Participatory Organizations as Infrastructures of Sustainability? The Case of Energy Cooperatives and Their Ways for Increasing Influence

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Cristina Besio, Nadine Arnold & Dzifa Ametowobla *

Abstract: *»Partizipative Organisationen als Infrastrukturen der Nachhaltigkeit? Energiegenossenschaften und ihre Möglichkeiten Einfluss zu gewinnen«.* This article sheds light on the organizational dimensions of infrastructures of sustainability. We employ the case of energy cooperatives, which co-shape the new decentralized infrastructure for the supply of renewable energy, to illustrate the relevance of the organizational dimension. From a perspective of the sociology of organizations, we argue in the first part of the article that energy cooperatives advance radical imaginaries and innovative practices of sustainability because they are "unconventional organizations" characterized by participatory structures. Their participatory makeup integrates different social groups and concerns in their decision-making processes and enables them to combine economic, social, and ecological aims. Given that participatory arrangements are often associated with small organizational size but need to be scalable, the second part of the article explores how energy cooperatives can extend their sustainable practices, thereby strengthening their role as infrastructures of sustainability. We identify organizational networks, digital platforms, and symbolic influence as organizational ways to expand the sustainability imaginaries of cooperatives.

Keywords: Sustainability, environmental decision-making, sustainable innovation, energy cooperatives, infrastructures.

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1. Introduction

In recent years sustainable development has become a common goal for societies and their organizations, yet there is still no consensus about how to achieve it in practice. Conceptually, most scholars and policymakers agree on the definition laid out in the seminal Brundtland report (World Commission on Environment and Development [WCED] 1987), which holds that sustainability is about acting in the present to prevent the destruction of future livelihoods. Additionally, sustainability is widely thought to convey social and environmental aspirations but offers no clear instructions on how to implement those goals. Indeed, the idea of sustainability does not come with a "road map." Very different projects and initiatives can fall under its heading. According to Homann (1996, 34-7), sustainability ultimately functions as a "regulative idea": While it might narrow the scope of action, it cannot prescribe concrete programs or objectives. As a consequence, the meaning of sustainability ultimately arises in local practice (Netzwerk Soziologie der Nachhaltigkeit [SONA] 2021). Adloff and Neckel (2019) therefore argue that different actors promote varying "imaginaries," or possible future trajectories, of sustainability.

Organizations substantially form the idea of sustainability, both discursively and in practice. Economic organizations in particular actively shape sustainability. They do so on a high-visibility level, for example, by participating in public debates or round tables or by providing consulting and advisory services to governments. Economic organizations also define what constitutes sustainability in less obvious ways, namely through their concrete everyday practices (e.g., manufacturing goods, selling services, trading resources). Moreover, in modern societies, economic organizations are often the actors that run complex and risky technologies. They enable the stable operation of technological devices and large-scale socio-technical systems, among them those that are the most relevant for responding to sustainability challenges and threats. The organizations running and granting access to such technologies are integral parts of infrastructures of sustainability and can be regarded as their organizational dimension. This article focuses on this organizational dimension of infrastructures of sustainability and argues that social imaginaries of sustainability are not only built into existing technical devices but also deeply depend on how organizations use and enable others to use available technology.

To analyze the organizational dimension of infrastructures for sustainability, the article discusses the case of German energy cooperatives. The structures and practices of energy cooperatives play an important role in the transformation of the energy sector from predominantly carbon-based to renewable sources. Cooperatives are capable of shaping profound

implementations of sustainability (Haigh and Hoffman 2014) and contributing to the construction of a novel decentralized infrastructure of energy supply centered on renewable energy sources. From the perspective of the sociology of organizations, we will argue that energy cooperatives can advance radical imaginaries and innovative practices of sustainability because they are "unconventional organizations," that is, their form deviates from the monolithic bureaucratic model of organizations (Brès, Raufflet, and Boghossian 2018; Hardy 1991). Instead, they are characterized by participatory structures. While such participatory structures are generally believed to be operable only within a small organizational size, we will identify ways that can help energy cooperatives to increase their influence and thereby strengthen the infrastructures of sustainability in the energy sector. Identifying these ways is important because increasing their scalability is crucial for energy cooperatives if they are to realize their transformative potential (e.g., Capellán-Pérez, Campos-Celador, and Terés-Zubiaga 2018).

The article is structured as follows: In Chapter 2, we introduce the case of German energy cooperatives as an element of the infrastructures of sustainability in the energy supply sector. We show how these organizations develop innovative and robust technical and organizational practices to produce and distribute sustainable energy, thereby shaping profound imaginaries of sustainability. In Chapter 3, we attempt to determine the reasons for the positive contribution of cooperatives to sustainability. Stressing the relevance of participation, we theoretically ground the idea that the orientation towards multiple stakeholders is a central element of profound implementations of sustainability. Chapter 4 identifies possibilities as to how energy cooperatives can increase their influence. In this chapter, we deal with the criticism that cooperatives in the energy sector have only a limited impact on energy transition because of their small sizes. We explain why cooperatives do not have to grow in size because they can scale their activities and impact by networking, for which they can utilize digital platforms or symbolic activities. In Chapter 5, we draw conclusions on how participatory structures can be crucial in relation to the organizational dimension of infrastructures of sustainability. Given the increased societal desire for a radical socio-ecological transformation and the political wish[1] for participative organizations such as cooperatives to gain more influence, this article is of both scientific and practical relevance.

[1] The European Commission for example states that social enterprises, to which group cooperatives belong, are prospering all over Europe thanks to policies and the use of the European Social Fund (Borzaga et al. 2020). The International Labour Organization (ILO) also promotes cooperatives, for example, through its Official Recommendation on the Promotion of Cooperatives, 2002 (No. 193), which identifies cooperatives as an instrument for improving living and working conditions and the provision of infrastructure and services worldwide.

2. Infrastructures of Sustainability and the Case of Energy Cooperatives in Germany

Infrastructures are pervasive basic premises that enable societies to operate and flourish but are often unobserved and unreflected (Bowker et al. 2010; Edwards 2003; Star and Ruhleder 1996). Important examples of infrastructures are transportation, information and communication systems, and energy supply, along with banking and finance systems and government services. While these infrastructures have a clear technical dimension, it is common sociological knowledge that infrastructures consist not only of technical devices but are constituted also by social elements and the interrelationship of social elements and technical devices (Angelo and Hentschel 2015; Edwards 2003). The social elements that constitute infrastructures can be complex and encompass among others social structures, stocks of knowledge, practices, cultural norms, and symbolic aspects. Often, formal organizations operate infrastructural technologies or enable their use in other ways, linking many of the relevant social elements closely to them and to one another and thus becoming a central part of the infrastructure. We focus on these organizations and conceptualize them as the "organizational dimension" of infrastructures, stressing that organizations are social entities that often develop, run, and disseminate technical devices (Bowker et al. 2010). By way of both verbal expressions and concrete actions, organizations can make the development, use, and diffusion of specific technologies either more likely or hinder them. This applies also to infrastructures of sustainability. To shed light on the organizational dimension of sustainability, we focus on an example of a very specific type of organization: energy cooperatives.

Cooperatives in general are considered to be "organizations of social innovation and sustainable development" (Elsen 2011, 85, own translation) and some scholars even argue that sustainability is part of the identity of cooperatives (Gonzalez 2018; Henrÿ 2017). The reason for this attribution lies in certain characteristics of cooperatives that distinguish them from other types of organizations. These characteristics include, on the one hand, a specific structure of ownership which leads to a pronounced membership orientation and, on the other hand, a tradition of democratic decision-making (Moldenhauer and Blome-Drees 2020). The members whose interests the cooperatives represent are typically workers, consumers, producers, and/or communities (cf. Ranson, Hinings, and Greenwood 1980; Cheney et al. 2014). These distinctions between member types are not always clear-cut: Members often both generate and consume products and/or services, which is why many cooperatives can be defined as "prosuming" organizations. Many of the energy

cooperatives are prosuming organizations (Klemisch and Boddenberg 2016), while others also produce and/or distribute energy to non-members.[2]

Energy cooperatives are organizations that run, develop, and stabilize decentralized renewable energy technologies. While different types of organizations (e.g., municipalities, public utilities, farms, or other small and medium enterprises) and other actors (e.g., projects or private persons) contribute to the supply of renewable energy in important respects, energy cooperatives play a special role for the energy transition in Germany. Despite having different business models, most of them share a pronounced social value orientation and place sustainability at the center of their activities (Amri-Henkel and Hofmeister 2018; Dorniok 2017; Yildiz et al. 2015). As we will describe in this section, the specific relevance of these cooperatives derives from the fact that they established promising models for an economical as well as eco-friendly energy supply at a relatively early stage of the energy transition.

In Germany, energy cooperatives have a long history; the first cooperatives were already established in the beginning of the 20th century. As so-called *Elektrizitätsgenossenschaften*, these organizations produced and distributed electricity for rural communities (Henkel 2018; Holstenkamp 2018; Klemisch 2014). These were very limited local initiatives that emerged in regions where large energy companies did not operate, for example because it was not profitable. This old, small-size form of energy cooperatives aimed at fulfilling the needs of its members and at improving their living conditions. However, in the 2000s, a new type of energy cooperative entered the scene (Henkel 2018; Kahla et al. 2017; Yildiz et al. 2015). These modern forms of energy cooperatives connect the organizational form of a cooperative with the ecological ideals propagated by the environmental movement (e.g., conserving resources, saving energy). In contrast to their predecessors, they did not arise as a response to an insufficient energy supply in specific regions but as a reaction to the lack of a supply of sustainable energy (Klemisch 2014). Thus, the new energy cooperatives which originated in the environmental movement are deeply rooted in a social context which fosters sustainable practices. As social enterprises, they are part of the economic domain: They continuously produce and/or sell products, taking an economic risk in providing their services and remunerating their members (Blome-Drees et al. 2016; Defourny and Nyssens 2010; Moldenhauer and Blome-Drees 2020; Nyssens 2007). At the same time, their economic practices serve a larger socio-environmental goal.

[2] While many energy cooperatives are prosuming organizations, the model of user-owner identity is not applicable to all of them (Dorniok 2018; Henkel 2018; Holstenkamp 2012; Klagge and Schmole 2018; Yildiz et al. 2015). Some production cooperatives focus on generating energy to be sold to consumers including non-members, some concentrate on the distribution and operate local electricity grids or local district heating networks, others are trading cooperatives that buy and sell energy while even others offer financial, marketing, or consulting services (Yildiz et al. 2015).

Due to favorable institutional conditions (on which we elaborate below), the number of the new energy cooperatives in Germany has increased sharply since the 2000s, and in particular between 2006 and 2011 (Henkel 2018; Kahla et al. 2017). Guided by ecological values (Amri-Henkel and Hofmeister 2018; Dorniok 2017; Yildiz et al. 2015), German renewable energy cooperatives have developed and now operate innovative technical infrastructures. They are mainly engaged in solar power installation, a fairly simple technology that can be used flexibly depending on the available space. However, in recent years they have also begun to invest in wind power and biomass (Yildiz et al. 2015). Cooperatives are involved in decentralized socio-technical projects such as *Bürgerkraftwerke* (citizens' power plants), *Bioenergiedörfer* (bioenergy villages) and leasing models which use the roofs of schools, churches, small businesses, or municipal buildings to produce solar energy (Henkel 2018; Mautz, Byzio, and Rosenbaum 2008, 54ff.; Yildiz et al. 2015). They are also active in the distribution and marketing of renewable energy at the local and regional levels (Klagge and Schmole 2018). German energy cooperatives thus demonstrate a broad range of services in comparison with energy cooperatives in other European countries (Wierling et al. 2018). Due to their normative orientation, energy cooperatives acted as pioneers of technical and organizational models at a time when politics and society had not yet started to engage themselves with the issue of renewable energy (Bruns, Ohlhorst, and Wenzel 2011). They have thus acted as early adopters of new renewable energy technologies (Dorniok 2018, 221).

Most energy cooperatives are not only ecologically oriented and prone to use new technological devices but also deeply embedded in local communities (Dorniok 2017; Müller, Dorniok, and Flieger 2015; Punt et al. 2022; Radtke 2014; Yildiz et al. 2015). Their initiatives are therefore often able to increase the acceptance of decentralized technical projects (Henkel 2018; Ohlhorst 2018; Viardot 2013). Since cooperatives bring together consumers, producers, and distributors in local and/or regional contexts, they are important regional economic players (Moldenhauer and Blome-Drees 2020). While members of higher-income groups are overrepresented in their membership structures (Yildiz et al. 2015), cooperatives sometimes also facilitate the active involvement of lower-income groups in the process of energy transition, for instance, by allowing members to participate in community-scale projects through low minimum investments (Viardot 2013).

Energy cooperatives are considered to have high transformative potential for the sustainable energy transition (Amri-Henkel and Hofmeister 2018; Dorniok 2017, 2018; Moldenhauer and Blome-Drees 2020). While some researchers support this notion with statistical evidence (Wierling et al. 2018), others argue that the potential is due to the democratization of decision-making and steering processes within cooperatives (Klemisch and Boddenberg 2016). In this sense, Tarhan (2015), in her review of the literature on the role and

impact of energy cooperatives, summarizes that these organizations "contribute to the imperative transition towards a sustainable energy sector through nurturing a culture of conservation and increasing public acceptance of RE [renewable energy] projects" (116). Specifically, they create models of decentralized and empowering energy production and distribution and contribute to energy transition by co-creating new socio-material infrastructures (Niewöhner 2014) that call into question the conventional infrastructures of energy supply centered on fossil fuels and large energy companies. Through their economic activities and their public communication (e.g., websites, workshops, educational tours, exhibitions, public consultations), energy cooperatives also influence the perception of the general purpose of energy suppliers: Energy cooperatives demonstrate that there are suppliers that regard production and distribution not primarily as a means of generating profit but as activities that should guarantee equitable, decentralized, and autonomous supply (Müller, Dorniok, and Flieger 2015; Dorniok 2017; Viardot 2013). Hence, energy cooperatives make a significant contribution to shaping profound imaginaries of sustainability. With their alternative technologies and practices, they (co-)create energy supply infrastructures that support imaginaries of sustainability toward a radical societal transformation (Adloff and Neckel 2019). Rooted in a deep criticism of capitalism, the idea of societal transformation includes a transition to a post-growth economy and implies changes of technologies and patterns of action, as well as changes to values, norms, and institutional structures (Kollmorgen, Merkel, and Wagener 2015). A sustainable energy supply is a central pillar of such an extensive societal transformation, which many consider necessary in order to cope with the current economic, ecological, and political challenges and threats.

Whether or not and to what extent energy cooperatives can take on this transformative role and spark the desired effects depends crucially on the conditions of the institutional framework (Wierling et al. 2018; Tarhan 2015). In Germany, changes in legislation in the early 2000s led to a founding boom of energy cooperatives. Particularly relevant were the Renewable Energy Sources Act (EEG) and its amendments (Moldenhauer and Blome-Drees 2020; Ohlhorst 2018), which laid down the principle of guaranteed feed-in tariffs as well as a feed-in priority for renewable energy plants, and the amended version of the Cooperative Societies Act (GenG) 2006, which facilitated the founding of cooperatives and their financing (Blome-Drees et al. 2016, 85ff.; Henkel 2018, 2-11). These changes to the institutional framework provided important economic incentives that created highly favorable conditions for energy cooperatives. Since 2012 however, the number of new foundings has decreased, a fact that can also be attributed to changes in legislation (Henkel 2018; Moldenhauer and Blome-Drees 2020; Yildiz et al. 2015). Crucial were the revision of the EEG in 2012, which introduced a gradual reduction of the feed-in tariff for both photovoltaic and wind energy, along with the EEG revision in 2014,

which established the obligation for all new installations to market their electricity themselves. This revision set the course for a change from fixed electricity feed-in tariffs to tendering procedures (EEG revision 2017) and thereby put energy cooperatives in direct competition with bigger enterprises, thereby threatening them radically. As a consequence, the number of newly founded energy cooperatives is now stagnating (Moldenhauer and Blome-Drees 2020; Wierling et al. 2018).

In absolute numbers, the energy produced by cooperatives is marginal. The German Federal Office for Energy Cooperatives currently counts 847 energy cooperatives with a total of 220,000 members. These account for only a 3.5 percent of the generated renewable electricity (Deutscher Genossenschafts- und Raiffeisenverband [DGRV] 2021). To achieve a broad impact for society, cooperatives need to scale up their services and activities (e.g., Capellán-Pérez, Campos-Celador, and Terés-Zubiaga 2018). Currently, their importance at the infrastructural level is not of a quantitative nature but consists of their ability to run and stabilize sustainable models of energy supply.

3. Being Unconventional or Why Cooperatives are Able to Implement Sustainability in a Profound Way

The capability of energy cooperatives to implement sustainability in a profound way and to act as an integral element of the infrastructures of sustainability can be explained by looking at their unconventional organizational form. Cooperatives can be conceptualized as unconventional organizations due to their specific ownership form, which results in a pronounced membership orientation, and due to their tradition of democratic decision-making. These characteristics establish a participatory makeup which is beneficial for robust interpretations of sustainability.

Various studies discuss the merits and pitfalls of unconventional organizations (e.g., Bakker 2010; Berkowitz and Dumez 2016; Brès, Raufflet, and Boghossian 2018). One common feature of these organizations is the diminished importance of the central pillars of conventional formal organizations, such as hierarchy, the standardization of work procedures, or the clear departmental structure. While both conventional and unconventional organizations have structural features, unconventional organizations are more likely to combine them with innovative emergent practices. Organizational practices are collective templates that help actors translate formal structures in concrete settings into interpretations and actions that align with organizational objectives. However, emergent practices should not be mistaken with a lack of formality. Formal structures which, in the sociology of organizations, are traditionally understood as the prescribed rules, procedures, and

hierarchies of organizations (Ranson, Hinings, and Greenwood 1980) are important to any organizational type. Nonetheless, the rules of membership, organizational objectives, decision-making processes, and organizational boundaries can be shaped in various alternative and unconventional ways and play a pivotal role in sustaining emergent practices. Many unconventional organizations are characterized by pronounced participatory structures and connected practices, that is, by an inclusive architecture (Ferraro, Etzion, and Gehman 2015).

Participatory organizational structures can allow various groups and audiences to access the core of unconventional organizations. By systematically including diverse stakeholders in key decision-making processes, organizations with such structures are able to consider a plurality of concerns and allow them to shape and influence their activities. As a consequence, unconventional organizations are often not characterized by a single priority implemented by hierarchies and interdependent procedures in a coherent, linear fashion (Brès, Raufflet, and Boghossian 2018). Instead, they tend to orchestrate different expectations and needs.

For conventional organizations, long-established templates lay out appropriate courses of action aligned with traditional structures for almost any conceivable situation. In conventional economic organizations, these templates have co-evolved with traditional economic rationales. As a result, the conventional form tends to tether new structures and practices to the primary goal of profit maximization, even if these new structures are supposed to serve alternative purposes like sustainability (Dyllick and Muff 2016; Haigh and Hoffman 2014). Conventional organizations usually consider socio-environmental concerns only if these concerns suit their managerial profit-oriented logic. This is why conventional approaches to sustainability are typically limited to a range between win-win solutions and trade-offs (Delmas 2002; van der Byl and Slawinski 2015). In both cases, organizations maintain their focus on profit maximization and consider sustainability either as a way to increase profit (win-win) or as an external pressure which they have to either resolve or dissipate (trade-off). While conventional organizations may act similarly to unconventional organizations as long as they are small and operate in specific niches, many studies have observed that attempts to introduce sustainability into conventional organizational practices often result in simplified and watered-down interpretations (Banerjee 2008; Dyllick and Muff 2016; Gold and Schleper 2017; Haigh and Hoffman 2014). Introducing such simplified interpretations under the label "sustainability" regularly means that more radical options are repressed. Radical options are typically risky and may carry high costs and potentially even short-term economic losses, but they can also have positive effects in the long term. Conventional economic organizations thus tend to further so-called "ecological modernization," a discourse which justifies the persistence of capitalist rules and institutions and does not

fundamentally contribute to a deep socio-ecological transformation toward a more sustainable economy (Neckel et al. 2018).

In contrast, unconventional organizations are expected to provide deeper and therefore more robust and fruitful interpretations of sustainability (Haigh and Hoffman 2014). Hence, there is a growing interest in the role of unconventional organizations and the ways in which they contribute to sustainability (Alexius and Furusten 2019; Botsman and Rogers 2010; Child 2015; Dorniok 2017; Dubois, Schor, and Carfagna 2014; Viardot 2013). Since the structures and purposes of unconventional organizations deviate from established templates, they are open to the use of both alternative technologies and alternative ways of operating these technologies. Moreover, they often have participatory structures which allow them to introduce marked value orientations in economic matters. The unconventional organizational form makes breaks with conventional practices more likely and brings with it the potential to establish innovative socio-technical infrastructures along with profound interpretations of sustainability (Adloff and Neckel 2019, 1016).

There is, however, no guarantee that unconventional organizations realize their transformative potential. Like all organizations, they are characterized by conflicts of interest, struggles for power, fluctuating motivations, and social dynamics that can hinder the development of their potential (Moldenhauer and Blome-Drees 2020; Yildiz et al. 2015). Unconventional organizations do have transformative potential, but they should not be idealized as infallible instruments to achieve societally desirable goals.

The participatory structures of cooperatives are closely related to their unconventional ownership form. As we highlighted earlier, the majority of cooperatives are worker-, consumer-, producer-, and/or community-owned (Ranson, Hinings, and Greenwood 1980). This has consequences for the relationships between members and the distribution of power within the organization. In particular, workers, consumers, and local communities as collective owner groups have great influence in cooperatives. This circumstance is often reflected in complex democratic decision-making structures. In other words, decision-making processes can be highly formalized but in ways that foster participation. Instead of top-down decision-making processes, the active participation of owner groups is required (Bialek 1995; Dorniok 2017; Varman and Chakrabarti 2004; Viardot 2013).

The democratic decision-making process of cooperatives is not only part and parcel of their participatory formal structures but can also shape participatory inclusive practices of production and consumption. Members can be involved in financing, purchasing, planning, budgeting, monitoring, and/or productive activities (Bryer 2020; Reedy, King, and Coupland 2016). In the case of prosuming cooperatives, the members receive cooperative goods and/or services in return for their contributions. Even when cooperatives also cater to non-members, the production and sale of goods or services may not

primarily be profit-driven, even though profits can be part of the business model of cooperatives. Priority may instead be given to other objectives, with the consequence that cooperatives face fewer economic constraints when advancing the idea of sustainable development in their economic practices (Amri-Henkel and Hofmeister 2018; Moldenhauer and Blome-Drees 2020; Yildiz et al. 2015). As a result, the practices of cooperatives tend to be less profitable but more ethically sound and open to radical ideas of sustainability. This is why social goals such as justice, reducing poverty, increasing social integration, and/or addressing precarious employment conditions strongly characterize what is known as the "European model" of cooperatives (Bryer 2020; Cheney et al. 2014; Zamagni 2017). As we have seen in the case of German energy cooperatives, sustainability-oriented objectives can be placed at the center of the activities of cooperatives. As in all unconventional organizations, however, the potential of cooperatives to create profound interpretations of sustainability depends inherently on the motivations of their owners and the history of the organization (Sardiello, Alexius, and Furusten 2019).

4. Three Ways of Increasing Influence

As we pointed out above, one key criticism of unconventional organizations such as energy cooperatives is that they function well in niche markets but may face difficulties when they attempt to grow (Bauwens, Huybrechts, and Dufays 2020). However, to be a relevant part of sustainability infrastructures, cooperatives need to leave their niche: The profound interpretations of sustainability the cooperatives may develop can only become relevant for the society at large if they become influential beyond the confines of their – usually small – community.

At present, the core challenge for cooperatives is that they have to pursue their values within markets and societal contexts that operate based on different norms (Cheney et al. 2014; Varman and Chakrabarti 2004). As the normative set-up of cooperatives typically differs from the more conventional orientations of their competitors, they are used to developing custom practices instead of relying on established templates for economic action. One example of such practices is participatory solutions for operating energy infrastructures (e.g., decentralizing energy production and associated decisions to largely autonomous producers), which differ markedly from the high centralization typical of traditional energy production. The advantage of their unconventional form enables cooperatives to introduce innovative models and can at the same time become an obstacle when it comes to furthering their growth. While many cooperatives manage to integrate diverse expectations and achieve a balance between economic and ethical objectives on a small scale (e.g., Arnold and Hammer 2018), organizational growth leads to a more

intense exchange with mostly conventional economic actors. This threatens the once stable balance, as new actors prioritize economic expectations over ethical ones. Additionally, problems related to participatory practices such as the length of participatory decision-making processes (Varman and Chakrabarti 2004), the emergence of informal power structures (Reedy, King, and Coupland 2016), and the lack of professionalization (Moldenhauer and Blome-Drees 2020, 296; Müller, Dorniok, and Flieger 2015) may also hinder growth.

While growth carries the risk of diluting an organization's initial aims (Bauwens and Pantazis 2018; Cheney et al. 2014; Gidron and Hasenfeld 2012; Schor 2014), unconventional organizations have other ways to increase their societal relevance. A closer look at the development of cooperatives shows that they increase their influence and thereby their infrastructural relevance in ways that do not always imply a growth in size. Based on the analysis of studies about the impact of cooperatives, we specifically identify three main ways of increasing influence: organizational networks, digital platforms, and symbolic influence.

4.1 Organizational Networks

Energy cooperatives are deeply anchored in local communities (Dorniok 2017; Müller, Dorniok, and Flieger 2015; Punt et al. 2022; Radtke 2014; Yildiz et al. 2015). Even if they propagate universal values, energy cooperatives often orientate their activities to local problems and needs. As a result, they mainly foster participation and acceptance of renewable energies at the community level. One newly discussed form of increasing influence without resorting to local anchoring is the capacity of cooperatives to network with other organizations at the regional level and thus to operate on a larger scale.

Specifically, cooperatives broaden local or regional networks by networking with other organizations with similar or compatible aims (Bauwens, Huybrechts, and Dufays 2020; Punt et al. 2022). Networks are built between cooperatives of the same type but also at different levels of the value chain. Interesting examples are new forms of networking such as *Energiedienstleistungsgenossenschaften* (energy service cooperatives) that combine the activities of several utilities and become consulting cooperatives, procurement cooperatives, and/or distribution cooperatives (Henkel 2018).

The fact that cooperatives have participatory structures and are therefore open to include varying societal expectations can also support the emergence of impactful networks that link economic, non-profit, and public spheres (Nyssens 2007; Doherty, Haugh, and Lyon 2014). In this respect, the ability of cooperatives to increase participation is also evident: While 79 percent of the German cooperatives collaborate with other cooperatives (Schmid et al.

2020), they are increasingly involved in partnerships with corporations, municipalities, and other public organizations.

Organizational networks contribute in various ways to strengthen infrastructures of sustainability. Within networks, knowledge and experience are shared and transferred. Learning processes between different types of organizations can be highly fruitful. Lall (2019), for example, showed how social enterprises establish meaningful links with social finance institutions that drive organizational learning processes. Moreover, joint projects can be initiated. For instance, when cooperatives align forces to sell electricity, money can be lent to other cooperatives and tasks (e.g., electricity delivery) can be delegated to other organizations (Bauwens, Huybrechts, and Dufays 2020; Huybrechts and Haugh 2018; Viardot 2013; Schmid et al. 2020). Specifically, important networking activities are often initiated in order to increase equity: In some cases, cooperatives expand the access to membership beyond the local area, in other cases they admit private investors as members and/or build up umbrella cooperatives for pooling capital (Moldenhauer and Blome-Drees 2020, 293). In this way, production activities can be realized at a larger scale and local solutions and models can diffuse more quickly (Bauwens, Huybrechts, and Dufays 2020; Huybrechts and Haugh 2018; Viardot 2013).

4.2 Digital Platforms

An additional way to increase influence and strengthen the infrastructural role is to connect to another kind of infrastructure: digital platforms. Digital platforms are socio-technical infrastructures based on digital technologies that are used to coordinate exchange and collaboration processes on the internet. They provide mechanisms that reduce the risks associated with economic interactions and thus enable individual or organized actors to directly engage with strangers (Kirchner and Beyer 2016). Digital platforms are operated by formal organizations that use digital technology to connect loosely to non-members, enable them to connect to each other, and govern their online interactions. Even though the operators restrictively regulate specific aspects of the interactions on the platform through technological interfaces, other aspects are mostly unregulated, which enables the emergence of particular social orders that are distinct for each platform (Ametowobla and Kirchner 2022). Digital platforms are thus highly variable and are used for diverse applications. Like the infrastructures of sustainability, digital platforms have an organizational and a technical dimension (cf. Gawer 2014).

Some energy cooperatives use digital platform technology to manage distributed energy resources and thereby create so-called virtual power plants: By connecting the various technical devices that produce and consume energy in the homes of the members (e.g., solar cells, batteries, heat pumps, etc.) through digital platform technology, energy cooperatives can manage

the activities of their decentralized technological base centrally (van Summeren, Wieczorek, and Verbong 2021). The resulting network of technical appliances, the virtual power plant, enables an energy cooperative to act like a traditional energy producer to outsiders and, for example, participate in energy markets designed for traditional, centralized energy producers. Virtual power plants are not limited to one cooperative because networks of them can be created by connecting the technological base of several energy cooperatives via platform technology. Such integration allows several autonomous energy cooperatives to act jointly on energy markets without individually growing in size (van Summeren, Wieczorek, and Verbong 2021). This form of non-growth scaling provides some of the advantages of larger size, like infrastructural relevance, but without some of the disadvantages, like a larger number of stakeholders that need to be integrated.

Energy cooperatives can also use digital platforms for "crowdfunding." The term "crowdfunding" refers to a practice in which individuals or organizations use a digital platform to find donors willing to invest in a project. Crowdfunding platforms provide project initiators with the means to advertise their projects, collect money, and communicate with investors. While crowdfunding is essentially a financial activity, a successful crowdfunding campaign creates more than just financial relations between the funded organization and its investors, because investors on crowdfunding platforms are often motivated by altruistic values (Burtch, Ghose, and Wattal 2013). They typically believe in the intrinsic value of the project, aim to make it a success, and support it not only with financial means but also with ideas for improvement and a willingness to advertise the project in their respective social circles (Nielsen 2018). Crowdfunding investors are thus an ideal group from which to recruit members for a cooperative. Hence, crowdfunding can be a way for energy cooperatives to broaden their financial base, recruit new members beyond the confines of their regional community, and integrate their contributions into organizational decisions (Dilger, Jovanović, and Voigt 2017). As a form of financing that combines economic with non-economic values, crowdfunding has similarities with cooperative organizing. The use of crowdfunding platforms therefore aligns well with the inclusive architecture of energy cooperatives. As crowdfunding platforms provide project initiators with elaborate means to tell their "stories" and keep all interested parties up to date on current developments (Nielsen 2018), energy cooperatives can also use these platforms to propagate their imaginaries and implementations of sustainability in a way that is accessible to non-members. Of course, these benefits must be balanced with possible negative, unintended consequences of digital technologies, such as high energy consumption of digital platforms (Lenz 2022).

4.3 Symbolic Influence

As an organizational form that takes a market-oriented approach to sustainability, cooperatives enjoy a high degree of legitimacy in contemporary society (Dart 2004). Accordingly, since the 1990s, policy-makers worldwide have increasingly attended to these unconventional organizations through policies and regulations that encourage their growth (e.g., Borzaga et al. 2020; Defourny 2001).

The roots of the high legitimacy enjoyed by cooperatives lie in their participative structures and practices, which allow them to take different concerns and needs into consideration. Because they might aim to represent or protect groups that are disadvantaged in capitalist systems or because they implement universalistic values such as sustainability, cooperatives are considered valuable, trustful, and credible actors in public debates (Meyer 2010; Meyer and Jepperson 2000). Therefore, even if they possess only limited financial resources and are small in size, cooperatives are highly legitimized and as a consequence have a relevant symbolic influence. Hence, cooperatives can communicate and marketize their innovative solutions in the public sphere, demonstrating the impact of alternative sustainable concepts and new forms of governance. Through these activities, associations of cooperatives and interest groups, which collect best practices and represent the position of many (often small) cooperatives in the public domain and in the political sphere, play an important role (Kahla et al. 2017).

In the media, cooperatives are stylized as symbols of the energy transition (Dorniok 2017, 2018; Müller, Dorniok, and Flieger 2015). Certainly, there are other actors such as non-profit organizations and social movements that have a strong symbolic influence in the debate about the transformation of the energy supply. However, the specific impact of energy cooperatives results from their combination of value-laden discourse and technically as well as economically well-functioning solutions. Energy cooperatives serve as role models because they exemplify successful cooperation in concrete business activities (Moldenhauer and Blome-Drees 2020). They thus contribute significantly to the diffusion of the idea of energy transition from below and represent the feasibility of a citizen-oriented energy transition in which communities and people can directly participate.

As organizations that act not only on behalf of their members but also to advance higher ideals, energy cooperatives have become relevant actors in the political promotion of the energy transition which has intensified in Germany since the 1990s. Without the existence of a network of organizations – highly legitimized actors in the public debate who run renewable energy technologies – political support and incentives in this area would have failed. Moreover, cooperatives form interest groups that help to push the interests of the ecological movement forward and to accompany the development of

legislation in an advisory capacity (Fettke and Fuchs 2017; Mautz, Byzio, and Rosenbaum 2008, 77ff). The discursive influence of energy cooperatives can even challenge large energy suppliers. By demonstrating the feasibility of alternative forms of energy supply, cooperatives drive the delegitimization of conventional forms of energy production. While large energy suppliers were still skeptical about the future of renewable energy in the 2000s, we have observed that they have reviewed their strategies in the last decade and now profile themselves as actors that can play an important role in the energy transition, for instance by ensuring the flexibility and stability of the energy supply (Kungl 2018, 243). To a certain degree, these changes are related to several political and economic factors, but the symbolic influence of highly legitimized actors pushing alternative models of energy supply should not be underestimated.

5. Conclusion

Thanks to their unconventional forms, cooperatives have the potential to break with established patterns of economic action and push major innovations. Since the structures of cooperatives and the resulting practices can be highly inclusive, they can allow groups that in the conventional model are merely audiences to access the organizational core and participate in decision-making processes and the development of organizational practices. As a result, cooperatives are able to operate in the economic field while simultaneously implementing alternative models of sustainable socio-technical infrastructures along with imaginaries oriented toward a radical societal transformation (Adloff and Neckel 2019).

While the unconventional organizational form of cooperatives carries a transformative potential (cf. Schiller-Merkens 2022, in this volume), it does not in itself guarantee that this potential is actualized. In this article, we have concentrated on the possibilities that inclusive organizational architectures have for radical interpretations of sustainability and presented ways in which cooperatives can hold on to these interpretations when confronted with well-known risks like mission drift or dilution of organizational aims which might come with growth. As we indicated in Chapter 3 and at the beginning of Chapter 4, organizational history, the composition and relationships of owners, and the strategies for organizational growth influence the development and establishment of sustainable practices for the operation and use of infrastructures in any specific case.

Focusing on energy cooperatives and stressing the relevance of their unconventional form, our article provides three main contributions. First, cooperatives contribute to the growing body of social science literature that deals with the implementation and translation of sustainability by showing

how organizations matter in the construction and meaning of sustainability. In particular, we argue that organizations and their structures and practices are vital for understanding what sustainability means on a day-to-day basis. Second, we contribute to the literature on unconventional forms of organizations by revealing their influence on shared understandings of sustainability. In doing so, our argument demonstrates the societal relevance of unconventional organizations like cooperatives. Third, we add to the current debate on the relevance of infrastructures for a transition to a post-growth economy by explicating how unconventional organizations, and in particular cooperatives, could play a role in shaping the use of alternative technologies in the economic field.

The structures and practices of cooperatives can open the way to embracing and creatively implementing sustainability, developing alternative economic concepts, and experimenting with and implementing radical technologies as well as practices of sustainable production and consumption. By linking economic and sustainability-oriented activities, cooperatives show that we have viable models for handling sustainability in the economic sphere at hand. Similar to other unconventional organizations, cooperatives struggle, however, when faced with the prospect of leaving their specific niches. The dilemma they are confronted with is well-known: They may either remain in the niche or strike out and attempt to grow alone and/or increase cooperation with other market actors.

When unconventional organizations like energy cooperatives remain in a niche, they may miss opportunities to shape relevant infrastructures of sustainability. Radical implementations of sustainability might thus remain exceptions, which induce local changes but have no effect on the economy at large. Such local changes are then likely to absorb the attention of participants dedicated to sustainability and convey to the engaged individuals and groups the illusion of contributing to a greater societal transformation while de facto maintaining the status quo. With these risks in mind, we identified three specific ways of increasing influence. First, we explained that, although cooperatives do not always possess sizeable financial resources, they do have a marked critical potential based on the fact that they run alternative technologies, implement related socio-economical practices, and convincingly transmit their solutions into the public sphere (symbolic influence). Second, along with the use of digital platforms, several forms of networking and cooperating with private and public actors (organizational networks) can be crucial to get more stakeholders involved without growing in size. All three ways are shaped by the participative form of cooperatives, which pushes them to cooperate with different partners and addresses not only the economic and technical but also the symbolic and political dimensions of sustainability.

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