledge sharing perspective is not considered at the time of creation but still the artifacts are used actively by knowledge seekers for knowledge sharing, this phenomenon could be termed as *knowledge pool*. The third type of knowledge sharing neither requires artifact exchange nor information

TABLE 3. Knowledge sharing means at ESF '08.

	Active Actor-Based Sharing	Artifact-Based Sharing	Passive Actor-Based Sharing
Knowledge Push by EPA	Yes	–	–
Knowledge Push by Previous OC	Yes	–	–
Knowledge Pull by Current OC	Yes	Yes	–

TABLE 4. Knowledge sharing means at ESF '10.

	Active Actor-Based Sharing	Artifact-Based Sharing	Passive Actor-Based Sharing
Knowledge Push by EPA	Yes	–	–
Knowledge Push by Previous OC	–	–	–
Knowledge Pull by Current OC	–	Yes	Yes

exchange between knowledge seekers and knowledge holders, but instead actors acquire this knowledge-based on their previous participation in the process *passively*. If EPA and the organizing committees involve the members of the upcoming ESF organizing committee in the organizing activities, this could be termed as *knowledge push* and in other case, where active involvement of the upcoming organizing committee members is not facilitated actively but still these members participate in the ESF event to get some knowledge for future use, this could be termed as *knowledge pull*.

The members of the upcoming organizing committees usually visit EPA meetings regularly to report on their work and to get feedback about their preparations. This is an important means of knowledge sharing. If we look at the preparation phase of ESF '08, NOC was informed about the website of the Greek social forum and the developer who designed it, but they refused to use the services of this developer as they had a free of charge alternative. Later on, when this alternative did not work out, they contacted the first developer again and website was (re-)designed. Similarly the organizing members of previous ESF and the members of NOC had meetings for knowledge sharing and they also provided the artifacts to their successors from TOC. The preparation of ALIS equipment for interpretation and the advice regarding the urgency to gather volunteers for ESF are examples of knowledge push actively initiated by the old organizing committee. Similarly, NOC members were equally interested in getting more knowledge about the former organizing process. The initial contacts of NOC members with Greek organizers were intended to learn about the problems, issues and structure of the forum, what is an example of knowledge pull from NOC. Although the NOC never really got the detailed budget of the Athens forum and that created a huge financial deficit, they still benefited from a short report of Athens ESF. Similarly, it took a lot of effort to acquire an email address list of participants of previous ESFs, but still it helped and is an example of artifact-based knowledge sharing. If we look at the reasons for lacking passive actor-based knowledge sharing and artifact-based sharing, we found two particular hints: Since the majority of the NOC members were new to the ESF process, the means of getting passive knowledge were limited. Furthermore, the organizing activities were carried out in an ad hoc way which means that detailed artifacts are not prepared.

In the case of knowledge sharing during the organizing process of ESF '10, there was not much knowledge exchange among the NOC and the Turkish organizing committee. There was some knowledge sharing pushed by the EPA. After the bad experience in Malmo, the EPA attendees wanted to have venues in close proximity. In order to ensure this, they visited them while in Istanbul. But for some reason they were changed later. One TOC member described how he learned of expenditures by analyzing the budget document of Athens ESF, which highlights the knowledge sharing by artifacts. Furthermore, the successful sharing of the Malmo website for ESF '10 is another example of artifact-based knowledge sharing pulled by the Turkish organizing committee. The members of TOC have participated in Athens and Malmo ESF. Therefore, they knew about the basic structure of ESF events which highlights the passive actor-based learning.

The empirical data highlight that the knowledge sharing process from Athens to Malmo worked better than from Malmo to Istanbul. Analyzing the framing conditions for better or worse sharing processes of nomadic knowledge, the first factor affecting the learning was the presence of respective activists in EPA meetings even after the hosting of the ESF events. Members of the Greek Organizing Committee participated actively in EPA meetings even after the Athens forum 2004, whereas the members of the Nordic Organizing Committee did not show up at EPA meetings after the ESF event 2008. Therefore, the absence of common meetings reduced the chances of an active actor-based knowledge sharing in between NOC and TOC. Furthermore, in the case of ESF '08 the number of people carrying out the organizing activities was bigger than in case of the organizing committee in Turkey, where the majority of the work was carried out by only one individual. The size of the organizing team also affects the knowledge sharing process. As the organization of ESF is a quite complex task, too few people in an organizing team would not have the liberty to indulge in knowledge sharing and to carry out tasks in a well-planned manner. Instead they will focus on the task at hands which are more important for staging the ESF than conducting them in a professional way. TOC members were very few so they were primarily focused on the urgent tasks at hand and did not have enough resources to inquire previous knowledge that could have been provided by NOC. One member of TOC was in contact with

the developer of the ESF '08 website even before the start of the organizing process, so this early contact resulted in a successful sharing of knowledge concerning the website. The third important factor playing part in the sharing of nomadic knowledge is prior participation in previous ESF meetings and events. NOC members were new to the ESF process, thus they experienced more misunderstandings regarding information they had gathered from different sources. Knowledge sharing level between NOC and TOC members was even lower than the knowledge sharing level between Greeks and Nordic organizers. But contrary to NOC, members of TOC were participating in the ESF process for a long time so they were able to carry out tasks with some organizing deficiencies using their passive knowledge, gained through participation in previous fora.

Learning from earlier instances of the event may not always be possible in case local conditions differ. The Greeks based on the Paris experience - advised to hold the event at only one location, but finding a single big place was too difficult because of many factors such as availability, suitability, and costs. Accordingly, nomadic knowledge needs to be restructured and realigned. The Istanbul committee was able to learn from Malmo and they managed to find three nearby places to host the event. Another important lesson that TOC members learned from the Malmo process was not making expenses when they do not have money at hand. This was evident when they did not use the services of the Greek developer for setting up the event site even though they were late and badly required it. As a result one of the members of TOC started learning PLONE to customize the webpage but it was getting late. Our research group helped the TOC by providing the server to host the website and to support them with regard to adjustments and adaptations. Another example of learning by TOC was visible when they prepaid the travelling expenses of interpreter volunteers to reestablish trust which was lost before during the ESF '08 in Malmo, where they did not get reimbursement of their travel expenses (ticket costs). An example of failed learning for TOC was the setup of interpretation system. TOC wanted to use the ALIS interpretation equipment, the ALIS team asked them to buy radios earlier so the system could be properly evaluated long before the forum. Since TOC did not have money at that time, so they did not buy the required equipment which caused the ALIS people to back out of the organization process. Thus, TOC had to approach another Turkish organization who promised to develop a free radio-based system for them, though in the end it did not work.

But with regard to nomadic knowledge one deals with expertise that is highly embedded in the event's community of practice. In order to generalize and externalize this highly contextual and situated knowledge, the relevant context, environment and framing conditions of the upcoming ESF event have to be identified. Furthermore, since each new ESF event has a different ICT setup, these different infrastructures may most probably not be interoperable with each other. Thus, a mainly repository-based approach would not be appro-

priate for this kind of nomadic knowledge sharing. The disappearance of experts after the event makes the use of a repository-based approach difficult, without knowing the relevant background/context information. De-contextualized information may lead to misinterpretation and misunderstandings.

Similarly, purely communication-based approaches are hardly appropriate for nomadic knowledge sharing processes in such an environment. The major hurdles for communication-based expertise sharing are urgency of information needs, lacking availability of experts, and discontinuity of actors' engagement. As it has been observed, organizing committees only start working actively quite near to the upcoming ESF event, what leaves them short time for the organizing process. Furthermore, the urgency of many tasks at hands doesn't allow for time consuming communication procedures; many time critical decisions may be delayed. In order to be successful, purely communication-based strategies require active involvement of experts from former events who are not available.

Therefore, with regard to the described nomadic knowledge sharing scenarios we propose a combination of repository-based and communication-based strategies. In the current state every new ESF event sets up its own infrastructure of mailing lists, websites etc. Our case study brought evidence that there is a need for pooling up and integrating these distributed ICT resources. In the empirical work it was observed that the complexity of reinstituting existing websites for the new event is a major obstacle for sustainability. New organizers of former ESF events should be encouraged to setup ICT artifacts and infrastructures could be managed and re-used easily. As one strategy, end user development paradigm (EUD) could help in modifying and adapting ICT resources according to new contextual requirements [77]. In order to find the relevance of information the temporal aspect is quite important and a time stamp associated with information would be quite helpful. This could be carried out by developing a timeline visualization associated with information to categorize ''old'' and ''current'' information at a specific point in time.

Appropriate search engines and crawlers that operate on the 'old' information infrastructure should become an integral part of the new infrastructure. The 'old' information structures should be visualized, but the 'new' actors should be supported to create their own clusters of remembered pieces. Furthermore, a shared map of persons and their expertise supported by expert recommended technology may be an approach to make the complex network more transparent [78]–[80].

VII. CONCLUSION

The KM community has extensively contributed in improving knowledge sharing in different organizational settings [19], [73], [75], [81]. However, this has been mainly explored in stable organizations and to a limited extent in fluid organizations. Organizational dynamics in fluid settings

pose different challenges in fostering successful knowledge sharing, as technological solutions adopted in stable settings may not optimally work in fluid organizations. So there is a need for KM community to specifically investigate such fragile settings to understand hindrances in technologically supporting KM processes. In this article we have documented the KM hindrances in one of such fluid setting (ESF) that advocates for new technological features and requirements.

In previous work [12], empirical data has been analyzed regarding knowledge sharing among members of the Organization Committee of the ESF '06 Athens and ESF '08 Malmo, but the single instance was insufficient to understand the whole knowledge sharing process. Therefore, in this contribution we analyzed empirical data by comparing the knowledge sharing processes of ESF '06 – ESF '08 and ESF '08 – ESF '10. Secondly, whilst [12] mainly focused on nomadic knowledge definition, in this article we focus on framing conditions for sharing of such knowledge.

We presented a framework for knowledge sharing that describes three modes of knowledge sharing among ESF actors. Since the reenactment of knowledge is important for the sustainability of the process of setting up knowledge-based systems [82], technologically supporting this knowledge sharing process is important. We have already analyzed the available IT infrastructure of the ESF network using human centered evaluation methods [53]. Based on our analysis we propose to have combination of repository based and communication based technologies for supporting nomadic knowledge. It was observed that active actor-based knowledge sharing mechanisms are effective but they may not work at each instance. As the knowledge holders may have limited interest in remaining active in the ESF process once they become free of the organization of the event. This inactiveness will not provide a meeting point with the knowledge seekers to indulge in knowledge sharing. It was observed that artifact-based knowledge sharing could be helpful in this kind of environments but this needs to be supported by occasional communication, which needs to be supported by appropriate tools. The ad hoc process of organizing an ESF does not generate well defined and extended artifacts. The limited details in artifacts could create problems e.g. the lack of detailed budget of Athens ESF resulted in financial problems of Malmo ESF. The passive knowledge gained by participation in previous ESFs also helps the new organizing committee which was evident in the Turkish case and the lack of participation of Malmo organizers in previous ESF's led them to problems such as dealing with Hamas/Hezbollah.

This rich description of nomadic knowledge sharing practices marks challenges and opportunities that are not yet supported adequately by the existing set of technologies. This contribution provides insights about underlying challenges of technologically-mediated knowledge and expertise sharing processes in such fluid organizational settings. Our findings demonstrate that there is an acute need that the scientific community invest in the design of tailorable technological systems to support such complex processes.

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