CHAPTER 12

# Emerging Forms of Sociotechnical Organisation: The Case of the Fediverse

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## Introduction

Shattering events and scandals involving the widespread illegal exchange and exploitation of personal sensitive data by private companies and governments, such as Cambridge Analytica, have had the side effect of putting commercial social media under the scrutiny of a broader audience.

One of the goals of this chapter is to contribute to the rearticulation of the debate around technology and in particular to critically account for the trend of ascribing ethical attributes to it, creating a polarisation between 'good' and 'evil' technologies. Information and communication technologies (ICTs) that open digital spaces for social interactions are probably the most debated: is 'social media' 'good' or 'bad'? In these terms, a technology is mistaken for its specific implementations, in particular what is called commercial social media. Indeed, digital apparatuses are not all the same. Global-scale social media managed by big corporations is often taken as the norm, forming the fabric of the most diffused digital environments, shaping their social relations. These tools, like any other technological tool, are not neutral but embody specific values and inner beliefs, through their underlying architecture. Design and infrastructure

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elements contribute to a precise vision of the world, that (digital) tools help to achieve by enabling certain behaviours. On the one hand, commercial social media promotes competition, mutual conditioning between humans and digital tools, automatisms (Milani and García forthcoming). On the other, Free/Libre and Open-Source Software (FLOSS) for social media seems to open spaces to develop a mutualistic experience of digital relations. In this chapter we want to scrutinise this experience through three different dichotomic tensions, highlighting the relationship between the values and beliefs embedded in digital tools, and the psychosocial beings and relationships they foster: infrastructure (de-centralisation/distribution); design (mutual conditioning/mutual aid); and governance (heteronomy/autonomy).

Recently, academic literature has highlighted an emerging set of practices and projects that try to redefine the very 'nature' of ICTs, rethinking their infrastructure and scale, and the relations they embed between human-to-human and human-to-machine. These practices seem to have foreseen a relationship between humans and apparatuses not based on domination of the first over the latter, but on conviviality (Illich 1973). In this perspective, moving from the idea of appropriate technologies (Pearce 2012), ICTs are considered in their social, environmental, economic and political implications, and in their sustainability. Therefore, digital spaces become profoundly linked with local communities, delineating what has been called the 'organic internet' (Antoniadis 2018), an internet able to embody organic relationships and reciprocal organisms' needs, or 'commons infrastructure' (Baig et al. 2015).

In the wake of these accounts, the key focus of this chapter is the reappropriation of technology intended as a way to conceive 'appropriate' social and technical organisation, in opposition to the forms of exploitation and capture put in place by digital platforms. How do practices of technology reappropriation concur to prefigure new sociotechnical imaginaries (Jasanoff and Kim 2015), shaping not only digital spaces and infrastructures but also social interactions and relations? And in what ways can the reappropriation of social media engender forms of mutualism, not only among human beings (Kropotkin 1902), but even among human and technical beings?

To answer these questions, we will take into account the constitution and development of the 'Fediverse'. The Fediverse can be defined as a network of servers that share a common vocabulary and syntax (the open standard Activity Streams[1]) and a common way to interact between each other (a shared protocol, in this case the open standard Activity Pub,[2] meant for decentralised social networking). In short, the roots of the Fediverse lie in a common language, based on open standards, to exchange messages and to communicate: it is exactly because of this openness[3] – of the protocols to compose and dispatch messages – that servers are able to communicate between each other potentially without limits, besides the ones imposed by themselves. We could think of this as a more complex implementation, in terms of the types of messages and interactions possible between peers, of email messaging. Following these

considerations, we can conceive of the Fediverse as more than a social network: a network of networks.

Our case study focuses on a digital community within the Fediverse composed of four instances of Mastodon, a Free and Open-Source Software for microblogging, which allows accounts – user's profiles – to publish short texts and multimedia content, with a limited number of characters. Each installation of the software is a node, called 'instance', which is able to communicate with other nodes in a network. This structure supports the interactions between accounts of different instances. This digital community has been at the centre of our digital ethnographical work since 2018.

## Methodology

The research merges the perspective of the genealogy of technology (Milani and García 2017), revising the Foucauldian method of genealogical investigation based on the archive, with digital ethnography (Murthy 2008), intended as a way of studying digital technologies, and the interactions and spaces they produce, taking into account the interconnections between the practices they entail and the underlying technology on which they are based. This methodological perspective, especially when adopted in a multifarious, ever-changing environment, such as the digital social medium called the Fediverse, exposes the researcher to problems, concerns and anxieties we encountered during our research.

As has been widely discussed in the scholarship, digital ethnographies in-the-making involve a high degree of uncertainty and different levels of tension and concerns that, while being a characteristic of ethnographic fieldwork in general (Hammersley 1992; Fabian 1994), have in this context their own peculiarities (Markham and Baym 2009; Hine 2012). In this regard, following Beaulieu (2004), we can summarise epistemological and methodological anxieties in relation to three aspects. First, the accountability of the field: what is 'real' and how to assess it. Second, the presence of the researcher: her role and position, as well as issues concerning her distance, anonymity and identity. Third, the relation of the researcher to the field: how and in what ways the researcher participates with and influences social interactions in a digital space. Another important prompt from Beaulieu's account is related to the apparent opposition between two processes. On the one hand there is the traditional ethnographic practice of transcription, in which the researcher can evaluate and elaborate her experience of the field. On the other hand, available to the researcher is the mechanical capture of digital interactions across different types of media content, in a field – the Mastodon instances analysed – considered totally open to them. While the capture process presents hindrances *per se*, in our fieldwork on the Fediverse we had to predominately rely on transcription, for two reasons: first, to organise the stream of information

coming from 'direct messages', 'mentions' and messages that can be restricted to certain digital social groups (i.e., one's 'followers', or the accounts of the same 'instances'); and second, to cope with the ephemeral nature of this type of content, which can always be altered or deleted by its creator. Furthermore, Wilson and Peterson noted that ethnographic accounts of new media have to face the rapid obsolescence of their very object of study (2002, 451). Similarly, we could say that the same happens with methodological and epistemological concerns: the emerging of diverse technologies and, as a consequence, of new forms of social interaction, often overcome and render obsolete existing problems of methodology, while opening up new ones. To face the constantly emerging challenges of the field, we assumed the practice of practiced self-reflexivity (Markham and Baym 2009) throughout the research to periodically assess our ethical and methodological choices in terms of positioning, involvement and influence in our digital relations.

In order to address not only the acknowledged 'messiness' of digitally-mediated interactions (Postill and Pink 2012) but also the specific openness and porosity that are constitutive of the Fediverse, we found ourselves giving form in our practice to a multi-sited – or rather 'decentralised' – ethnography of digital spaces. Building on the ethnographic modes described by Marcus (1995), we aspired to 'follow the flows' using a perspective that extends the idea of 'following the thing' to take into account the digital dimension. Therefore, we focused on the marks and traces that characterise the social interactions in digital spaces, being these streams of information data, signs or messages that circulate along the networks.

Embracing this approach, our digital ethnography moved from the examination of a singular Mastodon instance in the Fediverse to other nodes of this network, following the traces of digital interactions. During the study, we considered a total of four instances, mostly in the Italian or English language, populated by more than ten thousand accounts, of which approximately one thousand were 'active'. We defined as 'active' an account that logs into the platform at least once per week, information that is publicly available from the instance's statistics. The social context in which Mastodon instances initially developed is the Italian anarchist and radical left social movements and the hacking/hacktivism scene, loosely identified here as the heterogeneous consortium of people gravitating around the annual Italian Hackmeeting event (Anderlini 2018; Maxigas 2012). Since May 2018, the authors have been deeply involved in the life of the instances as members and participants, not only in digital interactions and conversations but also in 'offline' events, such as public meetings and gatherings. During this time, we collected field notes and various exchanges with other accounts. In order to respect the anonymity of the people involved, the names of accounts and instances have been removed and messages have been partially rephrased: references to these will be made stating the year and the type of message (DM, peers-only, public).

### *Infrastructure: (De)Centralisation/Distribution*

Roughly speaking, three typologies of network infrastructure exist – *centralised*, *decentralised* and *distributed* – carrying different topologies and enhancing different types of relations. In real world examples, these ideal models are actually mixed, but it is useful to mention their respective characteristics.

Technical terminology almost always gives important clues regarding the social questions that are at stake. Centralised systems use client/server architecture where one or more client nodes are directly connected to a central server. The *client* is also called *slave*, while the *server* is also called *master*. This server-master/client-slave architecture is the most commonly used type of system in many organisations where clients-slaves send requests to company's servers-masters and receive a response. The psychosocial relationship implied by the centralised networks is of a commercial type (clients asking [to] servers) and implies a relationship of submission (slaves to masters). Clients-slaves cannot directly communicate: they need the mediation-permission of the servers-masters.

Centralised systems present a number of advantages both from the client-slave side (e.g. it has a terminal, a hardware directly connected and seamlessly integrated with the company) and the server-master side (e.g. the ease of managing and detaching individual nodes). But there are a number of disadvantages too, with significant implications for the kind of social relations they allow. In particular, vertical scaling on a global scale rapidly reveal its limits.

Decentralised systems address the weaknesses inherent in centralised systems through a replication mechanism, as shown in Figure 12.1. Vertical scaling is also possible in decentralised systems. Each server-master node can add resources (hardware, software) to increase its performance, leading to an overall improvement of the entire system. Performance bottlenecks are better addressed, because the entire load can be balanced. But at the same time complexity increases, bringing with it possible coordination problems. In

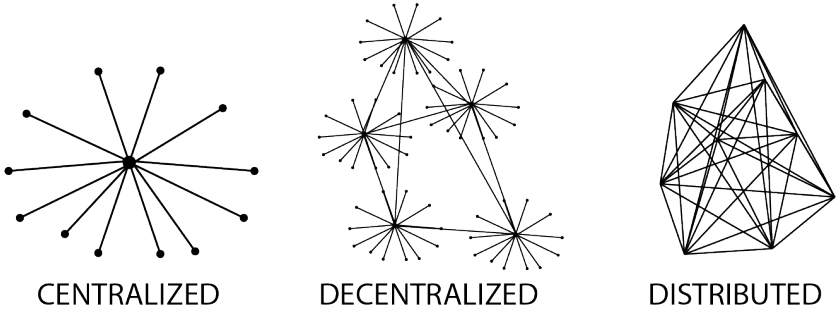


**Figure 12.1:** Different forms of infrastructure. Graphical representation by Jacopo Anderlini.

decentralised systems too, clients-slaves cannot directly get in touch without the server-master agreement and without supervision. From a social point of view, both centralised and decentralised systems are clearly inspired by a domination logic that is also evident from the terminology used. Decentralisation is a technique used to improve system reliability and does not necessarily imply distribution. In fact, commercial social media can rely on a decentralised system of machines (servers-masters), without having to decentralise decision-making or give more autonomy to their users.

A third model is the distributed system. Nodes are connected among them, which means that they create a graph where every single node is directly connected to every other node. In this model, in addition to vertical scaling, horizontal scaling is possible: each node can add resources, resulting in an improvement for the whole network. Typical applications of distributed systems are P2P (peer-to-peer) networks, where each node can function as a server. The fault tolerance is maximised – nodes are autonomous, the network will still be functional even if several nodes disappear. Coordination and consensus are however more expensive and time-consuming because every node has the same importance. The infrastructure of the Fediverse is based on this architectural model: each node of the network could potentially work by itself while still being able to provide basic functionalities. At the same time, the connection with other nodes to form a network allows for a better redistribution of resources and new possibilities of interaction for its users. A certain degree of automation is possible within such a network, for instance if a node asks for more connectivity, the target node(s) can be programmed to automatically provide it.

However, in practice the behaviour of each node is not predictable, each node acts in its own way, with a certain degree of freedom, juggling between the need to help other nodes and the actual availability of resources. Unlike centralised and decentralised systems, there is no single point of contact, no hierarchical leaders who decide for everyone or for significant portions of the network. Each node has its own autonomy, and the greater the node's autonomy in terms of decision-making, the greater the robustness of the network.

Drawing on Gilbert Simondon's perspective on 'technical alienation' (2014), we are convinced that from a technical point of view, and contrary to some widespread representations, automation corresponds to a rather low degree of technical perfection. In contrast, 'open machines' are characterised by their openness: they integrate their 'associated milieu' into their functioning, and can, therefore, tolerate greater interactions with human beings.

The analysis of the architectural dimension of network infrastructures demonstrates how this impacts the material fabric of psychosocial organisation. Power can be centralised, decentralised or distributed. But technology does not determine *per se* the output – distributed networks are not 'better' or 'freer' than centralised networks. They just present a number of design characteristics that open a field of possibilities for the agency of both humans and machines.

### *Design: Mutual Conditioning/Mutual Aid*

The design of digital interfaces is another element through which to understand the characteristics of communication in digital spaces. Interface design has become a 'battleground' that shapes human-to-human and human-to-machine digital interactions in a continuum that goes from dispossession to reappropriation. This continuum plots power relations. From one end, the interface can be put to work to increase behavioural automatism in order to 'free' the user from the freedom of choice: a relation of subjugation and gamified mutual conditioning between the human and the machine. At the other end, the interface can be designed to be convivial, self-organised, be able to open space for a relation between peers that takes into account the reciprocal specificities (humans and machines), and to develop interactions that are founded on appropriate technologies.

An example to better understand the role of the interface in shaping relations in digital spaces is the right to withdraw, to exit a digital space. The question to be asked is: can I close my account(s) on a specific platform? Can I erase all the information gathered by the platform? How much of this 'exit work' is difficult (technically, and in terms of time spent)? From a legal perspective, in 2016 the EU General Data Protection Regulation (GDPR) introduced, in Article 17, a 'right to erasure' – however in practice its application and enforcement seems to be limited to the jurisdiction of EU Member states. For example, an international company can erase personal data only from the EU version of its platform, keeping it available for other versions. However, legal loopholes are only the tip of the iceberg when assessing the problems faced by users who want to withdraw from digital platforms.

In the case of commercial social media, a common experience is the lack of clear information on how to delete personal data, to unsubscribe from the service or simply to log out. The path to achieve these goals usually requires many steps and it is 'hidden' in the interface *by design*. The overall goal pursued by this design is to discourage actions that would harm the interests of the companies running the platforms – especially any such interests that would impact on profits generated by selling data in the context of the data industry. In addition to this, many platforms require, through their interface, input from humans to validate or confirm their actions. This input often evokes emotional scenarios of loss (i.e. 'Do you want to lose all your messages and pictures?'), with a moral twist ('Are you sure you want to unsubscribe? Your friends will miss you!'). This kind of communication is a sort of 'emotional blackmail' based on what scholars have called FOMO – 'fear of missing out' (Przybylski et al. 2013). Indeed, the use of fearful discourses has been a constant in the promotion of closed, centralised advertising commercial ICTs (Sanvitale 2019). On the contrary, the entire digital experience with these platforms is designed to increase the time spent on the platform itself through mechanisms of gamified interactions and positive reinforcements: notifications that quantify social acceptance

and boost satisfaction (du Boulay 2019); an interface shaped to minimise the effort and therefore the mediation to perform the action; messages to validate and encourage the digital experience.

The microblogging software Mastodon sits on a different point in this continuum, between a complete mutual conditioning which nullifies the spaces of freedom and the provision of mutual aid aimed at strengthening expressions of freedom. The design of the interface is not fixed but is a negotiable element that every user can transform for herself in the digital space, mitigating (or not)

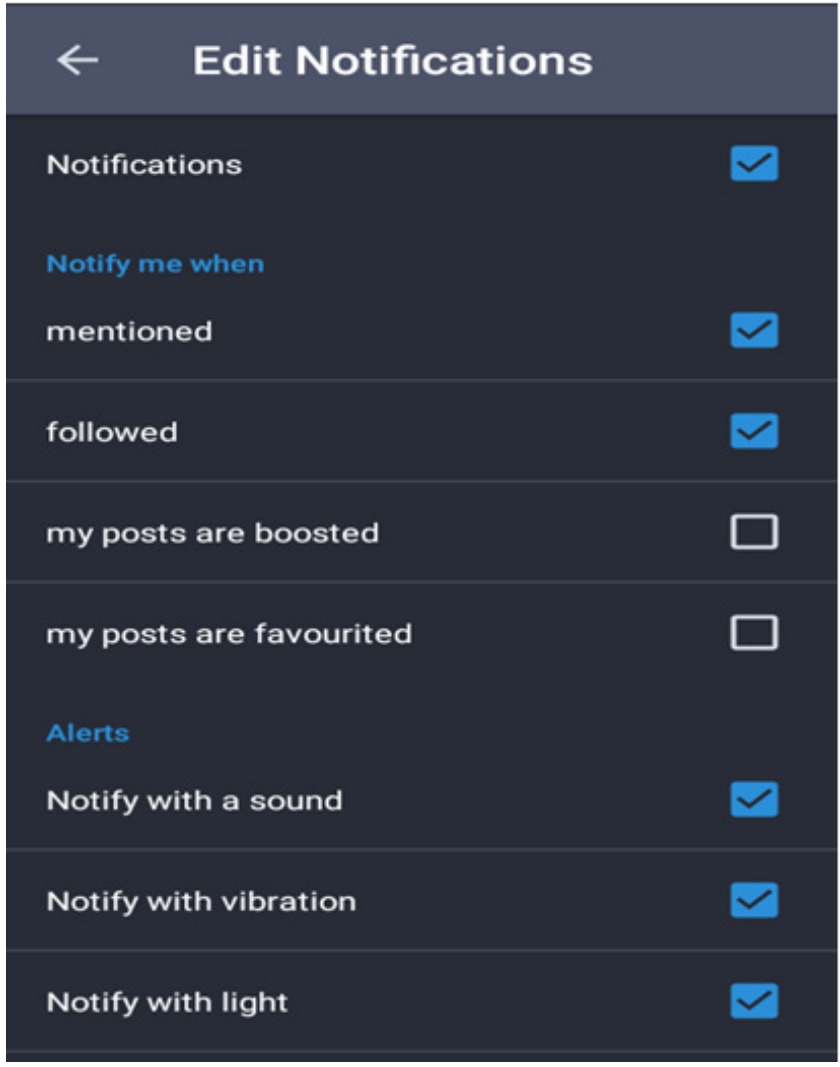


**Figure 12.2:** Mastodon's Notification Settings. Screenshot by the authors.

the elements that reproduce forms of gamification. Users can change elements of the interface for their accounts but also entire instances can set alternative interface defaults to shape their experience and interactions in the digital space. For example, an instance can decide to hide by default the number of 'followers/followed' or to fix a number for everyone.

The 'stars debate' in the Mastodon community highlights this. 'Stars' are used to *favour* a message written by another user. This action is one of the three that can be performed by accounts on a message, alongside the *retoot*, which disseminates the message amongst one's peers, and the *reply*, which allows users to engage directly in conversation with the author of the message. However, the use of the 'favour' action is ambiguous and has been publicly debated many times in the Mastodon community – at least five times, with long discussion threads on the topic lasting several days. While some users argue that there is no need for it – stating, 'I don't really use it. I don't need the star' (instance-only 2018), others refuse to use it, as a conscious reflection on the potential effects on fellow users, 'I don't want to use it. I don't want to trigger other people. I prefer to engage in a conversation, not to interrupt it with "medals"' (instance-only 2018). Many users, while mostly agreeing with the considerations on gamification, think that the star can be used to praise a message, to express acceptance with a limited risk of reproducing gamified dynamics: 'It is just a way to appreciate the contribution of someone. I am using it in this way, without abusing it' (instance-only 2019). Another common use of the star is less linked to a social dimension and consists in using the star as a bookmark for further reading or as a way to trace interesting conversations for oneself: 'I just star posts that I want to read later or that I want to find again in a while' (instance-only 2019). A widespread practice is the double use, as a bookmark and as a way to appreciate a message, mixing personal use and social acknowledgment.

Every time discussion moved to 'should the number of retoots and stars be displayed below a message by default?', the position varied. One proposal has been to refuse to show them to everyone in order to avoid what is perceived as a simplified interaction and to provide a different experience in comparison to commercial social media: 'I don't think we have to display this information at all. We don't need to quantify appreciation and show it to others' (instance-only 2018). Another has been the partial acceptance of it, limiting the display of information to the author only: 'I want the author of a post I appreciated to see that I liked it' (public 2018). One position that arose was to leave the decision to the individual, using the options, available to everyone, to change the software interface: 'Everyone should decide for herself if she wants to see stars and retoots or not' (public 2018). In general, despite the different positions on the topic, many members of the community showed an interest in actively experimenting with what they perceive as different or new practices in comparison with commercial social media: 'We test. We fail. We go back. We experiment. #gomastodon' (public 2019).

This approach to experimentation has been reflected not only through the individual use of interface elements in the digital space but also in the interactions and mediation of conflicts between different users, with common attempts to 'have a caring role in the conversation' and towards those involved. This diffused attitude towards self-reflection and experimentation in the use of social media, fostered by the possibility of altering the software interface, resulted in an increased self-awareness of users' digital experience. Many reported their experience with a different interface as a way to gain consciousness of digital space and their use of it, and also in comparison with their previous experience with other social media platforms: 'I have disabled notifications for stars for some time now and I can see I felt less urgency to look at notifications for "how many stars I got today" and I am more focused on the discussions. I also engage more in conversations with other people' (DM 2020). This aspect of empowerment of users is visible and also clearly arises in relation to the organisation and governance of the community.

### *Governance: Heteronomy/Autonomy*

Due to its tendency towards a decentralised or even distributed infrastructure, the Fediverse facilitates a more horizontal and distributed governance by redistributing power and thus creating the possibility for more open machines able to shape humans' personal and collective identities – and be transformed by human interactions (Milani 2010). The possibility to have multiple instances using different software, whilst being able to manage with whom to communicate and interact, has allowed the spread of clusters of nodes that are associated by common interests and views. The very nature of the federation is built on the autonomy of each node. In fact, in the Fediverse, the federative process can be instigated directly by users through their interactions with those of other instances. At the time of its creation, an instance A displays only a timeline with the messages of its users. Then, a user of instance A starts to follow the updates of a user of instance B. At this point, instances A and B start to share the public messages of their users between each other. Hence, it is through the activity of users, who interact with those of other instances, that the original instance increases its connections. Each instance shows a federated timeline gathering public messages coming from interconnected instances. This means that the technical possibility to federate with other nodes is also dependent upon users. A technical possibility that opens – but does not open automatically –implies *by design* that there is a space for a more horizontal governance of the instance, from an organisational, political and psychological point of view, and this impacts on the processes of subjectivation of 'users' in the context of digital platforms. They can negotiate their personal data exposure and sharing; users have the power to desert a given role if it does not suit their needs. Their choices, situated in a distributed network context, influence and are influenced

by the choices of others, thus helping to shape an appropriate socio-technical environment.

The ownership of the instance is in the hands of those who created and manage it, which can directly create clusters of federated instances – called 'relays' – or they can decide to *silence* or to *defederate* an instance. To silence implies that the messages coming from the excluded instance are not visible in the federated timeline for users of the first instance, while single users can still interact with those of the silenced instance. To defederate means that no interaction is possible, not even between individual users. These possibilities led to widespread initiatives and coalitions between instances to isolate other instances. Specifically, this happened with the 'alt-right', fascist, racist, antisemitic, sexist and transphobic network, 'Gab' (Katz 2018). On this occasion, a huge mobilisation of Fediverse users led to the almost total isolation of Gab and related instances, followed by an official statement by the Mastodon developer team (Mastodon 2019).

This episode highlights how the governance of the Fediverse is the result of actions and interactions between instances and their users and relies on the autonomy of each instance. It is reflected also in the internal management of each node, which can have a dedicated policy and specific rules for its users. In this case, the instances share a policy that excludes 'racist, sexist, fascist and discriminatory contents; nationalist propaganda or from institutional political parties; messages promoting commercial activities; offensive or denigratory messages, intended only to insult or threaten other users on a personal level; links to Facebook content; anything formulated without first thinking that the other users' sensitivities may differ from your own' (public policy 2018).

The founding collectives opened the governance of instances through meetings and a mailing list, to promote the self-organisation of the nodes. Through these tools, and constant conversations within instances, users and collectives experimented with a form of grassroot organisation of a digital space and the building of a variegated community. As previously mentioned, an important topic of discussion and decision-making has been regarding the interface itself: the boundaries of the digital space – an element that in commercial social media is taken for granted as a 'natural' aspect of the platform. Furthermore, the self-organising process has fostered a widespread crucial reflection on digital relations and the development of an ethics of care in order to create a more inclusive digital social space. This has been illustrated particularly in discussions around content moderation, and especially via the actions of administrators of instances to enforce the policy.

Content moderation is a practice broadly used in the regulation of digital spaces. It often reveals disparities between 'technical' and 'non-technical' users, producing relational dynamics that span between the admin 'patronising' and the user 'tipping off'. When instances were first set up, these dynamics had been partially reproduced: instead of engaging in interactions with users violating the policy, most users reported them to the admins. In fact, the admins are

the only ones with the technical power to silence an account or remove a message. The ability to silence single users from their personal timeline, however, is available to every account, and this has been a strategy adopted when admins were 'too slow' to take action. During the 2019 instances live meeting, following several digital conversations, the idea of a more direct and collective engagement was discussed: 'Everyone should feel responsible for making this instance a safer space' (instances live meeting 2019). On this occasion, dozens of participants agreed to speak out more in the digital space in order to preserve it. To reduce the damaging effects of conflictual interactions, the idea of a 'white flag' has been adopted: when a discussion escalates and becomes aggressive or hostile, a third user intervenes, not taking sides, but in order to temporarily suspend the exchange: 'Hey guys, this conversation is starting to become a fight :whiteflag:' (public 2020).

The governance of the Fediverse appears as a complex balance between 'admin-users' relationships and instance-to-instance interconnections. Machines, far from being mere neutral supporters of human action, are endowed with specific characteristics and a certain degree of freedom in their associated milieu – in a sense, they belong to evolving companion species (Haraway 2003), involved in processes of identity co-construction. While the technical solutions provided by the software's and protocols' architectures can foster a more autonomous governance of the network, its effective realisation is deeply dependent on users' agency and initiative. Indeed, the Fediverse allows for the direct participation of its users in its management at the level of the infrastructure, a condition that on commercial social media platforms is simply not possible.

## Conclusions

In this chapter, through the analysis of infrastructure, design and governance of social media we showed how practices of the reappropriation of technology can be mobilised to foster more autonomous forms of digital organisation encompassing both social and technical aspects.

The Fediverse appears as a *ligne de fuite* (line of flight), an always-changing way of building digital identities, individual and collective, that offers greater degrees of freedom compared to corporate social media. These possibilities of freedom, more open and horizontal, do not imply per se, in a deterministic way, that such communication exchanges and connections are open and horizontal by design, but provide – as technology does – spaces of possibility that can be inhabited or destructured through social relations in a stream of continuous feedback; spaces that still need to be addressed by media studies and STS scholarship. Further research, therefore, should focus on how elements of digital interfaces crucially affect the human perception and experience of digital space and at the same time are reflected in the development of technical tools and environments. In this regard, digital ethnography, as a research practice

building on the empathic connections that characterise ethnographic encounters, is a fundamental methodological approach we deem vital to investigate the multifarious socio-technical interactions of this still unexplored field.

In conclusion, in the context of broader reflections on the platformization of societies, our approach emphasises the necessity to rethink human-machine relationships in terms of psychosocial technical alienation. The development of 'open machines', with degrees of freedom and as part of distributed networks, is therefore a crucial phase of a process to favour less alienated activities of subjectivation and the co-construction of identity – a liberated algorithmic self – and, more generally, to imagine networks of appropriate technologies able to enact mutual aid relations to work against platform capitalism or desert it (Mezzadra 2016).

## Notes

[1] See: https://www.w3.org/TR/activitystreams-core.

[2] See: https://www.w3.org/TR/activitypub.

[3] For a critical historical account on the concept of open standards see Russell (2014).

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