

Collaborative Work and Its Relationship to Technologically-mediated Nomadicity

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Abstract This paper explores the relationship between technologically-mediated nomadicity (Tm-N) and issues of computer supported collaborative work. It presents findings from a four-year research project, which set out to investigate issues of Tm-N in academic settings. The findings herein presented support the argument that Tm-N can be seen as a dynamic and emergent process, which unfolds through the enactment of an ecology of practices and permeates both the work and non-work dimension of the lives of those whose jobs allow or demand some flexibility as to *when* and *where* work assignments should be carried out. The main contributions of the paper are: (i) a holistic and in-depth frame to understanding technologically-mediated nomadicity, which provides a more fine-grained and nuanced account of assorted aspects of the notion, and (ii) an analysis on how collaborative activities and computer-mediated remote interactions are related to the spectrum of motivational forces that people draw on to engage in nomadicity.

Introduction

Over the past number of years increasing attention has been paid to technologically-mediated nomadic work practices, also known as technologically-mediated nomadicity (Tm-N) (de Carvalho 2013; Ciolfi and de Carvalho 2014), and to associated issues such as the development of computer technologies to support such practices and the understanding of background activities encompassed in their accomplishment, also called *mobilisation work* (Perry and Brodie 2006).

Tm-N is herein defined as the process through which the workplace is mobilised to an assortment of locations with the help of computer technologies so that productive activities can be achieved from there. Studies like the ones presented by Kammass *et al.* (2003), Cousins and Robey (2005), Bean and Eisenberg (2006), Rossitto and Eklund (2007), Su and Mark (2008), among others, explore some Tm-N related issues and investigate the challenges faced by people whose jobs al-

low or demand them to achieve their productive activities at different sites, who are henceforth referred to in this paper as T-Nomads (Tech-Nomads).

Notwithstanding the growing interest in the matter, relatively few researchers have directly addressed it in-depth. This article presents findings that advance the understanding of such a phenomenon, by introducing a new perspective on Tm-N and discussing in detail how collaborative activities and computer-mediated remote interactions are related to what I refer to as the *spectrum of Tm-N*: a view on Tm-N that sees it not as a fixed configuration of factors, but as a dynamic and emergent process that blurs the distinctions between the work and non-work dimensions of T-Nomads' lives.

On the one hand, practices around collaborative work and social interaction are crucial issues in the study of Tm-N as some studies on the subject have demonstrated before (Perry *et al.* 2001; Chen and Nath 2005; Su and Mark 2008). On the other hand, understanding issues of Tm-N is relevant for the design of effective technological solutions or work environments for those involved with it (Rossitto and Eklundh 2007).

The findings herein presented are contextualised within a four-year research project, which investigated issues of Tm-N in academic settings (de Carvalho 2013). Based on empirical evidence from qualitative data collected through extensive ethnographically-informed fieldwork, this paper discusses how different factors compose a spectrum of *motivational forces* that lead people to engage in Tm-N and elaborates on how collaborative activities and computer-mediated remote interactions have an influential role in it. The paper is contextualized in the CSCW (Computer Supported Cooperative Work) tradition of reporting on in-depth qualitative studies about work practices, technology mediation and the articulation of social relationships within work settings (Schmidt and Bannon 2013).

The remainder of this paper is organised as follows: section 2 and 3 respectively introduce the context of the findings presented in the article and the methodology behind it. Section 4 elaborates on the new perspective on Tm-N introduced above. Section 5 goes on to present empirical data on the relationship between Tm-N and collaborative activities. Finally, section 6 presents some concluding remarks.

Research context

Despite the increasing number of studies on technologically-mediated nomadic practices, there remains a number of unexplored issues that are relevant for a better understanding of the matter (Ciolfi and de Carvalho 2014).

Research on Tm-N has primarily focused on: (i) how people mobilise their work (e.g. Perry and Brodie 2006); (ii) where they engage in it (e.g. Rossitto and Eklundh 2007); (iii) what impact can be imprinted upon organisations that decide to move towards a nomadic approach to business (i.e. having a nomadic workforce

whose members would be allowed to work from wherever they would like to)(e.g. Chen and Nath 2005) ; (iv) how technologies may support workers to get work done in and across several locations (e.g. Kleinrock 1996; Perry *et al.* 2001); and (v) what aspects should be considered for their design (e.g. Lamming *et al.* 2000).

However, these studies often take for granted how technologically-mediated nomadic practices are part of the T-Nomads' lives and neglect to some extent to explore the *reasons* why they engage in it. The impression gained from the literature on the matter is that there are some particular groups of people that are nomadic with the help of technologies, so it is possible to investigate how Tm-N unfolds by observing them. In order to clarify these issues, I have performed an in-depth ethnographic study of a group of T-Nomads: academics.

The focus of the study was on academics developing work in and across several locations as the flexibility of many of their work activities means that these can be performed at home, in the office, in cafés, restaurants, airports, airplanes, to name but a few locations. This *potential* "lack of a stable and fixed location" (Rossitto and Eklundh 2007, p.45) where work can be carried out characterises them as instances of T-Nomads.

The study featured sixteen academics of the University of Limerick, of which eight were men and eight were women. Participants fell into different age groups, ranging from the mid-thirties to late-fifties, working in different academic positions such as full/part time lecturers or research fellows and in different departments (Computing, Engineering, Sociology, Languages, Communication and Teaching & Learning). Thirteen of the participants were full time lecturers, two of them were part-time lecturers, and one of them was a research fellow with teaching and research responsibilities.

The *research questions* that led the investigation were to do with: 1) how Tm-N is evident in the work-life of academics; 2) in what ways computer technologies affect the process; and 3) what issues arise from engaging in it. As a study that aimed at contributing to human-centred computing fields of research, this investigation was particularly concerned with understanding people as they make use of computer technologies to deal with the nomadic aspect of their lives and with how technologies may impact the process.

In pursuing these research questions, it was possible to observe that Tm-N can be seen as a process that emerges from people's engagement with an *ecology of practices*, which involves a dialogue between human bodies and technologies as work gets accomplished in and across different sites, as will be further detailed in section 4.

Methodology

In order to answer the aforementioned research questions, an ethnographically-informed approach was adopted, i.e. direct observation and in-depth interviews

were used to collect data for the research. Using ethnographic approaches has become well-established within CSCW and HCI (Human-Computer Interaction) for the development of the necessary understanding to be applied to the design of new technologies (Crabtree *et al.* 2012).

Following the recommendations from the literature, (Perry *et al.* 2001; Su and Mark 2008; D'Andrea *et al.* 2011), multiple data collection instruments were used so that *triangulation* was possible.

At least one in-depth interview was conducted with each fieldwork participant. Most of them also participated in shadowing sessions, in which they were followed to the different locations where they accomplished work (e.g. office, lecture halls, university cafés, home, to name but a few). Some of the informants also participated in a follow-up interview that was performed some weeks after the shadowing session. A few participants also filled in and submitted diaries for analysis. The data collection process produced 16 in-depth interviews, 10 shadowing transcripts, 6 follow-up interviews and 6 diaries (see Table 1).

Participant ¹	Data Collection Activities			
	Interview	Shadowing ²	Follow-up Interview ³	Diary ⁴
Aoife	✓	½ working day	✓	-
Bridget	✓	-	-	-
Cathal	✓	-	-	-
Claus	✓	3 ½ working days	✓	1
Elaine	✓	½ working day	-	-
Gabriel	✓	-	-	-
James	✓	3 ½ working days	-	-
Jenny	✓	3 ½ working days	✓	1
Josh	✓	-	-	-
Kate	✓	½ working day	✓	1
Lucy	✓	3 working days	-	-
Maeve	✓	-	-	-
Marc	✓	-	-	-
Philip	✓	½ working day	✓	1
Shannon	✓	3 ½ working days	✓	2
Tom	✓	½ working day	-	-

Table 1. Overview of the data collection activities per participant

¹ Fictional names are used to ensure confidentiality

² Total number of working days for which each participant was shadowed

³ Follow-up interviews explored the themes emerging from the on-going data analysis being performed on the data collected during the first round of interviews, the shadowing sessions and the diaries. From the 16 participants, 6 agreed to participate in the last round of interviews.

⁴ Participants were asked to fill in a short diary recounting activities that they performed in a working day of their choice. A digital template, which could be printed out or filled in by using a word processor of choice, was provided to all participants. Five participants have returned their completed diaries; one of them filled in two diaries, reporting on two different working days.

The study was situated within the qualitative paradigm, which offers methods that allow researchers to grasp, hear, catch and comprehend the meanings of actions and occurrences that are essential for good understanding to be achieved (Creswell 2007).

Tm-N as a Dynamic and Emergent Process

As previously mentioned, past and current research commonly starts from the premise that Tm-N is exclusively associated with inherently nomadic work, i.e. types of work that require people to move to different locations in order to accomplish their productive tasks. However, as this study progressed, it became evident that whilst some types of work demand that people move to different locations in order to complete their work assignments (i.e. they are *inherently multilocated work*), certain types of work are not strictly nomadic but allow people to engage in work activities in different locations (i.e. they are *flexible work*). If people have/decide to move to different locations in order to work, Tm-N emerges from the way that they become involved in an ecology of practices to mobilise their workplace and accomplish work in and across multiple locations.

Therefore, the fieldwork findings suggest that Tm-N can be understood as a *dynamic* and *emergent* process associated with a *spectrum of motivational forces* and an *ecology of practices* for the *mobility of the workplace*⁵: *dynamic* because it is reconfigured according to the ways in which people think of their work-life, strategise about it and react in situations where tasks cannot be accomplished as planned; *emergent* because it has life cycles that reflect the accomplishment of work at assorted locations. As Wenger (1998) notes, elements of emergent structures “come together, they develop, they evolve, they disperse, according to timing, the logic, the rhythms, and the social energy” (p.96) of the process. Hence, as T-Nomads go on to engage in work in and across different locations, certain practices from their *Tm-N ecology* come together and once work is accomplished (or aborted) they fade away.

The notion of ecology has been used by several authors to refer to a mix of different elements that coexist and are related both to each other and to the context within which they exist (Star and Ruhleder 1994; Nardi and Whittaker 2002). For instance, Nardi and Whittaker (2002) define “information ecologies” as “local habitations of people, practices, technologies, and values” (p. 102).

The Tm-N ecology of practices was observed as people engaged in a series of different practices as they went on to accomplish work in multiple locations. Three elements were identified as key components of it: (1) *mobility*, which refers to the physical movements of people and resources; (2) *locations*, which refer to

⁵ To bring resources such as printouts, laptops, mobile phones and other sorts of resources that may be used for setting up temporary workplaces and carrying out work.

the geographical positions as well as the environment and infrastructure available in them; and (3) *workplace tokens*, which refer to all technological informational resources that are necessary to set up temporary workplaces at the locations to where T-Nomads move. The diagrammatic illustration in Fig. 1, inspired by Eisenberg's representation of the identity process (Gluesing 2008, p. 72), attempts to depict the process and its nuances. The model corresponds to the main outcome of this research and was forged through a dialogue between a review of the literature and the analysis of the empirical data collected through fieldwork.

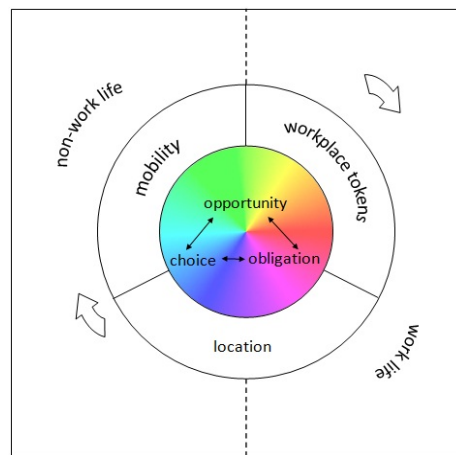


Fig.1. Tm-N as a dynamic and emergent process

In summary, this new perspective on Tm-N describes the process at three different levels of abstraction, with the higher levels including elements of the lower levels. At the core of the process (level 1), which refers to the inner circle of Fig. 1, there is a spectrum of motivational forces that lead people to engage in Tm-N; in the “shell” of it (level 2), which concerns the outer circle in Fig. 1, lie the components of the ecology of practices employed by T-Nomads as Tm-N unfolds; finally, outside the process there are the work and non-work life contexts of which Tm-N is part (level 3). The focus of this paper is on the relationship between the core element of this new perspective, i.e. the Tm-N spectrum of motivational forces, and collaborative activities.

When it comes to the literature, it is possible to observe a dichotomy in the arguments associated with the reasons why people engage in Tm-N. Frequently, research studies point out the need to meet face-to-face or to use specific resources fixed in a given location as the solely reasons why people would engage in Tm-N. Thus, T-Nomads would *have to* move to those locations and take with them resources that would afford the accomplishment of their work (Perry *et al.* 2001; Rossitto and Eklundh 2007; Su and Mark 2008). In turn, a few studies stress the element of choice, describing how computer technologies allow T-Nomads to en-

gage in work in locations where they can find comfort or in times that suit them best (Salazar 2001; Cousins and Robey 2005; Bean and Eisenberg 2006).

The fieldwork data collected in my study provided evidence that the factors leading to Tm-N are not as clear-cut as it was depicted in the literature. Choice and obligation emerged from the fieldwork data as two extremes of a spectrum of motivational forces that lead to Tm-N, as observable in the following vignette extracted from a diary provided by one of the fieldwork participants (Shannon, a full-time lecturer at the Department of Computer Science):

Between Monday, May 9 and Wednesday May 18, I was in [my home country], attending to family business. On Sunday, May 15, I had more time for catching up with work [...] I chose to do work on that day. [...] I sat down in front of my laptop [...] and went through my UL email. There were a few emails I had seen before, but didn't have time to answer. One was from a secondary school student interested in our [undergraduate] programme. As I didn't know the answer to the question he was asking, I searched the Handbook of Academic Regulations that I downloaded from the UL website for that purpose. The answer was still not obvious, so I checked if my colleague Lucy was online on Skype and dared to bother her on a Sunday morning with a work question. Fortunately, she had the answer, so I was able to write the reply and send it. [...] Then, I was contacted via Yahoo Messenger by Luna [...] about a paper we were working on for [an Irish] conference. She shared the draft paper with me via Google Docs and asked for my opinion on the introduction. I made a few comments, then we discussed my contribution and made a plan about future work. As the weather was lovely, I decided to copy the [master programme] reports that I had to read and mark to my Kindle device and go out to do this. I found a nice café by the canal that's crossing [the city], sat at a table and ordered an ice coffee before starting to read. Initially I took out my paper notebook to make comments on the papers, but very soon I decided I'll try out the commenting facility on the Kindle [...] at times I was distracted by conversations taking place around me. I overheard a discussion about Facebook and hoaxes that drew my attention and I tried to Google the issue on my Android phone, using my mobile Orange connection. I made a note on my notebook (I haven't installed Delicious on the Android yet) to bookmark the issue and maybe use it in a lecture for [one of the modules I teach]... (Shannon's Diary 01)

The vignette above illustrates both the emergent and dynamic aspects of Tm-N. In regard to the former, the vignette depicts Shannon's engagement in different work activities during a trip to her country of origin to take care of family business. It recounts how she got some work done as she found herself at different locations for various reasons, and as necessary resources became available. It describes several practices that are part of Shannon's Tm-N ecology of practices: access to remote resources, integration with other people, the assemblage and mobilisation of information and technological resources, physical movements to as-sorted locations and the configuration of temporary workplaces⁶. As for the dynamic aspect of Tm-N, the vignette shows reconfigurations taking place in the nomadic process as work was being carried out. Above all, the excerpt supports the argument that Tm-N is not a process just to do with moving to a specific location because particular resources that are needed for accomplishing a given task

⁶ Some of the aforementioned practices have already been observed in Su and Mark's (2008) study of T-Nomads.

will only be available there. Rather, Tm-N can be seen as a process that emerges from the way people deal with issues of their work and non-work lives: it sometimes happens to people as they are dealing with other aspects of their lives and it unfolds as they try to achieve a particular goal, resulting in gradual change of the context they are immersed into. Therefore, Tm-N is not to do with a matter of moving to be a nomad, but instead it is a process triggered by people's needs and motivations or by the opportunities they are presented with.

According to the fieldwork data, the motivational forces leading to Tm-N can be organised in a continuum that depicts a scale of freedom associated with the decision to move to a location to engage in a specific work task. This continuum ranges from choice and opportunity to obligation, as portrayed in Fig.2, which is organised according to the freedom involved in the decision to move to a specific location and accomplish work there (total freedom = choice; no decision⁷ = opportunity; no freedom = obligation)⁸.

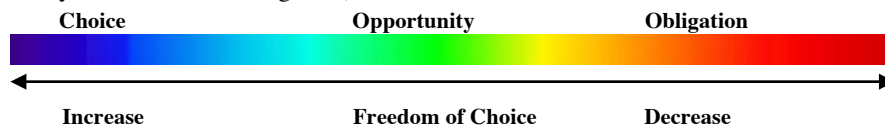


Fig. 2. Spectrum of nomadicity according to the *freedom of choice*

Empirical evidence as the one introduced above showed that, depending on the nature of the task, T-Nomads sometimes have total freedom to decide whether or not to go to a specific location and achieve work from there. They may choose to move to and work there because it offers them comfort, inspiration, subsistence (e.g. food), among other resources. Situations like these are located at the choice end of the continuum presented above.

In terms of opportunity, it was observed that sometimes T-Nomads engage in work at locations where they do not expect to do so because some kind of resource was conveniently made available. Therefore, *they do not choose to move to the location in question to work*; however, once they are at a certain location *they may choose to opportunistically engage in work there* because time was available or another resource came into play. For this reason, it is suggested here that the free-

⁷ 'no decision' means that the person did not decide to move to a location to engage in the work task in question. They move to the location due to some other reason, and then some resource becomes available and they opportunistically engage in the work task of reference.

⁸ It is worth pointing out that the spectrum of motivational forces in Fig. 1 looks different because it is organised according to the possibility of one motivation to lead to another one. For instance, if someone chooses to move to a location and work on a determined assignment, one may engage in another work task as other resources are conveniently made available on site (e.g. inspiration, time or other people); hence, choice led to opportunity. Similarly, someone may choose to go to a location (like when they go and visit a relative) and an unexpected situation forces them to move to other location and engage in work from there (e.g. a call from the boss demanding that some action is taken with regard to something); in this case, choice was followed by obligation.

dom of choice associated with opportunity lies between choice and obligation. For instance, when someone is having lunch in a restaurant and a collaborator meets them unexpectedly, they may end up discussing and achieving some work on their collaborative project because of a looming deadline. On the other hand, if time is not an issue, they may choose to talk about everything but work.

Finally, some situations force T-Nomads to move to specific locations and to engage in work there, i.e. they do not have a choice but move to these locations. This usually happens when they have to use specific resources that are found only at those locations, or because they are required to be at that location due to company policies. For instance, in the case of the academics taking part in my study, they are obliged to move to different lecture halls to deliver their lectures. Although they suggest that they can potentially⁹ lecture from anywhere (e.g. in a square, in a pub, etc.), they are required to move and work in the rooms assigned to them because it is part of the university's scheduling system. Situations like these are placed at the opposite end of the spectrum of motivational forces that I identified in this paper.

To conclude, the new perspective on Tm-N herein detailed describe a holistic and in-depth frame to understand technologically-mediated nomadicity, in that it considers underlying motivations for T-Nomads to mobilise their workplace to and accomplish work in different locations as well as multiple configurations of the practices and of technological mediation that may occur as the process unfolds. Furthermore, it addresses the blurring of work and non-work dimensions of life, whose relevance has been acknowledged within CSCW field of research, but so far has not been sufficiently explored (Ciolfi 2013). This holistic account is of special relevance to CSCW field of research, which is concerned with issues spanning over the use of computer technologies in context to support the accomplishment of work and to foster collaboration among different groups of people (Schmidt and Bannon 2013).

The Tm-N Spectrum and Issues of Collaborative Work

Collaborative activities have an influential role in Tm-N in that they may force people to move to different locations in order to meet collaborators and accomplish some work together, or they may provide opportunities from which Tm-N can emerge (e.g. when one unexpectedly meets a collaborator in a restaurant and accomplishes some work at that time and location). Therefore, it can be argued that collaborative work is intrinsically related to the *opportunity* and *obligation* regions of the Tm-N spectrum previously presented.

⁹ They cannot do so when lecturing involves specific resources (particular equipment, for example) found only in some places

This section elaborates particularly on to what extent collaborative activities may influence people to move to different locations in order to meet face-to-face and how computer-mediated remote interactions can act both as an enabler and a disabler to Tm-N.

In terms of understanding the relationship between collaborative work and the *obligation* region of the Tm-N spectrum, paying attention to the reasons and/or motivations for face-to-face interactions is of essential relevance. Face-to-face interactions are, according to several authors, fundamentally important for the success of some types of collaborative work (Olson and Olson 2000; Bradner and Mark 2002; Nardi and Whittaker 2002; Olson *et al.* 2002). Researchers such as Olson and Olson (2000) even present co-located interactions as something that will never be replaced or undermined, arguing that these types of interactions are crucial, especially at the beginning of collaborative efforts, for the establishment of the trust and common ground necessary for collaboration to succeed. Taking this into account, it is acceptable to think that collaborators would always have to move to a common place where they would engage in work and, therefore, Tm-N would be even more noticeable.

However, there is a portion of researchers who argue for the importance of mediated remote interactions for some types of collaborative work (e.g. Hollan and Stornetta 1992; Nardi and Whittaker 2002). With regard to collaborative work performed by academics, the findings of this research point towards the direction of the argument defended by the latter group of researchers. Participants often associated co-located interactions with the social aspect of work and with the possibility of a more pleasant interaction, rather than a necessity for successfully accomplishing collaborative work, as emphasised by Tom, a full-time research fellow from the Department of Computer Science:

[Face-to-face interactions] are not essential. It's possible now with all the computer communication and, and, shared workspace facilities that we have to effectively work collaboratively without any face-to-face meetings. So, to me it's important for the social aspect. It's more fun or it can be. (Tom, Interview)

Furthermore, when it comes to productivity, participants frequently acknowledged that they could¹⁰ achieve very positive results when they work over remote

¹⁰ It is worth pointing out that productivity is not necessarily directly (or exclusively) related to remote interactions. The data analysis conducted for this research identified that both the distant and the co-located *modalities of collaboration* can effectively support productivity. Participants have pointed out that face-to-face interactions are inherently richer in terms of meaning, thus allowing the involved parts to reach a common understanding of and an agreement on underlying issues faster. Therefore, participants considered *immediacy* as one of the motivations for choosing face-to-face interactions when possible. On the other hand, participants recursively acknowledged that, when it comes to some modes of remote communication, e.g. email, on-line material can be easily shared and discussions can be easily recorded for future reference. In their views, such things favour productivity especially in the case of formal collaborative exchanges, which suggests that achieving productivity through a particular modality of collaboration is also related to the *nature of work*. Hence, one should keep in mind that issues of productivity are multifaceted and involves variables like type of collaboration, mode of interaction, nature of work, etc.

interactions, as Claus, a full time lecturer at the Department of Computer Science, states below:

I think for research I have great results working on papers with people over the email only. When it's research work you can do that [...] With my supervisor here we had one of the best papers that we published was done completely on the email because he was in Australia, I was here. So after that he was shocked, 'we actually did this best paper when I wasn't in Ireland!' (laughs)(Claus, Interview)

It could be argued that the successful episode reported by Claus is associated with the fact that the activity in question is a loosely coupled activity developed by two people who had already a well-established trust relationship, shared high common ground and were ready to collaborate and to use collaboration technologies; these are three aspects that Olson and Olson (2000) and Olson *et al.* (2002) claim as essential for remote collaborative work to have a chance to succeed.

Nonetheless, in contrast with the argument by Olson and Olson (2000), who defend that co-located activities are the best way to achieve trust and common ground, the fieldwork data suggest that remote interactions are being increasingly used to do so. This becomes particularly noticeable when Kate, a full-time lecturer at the School of Languages, Literature, Culture and Communication, recounts how she started a collaborative project with people from a non-European country. She explains that the non-European group first contacted her research group by email and asked if they would be interested in collaborating in an international initiative. Later that year, after they had already agreed and started collaborating, they met at a conference "just to confirm" their relationship. For her, the fact that they do not meet face-to-face regularly is irrelevant:

It's really irrelevant that we have only met maybe twice. We met in 2006 and we met again maybe in 2008 face-to-face, but it feels like we meet all the time because we have video conferences and things like that. It's only when I say it now, it doesn't feel like we've only met face-to-face twice because we're regularly in contact by email, video conferences, chat on the forums and so on. (Kate, Interview)

Aoife, a part-time lecturer in the Department of Sociology, explains that the way the first contact is established does not matter for a successful collaborative experience. For her, building trust and common ground depends much more on the person who is making the contact and the past achievements of that person, which in the academic world can be easily verified on the Internet nowadays:

[...] it would depend on who the person was and what university they were coming from and what they were proposing. It would depend. The same criteria that if you met someone face-to-face I think would still apply, it doesn't really matter how someone approaches you necessarily if the rest of them is bona fide. It doesn't really matter if someone sends you an email or phones you, or if somebody approaches you at a conference or if somebody sends you a message. It depends really on what they're offering and who they are. (Aoife, Interview)

In Kate's experience, the constant contact via information and communication technologies even blurs the distinction between the physical and the remote. She mentions how they got so used to each other due to the constant contact via com-

puter so that it seems that they meet personally more often than they do. This blurring of the distinctions between in-person and remote was noted by several other fieldwork participants as well. This is an relevant finding in that it suggests that trust and common ground can effectively be established over remote interaction, and show how collaboration may succeed even between people who have never met before, echoing findings by Nardi and Whittaker (2002), who discusses how a mix of face-to-face and remote interactions might be particularly relevant and sometimes even more suitable to collaborative work than the single use of face-to-face interactions, as some authors would argue¹¹.

This is a relevant finding because there are times when travelling to engage in face-to-face interactions is not feasible, as widely acknowledged in the literature (even in studies that cherish face-to-face interactions). One of the main constraints that the fieldwork informants indicated for face-to-face interactions was high costs both in terms of monetary and of time resources. Other reasons that participants indicated as motivations to opt for computer-mediated remote interactions were: increased facility for keeping track of discussions conducted via information and communication technologies; the avoidance of unpleasant collaborators¹²; and finally, preference¹³.

Reflecting on the possibilities for remote interactions and the motivations that would lead people to become involved in them is relevant because remote interactions can potentially lead to a more stationary work style, meaning that Tm-N would be less common. As Makimoto and Manners (1997) emphatically put it, computer technologies can afford the creation of both the “*ultimate nomad*” (p.17), i.e. someone who is forever on the move, working in all different sorts of locations, and the “*ultimate ‘couch potato’*” (ibid), which refers to workers who would never leave the living-room sofa and, making use of assorted computer technologies, would accomplish all their productive activities from there.

However, as discussed throughout section 4, the findings of this research suggest that there are several other aspects driving Tm-N, which would lead people to keep engaging in it. Moreover, whilst remote interactions may limit Tm-N, they

¹¹ That sheds some light on Olson and Olson’s (2000) questioning whether trust can be built over remote mediated interactions.

¹² Participants pointed out that, as a matter of fact, sometimes collaborators may not be the most sociable people that one has to deal with: they may be important collaborators, share the same ideas, add important expertise to the group, but they “*might not be the most enjoyable people*”, in Tom’s words.

¹³ Some participants expressed that personal preference plays an important role in choosing between face-to-face and remote interactions. One particular participant expressed that, if she could, she would use mostly emails for communication: “... *not that I can’t talk*”, she says, “*I can talk forever, I just feel more comfortable in communicating that way and I feel I can think about what I have to say and I don’t speak as fast and I’ve just better control maybe over my communication*” (Kate, Interview). In addition to deeper reflection, participants also appraised the support that email gives to asynchronous interaction: it facilitates collaboration between partners in different time zones, allows writing to be stopped and resumed as needed, etc.

may favour it as well, as is explained by Philip, a full-time lecturer at the Department of Electronic & Computer Engineering:

In terms of the distance learning I engage more and more now for example, in the last year or two, with Moodle and so as a consequence that nomadic lifestyle or that nomad dimension to my work has been reduced because of the access to virtual learning tools, or virtual learning resources. Yes. By the same token I now can grade efforts from my [...] students in a café. (Philip, Interview)

Therefore, considering the improvements of computer technologies allowing people to engage in the most varied types of remote interactions in many different locations (in the past it would have been more difficult to engage in some types of remote interactions such as video conferences, which required expensive equipment available in specific rooms) and the different motivations people may have to move to different locations, there is actually a possibility that people will be increasingly nomadic.

Claus says that people like to have a rhythm in life and because of that they tend to engage in Tm-N. Staying in a single location may be very disruptive to life, according to him, so people will keep moving:

You want to have some everyday routine. Work from home can be very, very, very boring life, can be very boring and lonely life. It sounds like an attractive idea: 'oh I can stay at home and work from home', but it actually disrupts the daily routine, the rhythm of life, some sort of rhythm that, [when] you wake up, you [want] go to work. (Claus, Interview)

In reality, the participants' views resonate with the views of different authors (e.g. Makimoto and Manners 1997; Meerwarth *et al.* 2008). However, notwithstanding the benefits of remote mediated interactions, it is worth pointing out that face-to-face interactions are undoubtedly relevant to certain types of collaborative work, as widely explored in the literature and already noted in this paper. This is not disputed here. In fact, the fieldwork participants constantly mentioned varied attributes of face-to-face interactions, which would motivate them to opt for them when they have the possibility.

The data suggested that there is an increasing acceptance of collaboration started via remote interaction. However, participants drawn the attention to the fact that social media have empowered people in such a way that they have become "*complex social islands*" in the virtual space that sometimes do not correspond to the "*physical island*" they are on the real world, as some research on self-presentation in the online world has already suggested (Manago *et al.* 2008). Some participants acknowledged that, although people may keep convincing profiles on the web, meeting face-to-face might help to identify whether something is not right. Therefore, if people do not feel totally secure about investing in collaborative activities that they are about to start with people that they have never met before, they can decide to meet in-person so trust can be built and goals can be set.

These findings shed light towards how collaborative work may influence people to move to specific locations in order to accomplish work, therefore intensifying the Tm-N process in the lives of those whose jobs allow them some flexibility

in terms of where and when to engage in work. It also shows how remote mediated interactions can enable at the same time that they can disable Tm-N: they make it easy to T-Nomads to get connected to collaborators from wherever they are, thus creating opportunities for them to be working from several different locations at the same time that it allows them to stay put in a single location and work always from there.

Final Remarks

This paper advances the understanding of the notion of technologically-mediated nomadic practices by presenting empirical evidence supporting the argument that Tm-N can be seen as a dynamic and emergent process that is not to do exclusively with inherently nomadic work, but instead, to the way that people whose jobs involve or allow for flexible work arrangements approach the work and non-work dimensions of their lives.

As discussed in section 4, Tm-N is directly associated with a spectrum of motivational forces that might result in work being brought into the non-work dimension of life as T-Nomads go on to work at locations that used to be traditionally devoted to non-work activities (e.g. private homes, cafés, etc.), and conversely, how family and personal matters are brought into the work dimension of life as workers deal with those matters at locations that used to be traditionally dedicated to work.

The findings herein presented, on the other hand, suggest that there is a spectrum of motivational forces that leads people to mobilise work resources and accomplish work in different locations. According to them, this spectrum ranges from choice, going through opportunity to obligation, i.e. it respectively encompasses situations in which people, with many possible combinations of them: (1) may choose to move to a new location in order to work; (2) take the opportunity to engage in work in the location they are as some resources such as time, inspiration, Internet connection or other people become conveniently available; and (3) must move to new locations to work because the resources they need can only be found there or because the organisational policies require them to do so. This contrasts with the literature, which usually associates the reasons for people to engage in Tm-N either with choice or obligation. As discussed on section 4, literature on the matter suggests that the main reason for people to get involved in Tm-N is to meet face-to-face due to collaborative activities or to use specific resources (e.g. pieces of equipment) that are available only at a given location.

In addition to the presentation of a more nuanced account of technologically-mediated nomadicity, the paper elaborates on the influential role that collaborative activities plays in the Tm-N spectrum and discusses how remote interactions may enable and disable Tm-N at the same time. Whilst part of the findings presented in section 5 confirms that face-to-face interactions is one of the important sources of

motivations for people to move to assorted locations and accomplish work from there, hence intensifying the Tm-N process, another part of them shows that other reasons, e.g. costs, time availability, among others, may override the motivation for mobilising the workplace for a face-to-face meeting, especially due to technological developments that have made remote interactions more effective and acceptable. Nonetheless, although T-Nomads may decide not to move to meet face-to-face, they may choose to move to other places nearby due to other motivational factors and engage in computer-mediated remote collaborative work from there. In particular, the paper brings a significant contribution to the discussion about the appropriateness of remote interaction for establishing trust and common ground in collaborative projects that has been on for several years within the CSCW field of research. The findings herein presented supports the argument that common ground and trust can be effectively built over remote mediated interactions.

Acknowledgments The author would like to thank Dr. Luigina Ciolfi and Dr. Breda Gray for the valuable feedback on the draft versions of this paper and to acknowledge that this research was part of the “Nomadic Work/Life” project at the University of Limerick (Ireland). The project was funded by the Irish Social Science Platform (ISSP) via the Institute for the Study of Knowledge in Society (ISKS) of the University of Limerick, Ireland.

Reference

- Bean, C. J. and Eisenberg, E. M. (2006) “Employee Sensemaking in the Transition to Nomadic Work”, *Journal of Organizational Change Management*, 19(2), 210 - 222, DOI = <http://dx.doi.org/10.1108/09534810610648915>.
- Bradner, E. and Mark, G. (2002) “Why distance matters: effects on cooperation, persuasion and deception”, in *Proceedings of the 2002 ACM conference on Computer supported cooperative work*, New Orleans, Louisiana, USA, ACM, DOI = <http://dx.doi.org/10.1145/587078.587110>.
- Chen, L. and Nath, R. (2005) “Nomadic Culture: Cultural Support for Working Anytime, Anywhere”, *Information Systems Management*, 22(4), 56-64, DOI = <http://dx.doi.org/10.1201/1078.10580530/45520.22.4.20050901/90030.6>.
- Ciolfi, L. (2013) “Making Place for Work and Life”, in *ECSCW 2013 Workshop "CSCW at the Boundary of Work and Life"*, Paphos, Cyprus, 1-6.
- Ciolfi, L. and de Carvalho, A. F. P. (2014) “Work Practices, Nomadicity and the Mediational Role of Technology”, *Journal of Computer Supported Cooperative Work (CSCW)*, 23(2).
- Cousins, K. C. and Robey, D. (2005) “Human Agency in a Wireless World: Patterns of Technology Use in Nomadic Computing Environments”, *Information and Organization*, 15(2), 151-180, DOI = <http://dx.doi.org/10.1016/j.infoandorg.2005.02.008>.
- Crabtree, A., Rouncefield, M. and Tolmie, P. (2012) *Doing Design Ethnography*, London: Springer, 205 pp.
- Creswell, J. W. (2007) *Qualitative Inquiry & Research Design: Choosing Among Five Approaches*, 2nd ed., Thousand Oaks: SAGE, 395 pp.
- D'Andrea, A., Ciolfi, L. and Gray, B. (2011) “Methodological Challenges and Innovations in Mobilities Research”, *Mobilities*, 6(2), 149-160, DOI = <http://dx.doi.org/10.1080/17450101.2011.552769>.
- de Carvalho, A. F. P. (2013) *Technologically-mediated Nomadicity in Academic Settings: Tm-N as a Dynamic and Emergent Process*, PhD Thesis, University of Limerick, Limerick. 359 pp.

- Gluesing, J. C. (2008) "Identity in a Virtual World: The Coevolution of Technology, Work, and Lifecycle", in Meerwarth, T. L., Gluesing, J. C. and Jordan, B., eds., *Mobile Work, Mobile Lives: Cultural Accounts of Lived Experiences*, Malden, MA: Blackwell Publishing Inc., 70-88, DOI = <http://dx.doi.org/10.1111/j.1556-4797.2008.00020.x>.
- Hollan, J. and Stornetta, S. (1992) "Beyond being there", in *Proceedings of the SIGCHI conference on Human factors in computing systems*, Monterey, California, United States, ACM, DOI = <http://doi.acm.org/10.1145/142750.142769>.
- Kammas, S., Foley, S. and Rosenberg, D. (2003) "Interface or Interspace? Mediated Communication for Nomadic Knowledge Workers", in Jacko, J. and Stephanidis, C., eds., *Human-Computer Interaction: Theory and Practice, Part 2*, 1 ed., CRC Press, 98-102.
- Kleinrock, L. (1996) "Nomadicity: Anytime, Anywhere in a Disconnected World", *Mobile Networks and Applications*, 1(4), 351-357.
- Lamming, M., Eldridge, M., Flynn, M., Jones, C. and Pendlebury, D. (2000) "Satchel: Providing Access to Any Document, Any Time, Anywhere", *ACM Transactions on Computer-Human Interaction (TOCHI)*, 7(3), 322-352, DOI = <http://doi.acm.org/10.1145/355324.355326>.
- Makimoto, T. and Manners, D. (1997) *Digital Nomad*, New York, NY, USA: John Wiley & Sons, 256 pp.
- Manago, A. M., Graham, M. B., Greenfield, P. M. and Salimkhan, G. (2008) "Self-presentation and gender on MySpace", *Journal of Applied Developmental Psychology*, 29(6), 446-458.
- Meerwarth, T. L., Gluesing, J. C. and Jordan, B., eds. (2008) *Mobile Work, Mobile Lives: Cultural Accounts of Lived Experiences*, Malden, MA: Blackwell Publishing Inc., 158 pp.
- Nardi, B. A. and Whittaker, S. (2002) "The Place of Face-to-Face Communication in Distributed Work", in Hinds, P. J. and Kiesler, S., eds., *Distributed Work*, Cambridge (USA) and London: The MIT Press, 82-112.
- Olson, G. M. and Olson, J. S. (2000) "Distance matters", *Human-Computer Interaction*, 15(2), 139-178, DOI = http://dx.doi.org/10.1207/S15327051HCI1523_4.
- Olson, J. R., Teasley, S., Covi, L. and Olson, G. M. (2002) "The (Currently) Unique Advantages of Collocated Work", in Hinds, P. J. and Kiesler, S., eds., *Distributed Work*, Cambridge (USA) and London: The MIT Press, 113-136.
- Perry, M. and Brodie, J. (2006) "Virtually Connected, Practically Mobile", in Andriessen, J. H. E. and Vartiainen, M., eds., *Mobile Virtual Work: A New Paradigm?*, Berlin/Heidelberg: Springer, 97-128, DOI = http://dx.doi.org/10.1007/3-540-28365-X_2.
- Perry, M., O'Hara, K., Sellen, A., Brown, B. and Harper, R. (2001) "Dealing with Mobility: Understanding Access Anytime, Anywhere", *ACM Transactions on Computer-Human Interaction (TOCHI)*, 8(4), 323-347, DOI = <http://doi.acm.org/10.1145/504704.504707>.
- Rositto, C. and Eklundh, K. S. (2007) "Managing Work at Several Places: A Case of Project Work in a Nomadic Group of Students", in *Proceedings of the 14th European Conference on Cognitive Ergonomics*, London, UK, Aug 28-31, 2007, New York: ACM, 45-51, DOI = <http://doi.acm.org/10.1145/1362550.1362562>.
- Salazar, C. (2001) "Building Boundaries and Negotiating Work at Home", in *Proceedings of the 2001 International ACM SIGGROUP Conference on Supporting Group Work*, Boulder, Colorado, USA, New York: ACM Press, DOI = <http://dx.doi.org/10.1145/500286.500311>.
- Schmidt, K. and Bannon, L. (2013) "Constructing CSCW: the First Quarter Century", *Journal of Computer Supported Cooperative Work*, 22(4-6), 345-372.
- Star, S. L. and Ruhleder, K. (1994) "Steps towards an Ecology of Infrastructure: Complex Problems in Design and Access for Large-scale Collaborative Systems", in *Proceedings of the 1994 ACM Conference on Computer Supported Cooperative Work*, Chapel Hill, North Carolina, United States, New York, NY: ACM, 253-264, DOI = <http://dx.doi.org/10.1145/192844.193021>.
- Su, N. M. and Mark, G. (2008) "Designing for Nomadic Work", in *Proceedings of the 7th ACM Conference on Designing Interactive Systems*, Cape Town, South Africa, Feb 25-27, 2008, New York: ACM Press, 305-314, DOI = <http://doi.acm.org/10.1145/1394445.1394478>.
- Wenger, E. (1998) *Communities of Practice: Learning, Meaning, and Identity*, Cambridge: Cambridge University Press, 318 pp.