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What remains of lockdown? Evolution of artifact ecologies in civil security organizations

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Abstract. Crisis situations often led to profound professional transformations in terms of resources and practices. For example, COVID-19 has had major impacts on work environments with measures such as mandatory mask wearing, social distancing and containment episodes. Civil protection organizations (firefighters, emergency operations, healthcare) have not returned to their pre-confinement set-up since the end of the pandemic: their collaborative tools and professional practices (i.e. regular introduction of teleworking, new inter-departmental communication tools), that is their artifact ecologies, have evolved. My research aims to develop a better characterization of these evolutions by documenting and analyzing the evolutions of the ecologies of hardware and software artifacts of civil protection organizations, while and after the lockdown period. To achieve this, my study uses a qualitative research strategy based on semi-directive interviews and practical observations of inter-service training sessions. The lessons learnt from this aim at providing guidance for dealing with changes during crisis situations in the context of long-term cooperating organizations and their associated ecologies of artifacts.

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1 Positioning and research questions

The end of the COVID-19 pandemic marked the abolition of exceptional practices, such as the wearing of compulsory health masks and social distancing. To adapt to these special conditions, civil security populations (i.e. firefighters, emergency operations, healthcare), who always worked in close cooperation in the front line of a crisis situation (Linot, 2017), saw their collaborative processes, tools and work practices evolve in a very short time (Thirion, 2013; Chaluleau *et al.*, 2022). These radical changes in the practice of the profession have left their mark in current times, such as widespread practice of telecommuting or the insertion of new means of communication. However, few studies have documented these changes, and none have focused specifically on the civil protection profession.

Civil security organizations had to cope with lockdown while having to keep on their activities, combining presence on multiple changing fields, in remote work as well as hybrid configurations (Cormi, 2023). Therefore, their tools and practices of collaboration (*i.e.* softwares, hardwares, practical devices, remote work, etc.) or "artifact ecologies" had to change too. More than changing one tool for another, it's often the entire ecology of artifacts, taken as the set of hardware and software tools that actors possess and mobilize in a practice (Lyle *et al.*, 2020), that has had to be reshaped to enable activities to continue.

My research question deals with building a comprehensive and relevant overview of the evolution of the ecologies of artifacts of civil security organizations and professionals. Among the research work in CSCW and HCI studying artifact ecologies, this research identifies different perspectives going from activity theories (see Bødker and Klokmoose, 2011; Bødker, Lyle and Saad-Sulonen, 2017) to distributed cognition (see Vasiliou, 2017; Blandford and Furniss, 2005, 2010). Drawing on related and comparative theoretical work (Halverson, 2002), as well as examples of application to my own artifact ecologies, I identified several categories and visual representations reflecting key dimensions of artifact ecologies and their evolution: spatial, temporal, personal, interpersonal and interactional.

2 Fieldwork and methodological approach

On the basis of these dimensions, my research approach aims at documenting the evolutions of the ecologies of hardware and software artifacts of civil protection organizations, while and after the lockdown period. I am especially interested in which collaborative tools have been abandoned since COVID, which are retained, and why. As a first stage, I have chosen to focus my research on one civil security organization, namely the SDIS 57 firefighters of Moselle. Containing more than

5.000 agents and located in Saint-Julien-lès-Metz, the SDIS 57 is responsible for fire prevention, protection, and control as well as protection and fight against other accidents, disasters and catastrophes to the assessment and prevention of technological or natural risks and to emergency assistance of more than a million residents, distributed over 6.000 km². On the basis of a qualitative inquiry, my study seeks to disentangle the sociotechnical practices that have been of use, and those that have since been discarded, during the lockdown as well as the motivations behind these evolutions from the perspectives of the involved actors. I draw on multiple qualitative research methods from interviews to observation taking inspiration from Linot (2017), who worked with the same population. I also chose my research methods based on many user cases drew from a particular cooperative tool or practice study (*i.e.* Jung, Stolterman, Ryan, Thompson Siegel, 2008) or a COVID-related phenomenon (*i.e.* Franco *et al.*, 2021). My ambition is to expand the analysis to the other organizations who work in cooperation with SDIS57 in order to complete the interdimensional description with multiple points of view.

3 Work to date and next steps

An initial interview was conducted with the head of research and development of the SDIS 57 of Moselle, which enabled us to officially validate our partnership around this thesis, as well as to negotiate our fieldwork approach based on semi-directive interviews with multiple stakeholders (*i.e.* firefighters from multiple SDIS, regional command centers, interdepartmental zone headquarters, health services, internal security forces, army, approved civil protection associations, air resources group, mine-clearing services, etc.) and a more exploratory observation of an inter-service exercise in anticipation of the 2024 Olympics. In parallel, I am considering the publication of a comparative theoretical article on the study of artifact ecologies for civil security. The next steps are to formalize and precise this methodology enough to create an interview guide and start interviewing the various actors previously mentioned while preparing the observation of inter-service practical training from the Field Command Center, whose capture will be reduced to handwritten notes. I will be able to start the data collection afterwards.

4 Expected contributions

The lessons learnt from this study will provide guidance for dealing with changes during crisis situations in the context of long-term cooperating organizations and their associated ecologies of artifacts. I will use knowledge from the practice of civil security organizations to design better collaborative working tools, and even help independent services to work with and between themselves in the future.

Finally, this work proposes a theoretical perspective for visual representation of the changing artifact ecologies, highlighting that it is necessary to mix approaches to obtain a more complete and accurate vision of a collective phenomenon.

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