The Role of Technological Infrastructure in Nomadic Practices of a Social Activist Community

Aparecido Fabiano Pinatti de Carvalho *,
Saqib Saeed **,
Christian Reuter ^,
Volker Wulf *

* University of Siegen
Siegen, Germany
{fabiano.pinatti, volker.wulf}@uni-siegen.de

** Imam Abdulrahman Bin Faisal University
Dammam, Saudi Arabia
sbsaed@iauuod.edu.sa

^ Technische Universität Darmstadt
Darmstadt, Germany
christian.reuter@cs.tu-darmstadt.de

Abstract. Infrastructure is undoubtedly a key resource for people engaged in technologically-mediated nomadicity. Tech-Nomads rely on technological infrastructure components, such as Wi-Fi availability, to mobilise their workplaces and effectively accomplish their productive activities. In this paper, we introduce findings from an investigation focusing on how technological infrastructures are re-instantiated according to emerging demands. We focus particularly on the European Social Forum (ESF) (an activists' platform) and the problems faced by the members of this network in mobilising its infrastructure, stressing findings from the literature about the importance of making infrastructure visible for nomadic practices, which have not yet been sufficiently explored. We suggest that infrastructure (re-) design methods would be a relevant resource for Tech-Nomads engaged in activities such as the ones from ESF.

1 Introduction

Discussions on the relevance of infrastructure for people engaged in technologically-mediated nomadic practices, also known as Tech-Nomads (de Carvalho, 2014), have already been introduced in the literature. For instance, studies such as the ones by Humphry (2014), Liegl (2014), Rossitto et al. (2014) and de Carvalho et al. (2017) touch on important issues regarding infrastructure, as briefly discussed ahead in the related work. A deeper account of these issues is provided by Mark and Su (2010), who draw on Star and Ruhleder's (1996) notion of infrastructure to discuss how important is to make infrastructure visible for nomadic workers, contrasting with Weiser's views on the relevance of invisible infrastructure for effective ubiquitous computing (Weiser, 1991).

This paper elaborates on findings concerning the role of technological infrastructure for members of communities of social activists. We focus on European Social Forum (ESF) (an activists' platform), the characteristics of its human and technological infrastructures, and the challenges to maintain and instantiate such infrastructure as the community goes on to engage nomadic practices. In particular, we discuss the infrastructural challenges to make an ESF conference happen.

We highlight how infrastructure development is a key notion for nomadic cultures. In particular, we draw attention to the fact that infra-structure (re-) design methods can be a relevant resource for Tech-Nomads engaging in activities such as those reported in this paper.

2 Related Work

The making of nomadicity is directly related to the notion of place making, which is in turn intrinsically connected to issues of infrastructure (de Carvalho et al., 2011; Rossitto, 2009). Indeed, information technologies, artefacts and tools have become an important repertoire of modern 'work infrastructures', which comprise the full range of "devices, tools, technologies, standards, conventions, and protocols on which the individual worker or the collective rely to carry out the tasks and achieve the goals assigned" (Pipek and Wulf, 2009). These infrastructures are present globally and yet localised according to the needs of the work environments and work practices.

The relevance of infrastructure to nomadicity has been widely acknowledged in the literature. Humphry (2014), for instance, discusses the notion of officing and its articulation with the concepts of connecting, configuring and synchronizing as a set of infrastructure demands which can contribute significantly to further understand contemporary nomadic practices and the rise of new cultures of nomadicity. Liegl (2014) draws attention to the relevance of transportation

infrastructure for nomadic practices, going beyond the widely explored issue of the role of technological infrastructure in such practices. Rossitto et al. (2014) elaborate on the notion of constellation of technology, discussing how different technological infrastructures can impact upon collaboration among Tech-Nomads working from different locations. De Carvalho et al. (2017) discuss how technological infrastructure can influence people's motivations to engage in work in and across several locations. All these studies raise questions of infrastructure demands and do contribute to understand how it plays a role in nomadic practices, however, none of them goes deeper in discussing such impacts or what answers such demands would require. A notable exception is the work by Mark and Su (2010).

Mark and Su (2010) draw attention to the fact that Tech-Nomads are constantly in unknown environments, meaning that they do not actually know what such environments have to offer them in terms of infrastructure. The authors discuss how important is to make infrastructure visible to nomadic workers, so that they can actually find the relevant resources to accomplish their productive activities. The authors suggest developing local knowledge and sharing it within communities of practices for nomadic workers as a way to respond to infrastructure demands emerging from the engagement with nomadicity. However, the authors do not detail the characteristics of such infrastructures. We introduce these characteristics in this paper, based on findings from a study on nomadic practices in a community of social activists.

3 Infrastructure and Nomadic Practices of Social Activist Communities

Drawing on the findings from a *thematic analysis* (Braun and Clarke, 2012) carried out on ethnographic data and referring back to Star and Bowker's (2002) views on infrastructure, we describe the human and technological infrastructures concerning the activities of an activist network using a set of eight technological *and social* characteristics. These characteristics define a relation between technologies and their users/usages, which results ultimately in an 'infrastructure'. Our findings come mostly from the interviews and observations carried out during the organization of two ESF events dated from 2008 and 2010 – see Saeed et al. (2010) for details on the study.

The nomadic practices of the studied community are translated in the organization of their main event in different countries. ESF is a central event for European activists and organizations participating in anti-globalization social movements, held in different locations. This means that every time an event happens, the community must mobilise the event infrastructure to a new location (Saeed et al., 2011). Our findings suggest that this mobilisation is, in a way,

similar to the mobilisation of the workplace discussed by de Carvalho (2014), which is a defining criterion of technologically-mediated nomadicity.

3.1 Nomadic cultures and the seven characteristics of infrastructure

In summary, our findings suggest that technological infrastructure in communities of social activist can be described by the seven characteristics of infrastructure (Star and Ruhleder, 1996): *embeddedness, transparency, reach or scope, learned as part of membership, linked with conventions of practice, embodiment of standards/plugged in other infrastructures, building* on *installed base* and *visible on breakdown*. Most of these characteristics are discussed by Mark and Su (2010), although not in the same terms and definitely not in the necessary depth.

In terms of *embeddedness,* our findings suggest information exchange on collaborative websites, a component of the technological infrastructure, may lead to cooperative outcomes like planning for a joint activity, political campaigning etc. Regarding *transparency,* the findings suggest that infrastructure invisibly supports tasks without the need to be assembled or reinvented for each task. As for *reach or scope,* our findings support the idea that infrastructures have a spatial and/or temporal reach. Since the general tasks concerned with organizing ESF events remained the same, sometimes the same websites were reused, extended or re-developed with almost the same set of functionality. In terms of *learned as part of membership/taken-for-grantedness*, it became evident that activists working on the ESF would expect things like a website for each event where they could propose activities and find information about the event and would take for granted the work to bring this website alive. Concerning *linked with conventions of practice,* we have seen that infrastructures shape and are shaped by conventions of practice. In regard to *embodiment of standards/plugged in other infrastructures,* the findings show that several components of the ESF technological infrastructure includes other infrastructures, e.g. content management systems, databases, etc. In terms of *building on installed base,* we have seen how things like the Internet and the World Wide Web serve as construction sites for the technological infrastructure used by the participants. Finally, *visible on breakdown* refers to the fact that the infrastructure usually becomes visible when it is not found or does not work.

By using such understanding as an analytical focus, it becomes easier to look at even very heterogeneous ecosystems of people, technologies and usages, and it also becomes easier to acknowledge activities that do not create usages directly but help to make usages possible.

3.2 Fostering social activist communities nomadic culture

The results of our analysis show that the work in activist networks is quite peculiar. Sometimes there is neither a continuous work practice nor are there resources that would support updating and managing the necessary technological infrastructures. Furthermore, due to the discrete nature of work practices, activist networks have high and low points of participation and only in times of high participation is the need for technological infrastructure primary. Maybe it is not needed further until the next high point of interest. The maintenance during these low points of interest is quite complex as not many people are taking care of this infrastructure. It may disappear and at the next point of high demand localization may require development of information infrastructure from scratch. Mark and Su (Mark and Su, 2010) argues that this non-routine element is characteristic of nomadicity.

As a result, such networks end up having to find out the available 'global' infrastructure of online tools and by negotiating their usages against the backdrop of an international setting. This infrastructure localisation process may be influenced by choices and preferences of developing volunteers instead of solely facilitating organizational needs. Similarly, repeated localisation efforts hamper the maturity of IT artefacts, because new (unstable) artefacts emerge frequently.

The maintenance of the human infrastructure, which is responsible to maintain the technological infrastructure is also quite challenging within such communities. The volunteers are backbone of social activist organisations and, as such, the human infrastructure is subject to constant changes. This requires a further layer of work to keep track of who is doing what for the community, as volunteers might be unable to engage in some of the community activities due to other commitments (Saeed et al., 2010). Again, this refers back to what Mark and Su (2010) calls the interplay of technical, physical and human infrastructure, in allusion to the embeddedness of the technical infrastructure within other social arrangements, which can affect nomadic practices. Supporting an effective interplay between these infrastructures would be key for fostering the development of stronger and, to some extent, more stable nomadic cultures.

4 Conclusion

In this paper, we tried to highlight the challenges in maintaining sustainable human and technological infrastructures for nomadic practices of social activist communities. We focused especially on problems faced in finding the relevant components of human and technological infrastructures of the community at the time of need. For that we introduced findings from a long-term study of the localisation of infrastructure in the European Social Forum (ESF) and articulate their connections with Susan Leigh Star's considerations of 'infrastructure' (Star

and Bowker, 2002; Star and Ruhleder, 1996) and Mark and Su's (2010) findings on the relevance of making infrastructure visible for people engaged in nomadic practices. We argue that, in order to foster and sustain nomadic cultures it is extremely relevant to pay attention to the issues of infrastructure. Furthermore, we argue that elaborating design methods to support the re-instantiation of such community infrastructures is a potential support for such nomadic culture. This is a potential new direction for research on technologically-mediated nomadicity and the nomadic cultures emerging from the popularisation of such practices, which we want to pursue.

5 Acknowledgements

We would like to thank all ESF informants who participated in our study, providing us with insightful information throughout our research.

6 References

Braun, V., and Clarke, V. (2012). Thematic Analysis. In D. Rindskopf and K. J. Sher (Eds.), *APA Handbook of Research Methods in Psychology* , vol. 2. Washington, DC, US: American Psychological Association, 57–71.

de Carvalho, A. F. P. (2014). Collaborative Work and Its Relationship to Technologically-Mediated Nomadicity. In *Proceedings of the 11th International Conference on the Design of Cooperative Systems (COOP '14)*. Nice (France): Springer International Publishing. doi:10.1007/978-3-319-06498-7_13

de Carvalho, A. F. P., Ciolfi, L., and Gray, B. (2011). The Making of Nomadic Work: Understanding the Mediational Role of ICTs. In M. M. Cruz-Cunha and F. Moreira (Eds.), *Handbook of Research on Mobility and Computing: Evolving Technologies and Ubiquitous Impacts*. Hershey, PA, USA: IGI Global, 381–396.

de Carvalho, A. F. P., Ciolfi, L., and Gray, B. (2017). Detailing a Spectrum of Motivational Forces Shaping Nomadic Practices. In *Proceedings of the 2017 ACM Conference on Computer-Supported Cooperative Work and Social Computing (CSCW 2017)*. New York, NY, USA: ACM, 962–977. doi:10.1145/2998181.2998313

Humphry, J. (2014). Officing: Mediating Time and the Professional Self in the Support of Nomadic Work. *Journal of Computer Supported Cooperative Work*, *23*(2), 185–204. doi:10.1007/s10606-013-9197-3

Liegl, M. (2014). Nomadicity and the Care of Place - On the Aesthetic and Affective Organization of Space in Freelance Creative Work. *Journal of Computer Supported Cooperative Work*, *23*(2), 163–183. doi:http://dx.doi.org/10.1007/s10606-014-9198-x

Mark, G., and Su, N. M. (2010). Making Infrastructure Visible for Nomadic Work. *Pervasive and Mobile Computing*. doi:http://dx.doi.org/10.1016/j.pmcj.2009.12.004

Pipek, V., and Wulf, V. (2009). Infrastructuring: Toward an Integrated Perspective on the Design and Use of Information Technology. *Journal of the Association for Information Systems (JAIS)*, *10*(5), 447–473.

Rossitto, C. (2009). *Managing Work at Several Places: Understanding Nomadic Practices in Student Groups*. *KTH Computer Science and Communication Department*. Stockholm University, Stockholm.

Rossitto, C., Bogdan, C., and Severinson-Eklundh, K. (2014). Understanding Constellations of Technologies in Use in a Collaborative Nomadic Setting. *Journal of Computer Supported Cooperative Work*, *23*(2), 137–161. doi:10.1007/s10606-013-9196-4

Saeed, S., Pipek, V., Rohde, M., and Wulf, V. (2010). Managing nomadic knowledge: a case study of the European social forum. In *Proceedings of the 28th International Conference on Human Factors in Computing Systems (CHI '10)*, 537–546. doi:10.1145/1753326.1753406

Saeed, S., Rohde, M., and Wulf, V. (2011). Analyzing Political Activists' Organization Practices: Findings from a Long Term Case Study of the European Social Forum. *Computer Supported Cooperative Work: The Journal of Collaborative Computing (JCSCW)*, *20*, 265–304. doi:10.1007/s10606-011-9144-0

Star, S. L., and Bowker, G. C. (2002). How to Infrastructure. In La Lievrouw and S. Livingstone (Eds.), *Handbook of new media*. London, Great Britain, 151–162.

Star, S. L., and Ruhleder, K. (1996). Steps toward an Ecology of Infrastructure : Design and Access for Large. *Information Systems Research*, *7*(1), 111–134.

Weiser, M. (1991). The computer for the 21st century. *Scientific American 265*, *3*(1991), 94–104.