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Intentional sustainable communities and sustainable development goals: from micro-scale implementation to scalability of innovative practices

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Intentional sustainable communities (ISCs) are commonly described as micro-based community initiatives that seek to develop sustainable lifestyles with low environmental impact. More recently, they have been analyzed as laboratories for the emergence of innovation, namely social innovation, and as actors that can contribute to sustainable transitions. This reinforces their role as pressure agents and as microscale communities of practice. Theoretically, it is argued that this scalability of innovation dynamics requires a multi-level and multi-actor perspective, mechanisms of reciprocity and that actors are not isolated and atomized. These mechanisms, such as networks, are crucial for the dissemination of sustainability practices and for increasing their potential impact. This article argues that these communities can also be important micro agents in achieving Sustainable Development Goals (SDGs) and to mainstream the importance of scaling their innovation practices. To this end, the study uses quantitative data from a survey applied to the ISCs in Europe. The data corroborates the communities' contribution to the SDGs, namely to SDG12, SDG13 and SDG16 and presents the collaboration network structure established within these communities.

Keywords: Intentional Sustainable Communities; sustainable development goals; social innovation; networks; ecovillages; micro-scale

1. Introduction

The environmental crisis and the challenge of sustainability are cross-cutting challenges in contemporary societies of the 21st century. Responding to these challenges has become imperative, and traditional responses have proved insufficient. It is increasingly necessary to think about differentiated possibilities that can guide development toward a more sustainable paradigm that can effectively contribute toward a sustainable transition. The problems are complex and cross-cutting. They claim for multidisciplinary responses, the engagement of different stakeholders and a concerted articulation of multiple levels of action.

Top-down approaches to guide public policy and establish lines of action remain important. The Sustainable Development Goals (SDGs) are a clear example of this by recognizing the changing development patterns in a holistic approach. On the other hand, it is increasingly vital to look at the bottom-up, microscale initiatives that

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emerge from civil society and the collective action of citizens. Intentional sustainable communities (ISCs), commonly known as ecovillages, are an example of these micro-based initiatives. These communities are formats of voluntary social organization, with members committed to living more ecologically and communally (Bang 2005; Mulder, Costanza, and Erickson 2006).

Due to their notable characteristics, academic interest in these communities has been increasing in recent decades. One of the analytical dimensions that received attention is the role that these communities can play as agents of pressure for change. In this way, many studies have focused on innovative practices developed within these communities, in particular social innovation (Avelino *et al.* 2015). However, there is still a predominance of studies with a qualitative and ethnographic nature. This study addresses this gap, mobilizing a quantitative approach that can bring insights regarding the structural conditions of innovative and sustainable practices of ISCs.

The main objective of this article is to understand to what extent the sustainability practices that the ISCs integrate into their daily lives are aligned with the SDGs. In addition, it also seeks to understand whether these practices, many of them innovative, have the potential for scalability. Thus, the article starts with the presentation of data collected through a survey applied to the ISCs in Europe. The descriptive analysis focuses on the levels of integration of a set of sustainable practices in these communities and presents the structural network of collaborations that they establish, identifying existing links with external actors, key for the dissemination of their practices.

The text is organized in four main parts. The first section seeks, on the one hand, to characterize ISCs, highlighting the dimensions for aligning its practices with SDGs, and on the other hand, to explain how these micro-based practices can be scaled. A second moment refers to methodological options, namely the procedure and the sample characterization. Then, data is analyzed, showing the sustainability practices and their articulation with SDGs, innovation dynamics, their level of implementation and the characteristics of the collaboration networks. The article ends with discussion of the results and some conclusive lines and implications for public policies on sustainability.

2. Intentional sustainable communities, SDGs and innovation

2.1. ISCS as a micro locus for sustainable innovation

2015 marks the recent history of political developments on sustainable development, with the 2030 Agenda and its 17 global Sustainable Development Goals (UN 2015). However, despite all the advances in past decades, strategies are falling short in the impact needed to respond to the socioeconomic and climate urgencies. The problem is structural, transversal and macro; it is not exclusive to nation states or territorial borders. As such, the responses must also be structural and cross-cutting, thus emerging both from the micro level through a set of civil society initiatives and from the macro level through public policy instruments and responsible business activities. This double emergency is critical because micro-based initiatives need to dialogue with crystallized structures to see their potential increased. The political appropriation of sustainability as a rhetorical resource (Spindler 2013) and its hijacking by multinational companies and other dominant economic actors (Latouche 2009) are fundamental criticisms to sustainable development policy making and implementation.

This theoretical framework seeks to situate intentional ISCs as privileged places for the emergence of everyday sustainability practices that are aligned with the SDGs.

ISCs are a type of intentional community in which the substantive good is the search for a sustainable way of life based on principles and concerns consistent with the ecological movement. The pioneers of this movement began to experiment with different forms of technology, and also new ways of living in the community, comprehensively covering all areas of life from consumption, production and infrastructure planning to organization, governance and also social relationships and education (Bang 2005; Christian 2003). ISCs are defined as communities that consciously seek environmental sustainability to continuously improve their approach to supporting healthy human development and reducing their environmental impact (Bang 2005).

It is currently considered that an ISC must be based on the following foundations (Global Ecovillage Network 2019; Hall 2015; Joubert and Alfred 2007; Kunze and Avelino 2015):

- a social or political dimension, since people must feel simultaneously supported and responsible for the group, building a sense of belonging through the ability to be part of the decision-making process in a transparent manner;
- an ecological or environmental dimension, through the connection between the individual, the group and the land, satisfying their daily needs in articulation with, and with respect to, the cycles of nature;
- a cultural or spiritual dimension, through the promotion of activities that enhance the artistic and creative spirit; and,
- an economic dimension based on the principles of redistribution characteristic of the solidarity economy.

ISCs' daily practices aim to reduce energy consumption, support green industries and job creation, eliminate unsustainable patterns of production and consumption, respect regeneration cycles, reduce, reuse and recycle waste, and promote the active participation of citizens on the global level and its members on a local scale (Bang 2005; Kirby 2003; Mulder, Costanza, and Erickson 2006). Many of these practices can be analyzed as contributing to SDGs.

In fact, a series of impact assessments conducted by the Global Ecovillage Network (GEN) in 29 demonstration ecovillages on five continents showed that the vast majority make concrete contributions to achieving the SDGs (Barani, Alibeygi, and Papzan 2018). Regarding ecological impacts, 97% of these communities actively work to restore degraded ecosystems (SDG15), 90% retain carbon in the soil and/or biomass (SDG13) and 97% work to repair or replace sources and water cycles (SDG6). At the level of the social dimension, all ISCs offer education in sustainability-related areas (SDG4), women occupy at least 40% of decision-making roles in 90% of cases (SDG5); all support local traditions relevant to the development of sustainable methods of construction and food production (SDG11); 90% reuse or recycle more than half of their waste; and 85% compost all food waste (SDG12). With respect to conflicts, 80% have established resolution procedures; 100% provide training in the decision-making process (SDG16); and 95% participate in campaigns that seek to protect human and nature rights (SDG17).

Interactions between governmental or intergovernmental top-down action and ISCs are relatively recent. In this movement, GEN has been a central actor in articulating, measuring and showcasing the impact and practices of ecovillages and other community-led initiatives for achieving the SDGs. It was in this way that they created a tool

called “The Ecovillage Impact Assessment”¹. This tool, available online, enables consideration of communities and an understanding of the role they play. It currently gathers data from a survey answered by 51 ecovillages between November 2021 and January 2022. The data is based on these communities’ scores for their contributions to each of the SDGs. Goals for which the contribution of these communities is greater (with higher scores) are the following: zero hunger (7.41/10); partnerships for the goals (7.41/10); peace, justice and strong institutions (7.08/10); clean water and sanitation (7.02/10); and life below water (7/10).

The importance of these communities for sustainable development is recognized in the literature (Bakshi, Vale, and Vale 2014; Carroll 2010). For example, Carroll (2010) studied some of the most developed ISCs and reported various methods for their overall sustainability, such as co-housing and using resources collectively, implementing green technologies and energy efficiency methods, and recycling organic materials. This reveals commitment to developing innovative practices that seek to minimize environmental impact and provide more sustainable modes of consumption, production and living.

Studies linking these communities with innovation have increased (Avelino and Kunze 2009; Kunze 2012; Kunze and Avelino 2015); more precisely, they perceive ISCs as communities of practice for a sustainable life, where grassroots innovations are developed (Seyfang and Smith 2007) to meet social needs (Temesgen 2020). A study of the Dancing Rabbit community, in the US, revealed that its members had managed to reduce their environmental impact to less than 10% of the average American citizen (Lockyer 2017), mainly “by moving away from exclusive ownership of capital goods, investing in skills that facilitate the collective management of resources, eliminating waste and taking advantage of locally available resources” (Boyer 2016, 1). Other literature regarding these communities also contains recurrent claims of greater sustainability, namely their reduced environmental impact, when compared with similar mainstream communities (Assadourian 2008; Marckmann *et al.* 2012).

The empirical study of ISCs allows exploration of a set of dimensions that are particularly relevant to the analysis of their role as agents for social change and to the transition to more sustainable development paradigms. Times of crisis turn out to be fertile periods of innovation and creative solutions to minimize the consequences that ensue. ISCs can represent a mechanism for developing transition proposals. Recent contributions have been reflecting on this type of community, precisely as agents of change and transition (Adalilar, Alkibay, and Eser 2015; Kunze and Avelino 2015).

The question of level has been debated in the sustainability literature. On the one hand, climate problems lack structural responses that emerge from the macro level, in a top-down logic. On the other hand, the micro-level of individual behaviors is also fundamental, mainly to highlight the function of pressure agents. However, the most important thing is the promotion of aggregated proposals. Specific initiatives need to cultivate a positive and productive relationship with the governments to achieve their goals (Echebarria *et al.* 2018). This is particularly important in terms of individual values and beliefs, based on sustainability, as is the case in these communities. Jain and Jain (2020) suggest that values are fundamental to sustainable development and are socially and environmentally interactive. Policies may impact and change values.

2.2. *Scaling up micro sustainable practices*

The question that remains is how micro community initiatives can generate potentially scalable sustainability innovations. This implies mechanisms for generating and diffusing knowledge between the macro- and micro-scales in both directions (Nogueira *et al.* 2019). The SDGs presuppose, even if indirectly, the need for a transition to more sustainable development paradigms. The term “transitions to sustainability” is increasingly used to refer to large-scale social changes deemed necessary to address social challenges. Transitions to sustainability are large-scale disruptive changes in social systems that emerge over an extensive period of decades. These transitions are a threat to existing and stable configurations that face persistent sustainability challenges (Loorbach *et al.* 2017). Transitions expose opportunities for more radical, systemic and accelerated change.

It is important to emphasize that it is not our objective in this article to verify whether ISCs contribute to a macro-level achievement of the SDGs or whether they are agents of social change for a transition to sustainability. This would only be possible from a historical perspective in retrospect, which is not possible while history is taking place. The objective is rather to verify whether these communities have the necessary mechanisms for the scalability of their sustainable innovation practices.

In this article, ISCs are understood as niche micro-based actors, enabled through the relationships that emerge in the formation of networks (Pel *et al.* 2020). ISCs, through the networks they form, combine local integration with translocal and transnational connectivity (Avelino *et al.* 2015). This connectivity ends up contributing to the transformative impact of these communities in different ways. On the one hand, this impact depends on changes in the tensions and stability of the field(s) of action in which they operate (Pel *et al.* 2020). In this case, the communities under analysis can be understood as a field of action. On the other hand, translocal networks are a source of empowerment for social innovation initiatives (Avelino and Kunze 2009). Finally, the formation of alternative discourses and their mediation through communication infrastructures increase the reach of network formation (Pel *et al.* 2020). ISCs collectively create a set of differentiated discourses and narratives of change. The Global Ecovillage Network here assumes a central role in its dissemination.

Another crucial aspect is the relationship these initiatives have with institutional change, reflected in the way they seek to challenge, change or replace dominant institutions while being shaped by them (Pel *et al.* 2020). This dialectic between agency and structure allows reflection on how communities adapt their strategies to deal with the constraints of the institutional environment and, simultaneously, the way in which opportunities for the development of social innovation are built through institutional architectures, with multiple stakeholders at various levels (Nogueira *et al.* 2019). In order to drive institutional change, ISCs need to combine different forms of institutional entrepreneurship and proactively adapt these strategies in response to changing circumstances (Pel *et al.* 2020).

The emergence of social innovation initiatives, the formation of networks and the dynamics of institutionalization are shaped by generic developments in the socio-material context, i.e. in the landscape (Pel *et al.* 2020). Therefore, there is a constant symbiotic relationship between the radical core of these initiatives, namely ISCs, and the social context, which conditions what is understood as potentially innovative or transformative in both directions. Therefore, it is necessary to look at cross-functional interaction - how different types of innovation interact in a local context, the social

dimension of community building, the dynamics of self-governing citizen initiatives as opposed to centralized governance and the role of networks between transnational corporations in sustainability transitions (Avelino and Kunze 2009; Chitewere 2016; Kunze and Avelino 2015).

Combined with the argument that the dominant governance logics of state and market conflicts with sustainability, governance for sustainability often requires targeted strategies to enable specific transformative solutions developed in multi-stakeholder networks. This implies, for example, a specific focus on social innovation in the early stages of transitions to sustainability, as well as strategies focused on dealing with system destabilization and the institutionalization of emerging transitions (Loorbach *et al.* 2017). It is understood, then, that ISCs have the potential to serve as a transition mechanism in the early stages through the development of a set of innovative practices aligned with the SDGs and as pressure mechanisms to destabilise regimes and institutionalise emerging transitions through their presence on networks.

Avelino and Kunze (2009) analyze the link between ISCs and transitions to sustainability, raising some questions: how can the ecovillages movement be characterized in terms of transition; that is, in which transition(s) are they involved, and what is the dynamic interaction between the different scales (macro, meso and micro)?; how do these communities empower actors, and what kind of power do these actors wield?; and finally, how and to what extent can ecovillages' practices be scalable and foster social transformation toward sustainability?

To answer these questions, it is first necessary to understand that intentional communities, whose objective is the search for sustainability, present bottom-up planning methods. This factor differentiates them from other top-down approaches in contemporary societies. Other factors that characterize them in terms of transition are, on the one hand, the creation of small-scale and self-sustaining economies, which replace the corporate economy and, on the other hand, the self-government of citizens, which replaces centralized governance. Furthermore, socially fragmented and individualized ways of life are replaced by holistic ways of living and working within a community. In general, these communities envision a global transition: from large-scale, fragmented and centralized social systems to smaller, integrated, self-governing systems. In this sense, it is possible to consider them as niches within existing models of planning, governance and economic organization (Avelino and Kunze 2009; Haxeltine *et al.* 2018; Kunze 2012).

More specifically, organic farming practices, the use of renewable energy sources and construction methods, among others, make it possible to relate this type of community to different types of (sociotechnical) transitions. In addition to the formation and experimentation of local niches, ISCs form transnational networks, such as the GEN, thus cementing a link between the global movement, on the one hand, and local initiatives on the other hand. In this way, Avelino and Kunze (2009) characterize them as a transnational niche network that aims to connect and facilitate various niches transnationally.

An important point to mention is the growing demand for sustainable ways of life as a response to environmental, economic and social challenges. An interrogation, however, is to what extent ISCs are able to further stimulate and facilitate this demand. In fact, many of these communities already receive membership requests that exceed their capacity (Kunze 2012), which underlines the importance of their scalability.

For the transition to occur, the practices developed by the niches need to be scaled and transferred to conventional practices, thereby changing social practices and relationships. While niches can create new resources, they lack meso-level institutions to distribute these resources and implement new architectures in a macro context. Institutions also need niches to cope with new landscape developments. However, the institutional absorption of practices developed at the niche level can have an adverse effect because if, on the one hand, the influence of niches is directly related to their compatibility with the current institutions' arrangements, on the other hand, this compatibility can compromise its innovative potential. Smith (2006) calls this process the niche paradox and states that during the cooperation process there is a risk that the niches will be absorbed by the institutions, which can compromise their ability to replace or substantially transform them.

In this sense, niches need to maintain some flexibility in order to achieve some kind of reform or social change. This means that while some niche elements are transferred, it is crucial that some more radical components remain unchanged so that it is possible to continue the process of developing radical experiences at the micro level (Sørensen 2015). The question that arises, then, is how these communities can engage with the institutions while maintaining their advantages and radical cores. Power is a crucial concept in this analysis. In this struggle for power, the key factor is dependence, because the more dependent the niches are on the systems, the more likely they are to be absorbed. To avoid this, niches have to reduce their dependence to ensure their survival and growth (Smith 2006).

ISCs effectively seek to reduce their dependence. These communities demonstrate that by creating smaller, self-sufficient, community-based systems, individuals can mobilize resources independently of existing institutions (Avelino and Wittmayer 2016). These considerations enabling thinking of ISCs as a phenomenon with scalability potential, especially in terms of the knowledge they produce. The question that remains is whether they have knowledge scalability and dissemination mechanisms to possibly produce changes in current institutional arrangements and subsequently introduce more macrosocial changes.

3. Methodological considerations

3.1. Procedure

Some studies explore the link between ISCs and their role as agents that develop social innovation practices on the microscale, which can contribute to the implementation of the SDGs (Avelino and Kunze 2009; Haxeltine *et al.* 2018; Kunze and Avelino 2015). Most of these studies are based on qualitative methodologies; thus, there is a lack quantitative studies. Although there are some relevant quantitative studies that seek to analyze, in a transversal way, some dimensions of these communities, such as their environmental impact (Daly 2017), quality of life (Grinde *et al.* 2018) and prosperity (Rubin, Willis, and Ludwig 2019), issues related to the innovation developed by these communities are still lacking this type of analysis.

This study aims to address this gap by trying to understand the following issues using a quantitative approach: i) the level of integration of sustainability practices in the daily lives of these communities, ii) how these practices align with the SDGs, iii) the innovative activities they develop, iv) the main enablers and the main barriers they

encounter, v) how these communities perceive the scalability of their practices, and, vi) the knowledge-transfer mechanisms they have (networks).

One difficulty when studying ISCs is the uncertainty regarding how many of these communities exist in the world. GEN's international website identifies around 1,000 local ecovillage projects and networks worldwide, of which about 130 are located in Europe. Data collected in 2014 by the EUROTOPIA directory (an organization independent of GEN) lists 430 ISCs, while the map provided by ECOLISE, the European network for community-led initiatives on climate change and sustainability, identifies 57 ecovillages in Europe. In this sense, it can be said that, to date, the number of ISCs in Europe cannot be ascertained.

As this study starts from a quantitative approach, the technique used for data collection was an online survey. The strategy to reach the largest possible number of ISCs in Europe was divided into two stages. In the first phase, we requested the collaboration of the main European networks of this type of community to disseminate the survey through their databases. The networks that collaborated in disseminating the questionnaire were GEN, the Baltic Ecovillage Network (BEN), the Iberian Network of Ecovillages (RIE) and the Italian Network of Ecovillages (RIVE). Subsequently, to increase the response rate, we built a database by searching the maps provided by GEN, ECOLISE and EUROTOPIA.

The survey was sent by email to the identified communities. The instructions provided information on the dimensions on which this questionnaire focused (namely, dimensions of characterization and the development of innovation practices). In this way, it was requested that those who answered the survey have knowledge of these dimensions. Furthermore, the importance of receiving only one response per community was underlined, as it was important to collect information on community practices and not on the individual perceptions of its members. There were no cases of receiving more than one response per community. However, we recognize that the answers can always have a bias introduced by the respondents themselves. This generates a problem related to household-level data, where each community entrusts a single member to report on the progress toward their goal, which is one of the limitations of this type of study.

In total, 324 ISCs were identified in Europe. The survey was distributed through the premium version of the SurveyMonkey platform and was available for six months, between April and October 2019. We received 108 responses, 103 valid, resulting in a response rate of 31.8%. Data were analyzed using IBM SPSS, Statistical Package for Social Sciences.

3.2. Sample characterisation

This section characterizes the analyzed sample according to six indicators: the year of foundation, the location, the geographical context in which they develop their activities, the number of members, the area available (in hectares), and their legal status.

ISCs are the type of intentional community with the highest growth rate and expansion during the last 40 years (Adalilar, Alkibay, and Eser 2015), experiencing periods of multiplication, restructuring and organization worldwide (Lüpke 2012). Although data can corroborate the literature and reveals a sign of the movement's growth in recent years, it is also true that these communities have a very high failure rate (Lifin 2014), so this can also reveal the effects of a low survivorship rate. Among the projects under study, only two were founded in the years before the '70s.

Between 2000 and 2009 there was a considerable increase, with the emergence of 25 ISCs. This number has grown significantly in recent years. In the period, between 2010 and 2019, we identified 40 of these communities under analysis.

Regarding geographic dispersion, the ISCs analyzed in this study are located in Spain ($n=20$), Denmark ($n=15$), Germany ($n=12$), Portugal ($n=10$), Italy ($n=8$), Sweden ($n=5$), the Netherlands and the United Kingdom ($n=4$ each), France and Switzerland ($n=3$ each), Austria, Slovenia, Hungary and Greece ($n=2$ each) and finally, with only one community under study are Iceland, Ireland, Belgium, Finland, Latvia, Russia, Belarus, Poland, Ukraine and Turkey.

Data collected does not suggest that there are more ISCs in Spain than in France, for example. They only indicate the country of origin reported by the projects responding to the questionnaire. It is important to emphasize that the response rate by country may be related to the proximity to the networks that disseminated the survey. Dissemination through these networks may have conditioned the number of respondents in each country, thus increasing the number of responses in countries directly associated with them.

An ISC presupposes a physical space where members can reside and where it is possible to carry out activities that contribute to the community's resilience. In the communities under analysis, 80% are located in rural contexts, 5% are found in urban contexts, and 12% claim to be located in both contexts. A similar study in Portugal revealed precisely this same trend (Nogueira 2015). This is because, according to this study, one of the main concerns transversal to these projects is to guarantee the capacity for food subsistence through sustainable practices of biological agriculture and permaculture, which implies the existence of a geographic context that can provide conditions for the development of these activities.

Regarding size, it is possible to see that most communities analyzed are small and have up to 15 members (43.7%) or between 16 to 25 members (13.6%). On the other hand, about 17% are large communities having more than 95 full-time residents/members. Another variable that allows checking the size of communities is the area in hectares (ha). In this variable, the results follow similar trends to those verified in the number of members. The majority (53%) have less than 10 hectares available, and 21% have between 11 to 30 hectares. However, about 10% of ISCs have vast territories available, with more than 180 hectares, to develop their activities.

As would be expected, the ISCs under analysis assume legal formats associated with the third sector in a logic based on social and solidarity economy principles. In this sense, 44% of the projects under study are private nonprofit associations, 24% are cooperatives, and 8% are foundations. These communities tend to present themselves as alternative models to neoliberalism and represent an attempt to break with the established social structures (Chitewere 2016), which usually increases the level of informality of these projects (Haxeltine *et al.* 2018; Joubert and Alfred 2007). These data, however, reveal a considerable degree of formalization of projects and show only around 9% of informal groups.

4. Intentional sustainable communities, SDGs and scaling up

4.1. Sustainable practices and SDGs

Based on the dimensions previously mentioned (social, ecological and economic), the study identifies a set of indicators that should reflect the daily practices of these

ODS	Sustainable Practices	Integrated (%)	Non-integrated (%)
16	Active participation of members in daily tasks	72,8	27,2
16	Decision making through consensus	74,8	25,2
16	Use of a formal method of governance	68	32
16	Different levels of commitment and responsibility	73,8	26,2
16	Existence of a leader	29,1	70,9
8	Payment of wages based on activities performed	25,2	74,8
8	Using an Alternative Coin	11,7	88,3
8	Financial institutions created within the community	13,6	86,4
8	Self-financing activities	60,2	39,8
12	Resource reuse	81,6	18,4
12	Permaculture practices	66	34
12	Bio-construction practices	60,2	39,8
12	Conscious consumption of products/services	72,8	27,2
13	Biodiversity and ecosystem regeneration	77,7	22,3
13	Collective management of resources and activities	72,8	27,2
13	Sharing community resources	77,7	22,3
1	Non-monetary exchanges	40,8	59,2
1	Equitable division of land	56,3	43,7
2	Cultivation of endogenous/endemic foods	67	33
2	Organic/biological food production	85,4	14,6
6	Water sources and cycles	62,1	37,9
7	Renewable energy	74,8	25,2
11	Boosting the local economy	50,5	49,5

Figure 1. ISCs sustainability practices: Level of integration and alignment to SDGs.
Source: Own elaboration.

communities. These sustainability practices emerge from GEN's guidelines as the most important for a project to be considered an ISC. Respondents were asked to classify the level of integration of each indicator from 1 to 6 in their everyday life, where 1 meant "non-integrated practice", and 6 meant "fully integrated practice". The results are divided into two classifications: "integrated practice" (which results from the sum of categories 1 to 3) and "non-integrated practice" (which results from the sum of the categories 4 to 6).

These practices were codified taking into account their relationship and contribution to the SDGs. Figure 1 shows these indicators, to which SDGs are related and their level of integration. In general, it was possible to see that the practices developed in these communities are related to nine SDGs. More specifically, we found evidence of a relationship with SDG16—peace, justice and strong institutions, SDG8—decent work and economic growth, SDG12—responsible consumption and production, SDG13—climate action, SDG1—no poverty, SDG2—zero hunger, SDG6—clean water and sanitation, SDG7—affordable and clean energy and SDG11—sustainable cities and communities.

SDG 16 is related to peace, justice and strong institutions, and it is one of the goals to which these communities contribute the most. For this analysis, what matters

is essentially the need to develop effective, accountable and transparent institutions at all levels and ensure responsiveness, including participatory and representative decision-making at all levels. This objective is in keeping with the social dimension of these communities. In this dimension, the most integrated practices are the active participation of all members in the daily tasks of the community, the decision-making process through consensus, the existence of members with different levels of commitment and responsibility within the community and the use of a formal method of governance, like sociocracy. Through the high levels of integration of these practices, it is possible to see that these communities assume a commitment to the transparency of decision-making processes, encouraging the participation of their members, looking for the effectiveness of the community as an institution.

Other goals that are very present in the practices and concerns of these communities are SDG 12—responsible consumption and production and SDG 13—climate action. These communities integrate deeply within their daily lives, practices related to the efficient management and re-use of resources to minimize their adverse impacts on human health and the environment. Furthermore, they seek to promote a conscious consumption of goods and services and respect endogenous cycles and materials, both in agricultural practices and construction. The concern with climate is unavoidable in these communities. Historically, ISCs emerged inspired by the ecological movement of the '70s as a response to the environmental problems produced by industrial development.

These communities develop other sets of activities, largely integrated into their daily lives, related to the regeneration of water sources and cycles and the use of renewable energies. These activities are linked to the sustainability concerns of ISCs. More specifically, in terms of water resources management, ISCs seek to play an active role among their members in supporting and strengthening the participation of local communities in improving water and sanitation management. To this end, they develop practices that aim to increase water-use efficiency across all sectors and ensure sustainable withdrawals to protect and restore water-related ecosystems, and these principles are directly aligned with SDG6. ISCs also seek to develop a set of techniques, in line with SDG7, that aim at energy efficiency, promoting clean energy and minimizing the use of fossil energy. At the same time, they contribute to SDG2, as they favor the cultivation and production of organic and biological foods, which respect endogenous and seasonal characteristics. These activities are developed based on a sustainable food production system of resilient agricultural practices that help maintain ecosystems by incorporating permaculture principles.

Although the economic dimension is integrated into some of these communities, it is clear where there is a tendency toward less integration. Activities classified in the economic dimension relate to SDG8. The payment of salaries, the use of an alternative and/or complementary currency and the creation of financial institutions within the community are poorly integrated into these communities' daily lives. These practices are critical to ensure community resilience and self-reliance, although they are more challenging to achieve.

4.2. *Innovation and scalability*

The sustainability practices identified above reveal the willingness of these communities to develop innovative and differentiated techniques whose objective is to

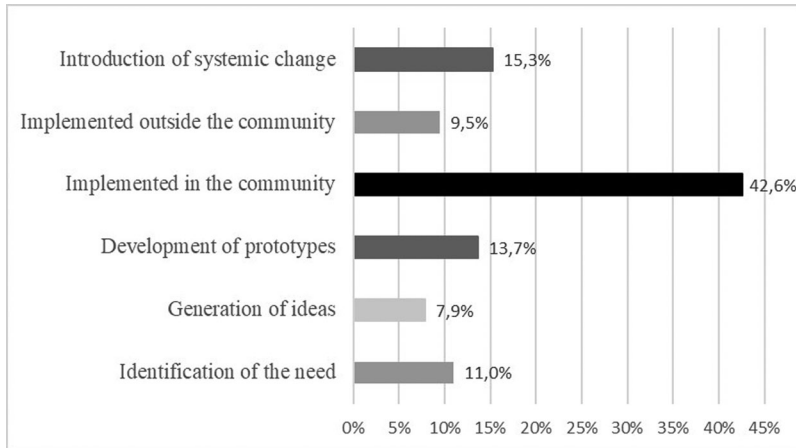


Figure 2. Stage of development of ISCs' innovative practices.
Source: Own elaboration.

minimize the human impact on the environment. Furthermore, the purposes of the ISCs translate into meeting the social needs of their members, supported by the logic of social innovation. In this study, we noticed that 71.8% of the communities claimed to have developed social innovation practices in the last three years. For the remaining 28.2% who had not established innovation practices, the most mentioned reasons are the following: investment in innovation is too risky (30%) and expensive (25.4%), difficulty in identifying their needs (13%), involvement of community members (10%), participation of agents outside the community (9.7%), not recognizing the advantage of developing innovation (7.3%) and the lack of time for its development (4.6%).

Through their individual and microscale practices, these communities can offer interesting macroscale insights to achieving the SDGs. For this, it is necessary that these practices, developed on a microscale, or grassroots innovation, have transferability and scalability potential. This scalability implies ranging from different stages: from need identification, idea generation, development and testing, implementation, transfer (scaling-up), to introducing systemic change (Mulgan *et al.* 2012). One of the main objectives of this paper is to understand how these community initiatives on the microscale can generate potentially generalizable innovations working as transition mechanisms toward more sustainable social, economic and environmental models at the macro level, thus contributing to the SDG. To this end, participants were asked to indicate at what stage of development they were in the innovative practices they develop (Figure 2).

The analysis of the development level of these communities' innovation practices reveals that about 43% are located at the level of implementation within their specific context, in this case, within the community itself. In only 10% of cases, an innovative practice was implemented outside the community itself. A relevant aspect of this analysis is related to the percentage of communities that affirm that their practices introduced systemic changes, the most advanced stage of the social innovation cycle. The discussion about what systemic change means is controversial and refers to the very notion of system. It is not the purpose of this paper to enter into a theoretical discussion about these aspects.

In this case, it is assumed that systemic change is a stage that is only reached after the scaling-up of innovations and through a process of organizational development and changes in relationships between institutions and stakeholders (European Commission 2013). Systemic change generally involves new frameworks or architectures made up of many smaller innovations, resulting in changes in the public sector, private sector, grant economy and household sector, usually over long periods (Murray, Caulier-Grice, and Mulgan 2010). This means that this “innovation” has in itself a transformative capacity that leads to a cultural and political change in the way we look at, and intervene in, the problem/need under analysis (Murray, Caulier-Grice, and Mulgan 2010).

In this sense, the idea that in 15% of cases the innovations generated are inducers of systemic change must be scrutinized with caution and critical thinking. This aspect is problematic and reveals some idiosyncrasies. This may be because the theoretical notion of “systemic change” does not have to be shared and known by all social agents, namely the respondents to the survey. The classification of their practices as systemic change inducers may be due to a solid commitment to their life models, an attempt to underline the importance of these practices for society, some romanticization or a projection of a change/desirable future path. These features may lead to some errors of judgment (when compared to the theoretical definition of systemic change) on the part of the participants in this self-rating.

Data underlines the importance of a twofold analysis of the innovation process. This process must be comprehended in a co-evolution logic of complexity supplanting more simplistic notions of a single directional impact. This implies, as mentioned, rethinking what is understood by “system” by replacing the idea of equilibrium with a notion of systematic and dynamic processes. Basically, it is the idea that social practices are located in time and space, contributing to the empirical analysis of social change and the connection between different levels of analysis (Walby 2003).

As mentioned earlier, for the ISCs to have the potential to transfer the innovation they generate from a microscale to a macroscale of intervention, it is necessary that they have mechanisms that allow this transfer, since all innovation (namely, social) is a constructed social action imbued with meaning, based on the interaction between actors, contextual factors and their intersubjective rules. This reinforces the importance of analyzing simultaneously not only the contextual factors that enhance or limit the development of innovation practices but also the interactions established between the actors.

In order to understand the characteristics of the interactions and relationships that European ISCs establish, a social network analysis (SNA) was carried out. Of the total number of valid responses, 62.1% of the communities under analysis said they collaborate with other entities, 35.9% affirmed that they did not collaborate, and 1.9% did not know or did not respond. Each respondent community was asked to identify up to five entities with which they established frequent relationships. Figure 3 shows the complete network established by the communities analyzed in this paper. In total, 251 nodes or organizations were identified, represented by the circles, and 489 ties or connections, represented by the lines.

One of the metrics used was density, the general level of connection in a network. Graphs with values close to 1 are typically considered dense, while those close to zero are termed as sparse graphs (Scott 2017). The links identified by the ISC under study constitute a network with very low density, or a sparse network, that is, the proportion

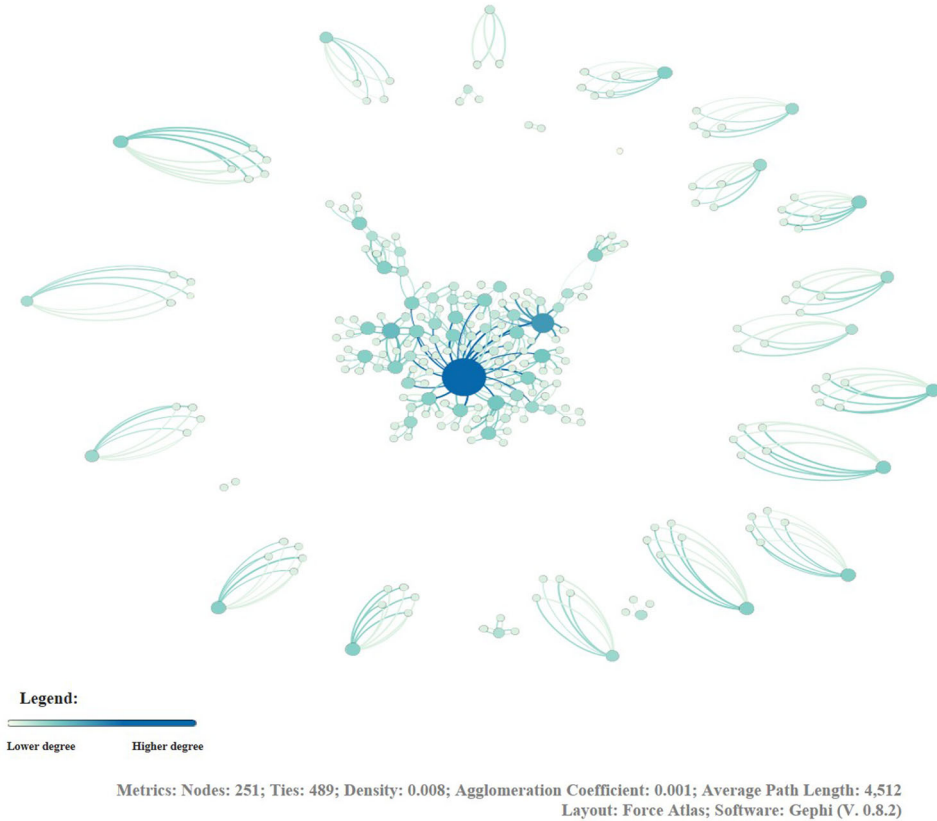


Figure 3. Network of collaboration relations established by European ISCs.
Source: Own elaboration using Gephi (V. 0.8.2).

of existing links to the total number of possible links is only 0.008. The degree measures the total number of connections that a node establishes, and, in the case of this network, the average degree is 1.901, which means that each node has about 2 connections with other actors in the network. The network has a low clustering coefficient of 0.001. This parameter measures the probability that two actors, associated with the same actor, must be able to be connected to each other (varies between 0 and 1). The diameter of the network was also analyzed. In practice, the diameter allows us to understand the complexity of the network, because it indicates how many steps (links) are necessary for the two most distant nodes (actors) in the network to reach each other (Borgatti *et al.* 2013). In this case, we are dealing with a complex network since its diameter is 10, which means that the greatest distance between two actors is 10 ties.

The size and color of the nodes indicate their degree; the bigger and darker the knot, the higher degree it has. One of the main characteristics of this network is the fact that it has a core (main component) that is completely connected, and therefore denser, and a periphery composed of several disconnected components. A component, in the language of network analysis, consists of all nodes that can be connected to each other by at least one path (tie), and the existence of components is the minimum configuration for a cohesive structure to exist (Scott 2017).

In this case, 25 components were identified, namely the most central and small groups around the nucleus that are not connected to the main component. These peripheral and disconnected components are formed by the respondent community and the entities they have identified as the most important partnerships. The fact that they establish small networks, mostly local or regional, makes them increase the scope of the type of entities with which they relate, so that they can meet their needs for accessing and sharing information. This structure reveals interesting aspects of the respondent communities' interactions. From the outset, it reinforces the idea that these communities seek to gain a sense of autonomy, as most aim to achieve high levels of ecological, economic and social self-sufficiency in their local and regional context (Barani, Alibeygi, and Papzan 2018).

Although this trend is transversal to all ISCs, there are some that are clearly more radical, in the sense that they are more closed communities (Adalilar *et al.* 2015), which may condition their connection to other entities. Furthermore, when the first wave of this type of communities appeared in the '70s, there were no structures that aggregated them and facilitated communication between them. With the creation of GEN in 1995, there was a shift from small individual groups to a greater connection between them (Temesgen 2020). GEN plays a crucial role in this network, being the node with the highest number of connections (degree,) and it has brought a more cohesive dynamic to the ecovillages movement, since it works as a space where it is possible to share experiences on how to achieve the autonomy that the ISCs pursue. This importance is visible through the analysis of the network (Figure 3), where GEN always assumes a central role, being the node with the highest degree and consolidating the structure of most of the identified connections.

In order to understand the potential of transferred knowledge to introduce social changes oriented toward more sustainable development, it is necessary to understand what types of entities these communities relate to most. Among all the nodes identified in the network, 34.72% of the actors are communities, and 31.25% are national/international networks, such as GEN. Most of the network is formed by this type of entity. The entities with the least representation in the network are private non-profit associations (9.72%), universities and R&D centers (6.94%), governance bodies (6.25%) and entities classified as "others" (11.1%). Within this category, 5.55% are public associations, 4.86% are other types of entities and 0.69% are companies.

Still, in this sense, it was possible to notice that each ISC under study established an average of 0.4 with governance bodies and with private non-profit associations, 0.3 links with knowledge agents (universities and R&D centers) and 0.2 with other organizations. These communities tend to have more relationships with other communities of the same type, with an average of 1.5 relationships for each ISC under analysis, and with national/international networks, with an average of 1.3 connections.

This allows two main aspects to be underlined. First, the relationship with governance bodies is still not very significant in the general structure of the network established by these communities. In this sense, although their daily practices are aligned with some SDGs, their impact potential may be compromised due to this gap in the interconnection with governance. And second, the fact that ISCs are essentially related to other communities and national/international networks indicates that there is a tendency toward relationships between organizations that share the same codes, objectives, norms and values.

National/international networks, such as GEN, thus assume a central role, mainly because they are located either at the core of the network or between the core and the

periphery. These actors that are located on the periphery are characterized by the greater weight of weak, less intense ties. The literature suggests that actors with strong ties tend to have more stable relationships. On the other hand, actors with weak ties in the network have more connections outside the network, which is fundamental to facilitate the flow of new ideas and the introduction of innovation to the network (Granovetter 1973).

4.3. Discussion

ISCs integrate into their daily practices concerns and principles aligned with sustainability strategies, even if unintentionally. In particular, they carry out activities that contribute to some of the SDGs. These practices are generated on a microscale and can be seen as a privileged *locus* for developing innovative practices. However, if they do not find transfer and scalability mechanisms, their potential to introduce significant change may be compromised. Introducing substantial changes on a macroscale requires an integrated, multiscale approach that involves different stakeholders, from community members to governance bodies. This is the great challenge of innovation.

Our understanding of innovation, namely social innovation, is based on the principle that the focus is on collective action and on changing social relations. This implies thinking about social innovation as a process that integrates the macro, meso and micro levels of social systems (Edwards-Schachter and Wallace 2017) and that, therefore, goes beyond the visions that oppose agency and structure, individualism and structuralism. In this sense, understanding what is meant by social innovation also involves realizing in which institutional environments the agents are inserted and how these environments condition or enable their actions.

Focusing on social practice means assuming that it is only through social practice that the various innovations penetrate society, thus becoming the object of acts of imitation. Social practice is directly linked to social change, since the wide variety of everyday inventions constitute stimuli and incentives to reflect and, possibly, change social practices. When these stimuli are absorbed, they lead to changes in existing social practices that later spread through society and rebuild social cohesion through acts of imitation, ultimately contributing to social transformation (Howaldt, Kaletka, and Schröder 2016).

The data presented shows how certain sustainable practices are integrated into the daily lives of these communities. This allows us to reflect on the way in which the ISCs shape their social practices and guide them through a set of collective actions toward more sustainable ways of life. These practices emerge more from cultural trends and from an internal and collective concern about the consequences of their impact on the environment than from a deep critique of history and a concern to align with the strategies advocated by governance bodies. Despite this, they still represent good examples of how citizens can collectively change the way they relate to the environment and to each other. With proper dissemination and scalability, these practices can be the target of acts of imitation and thus constantly contribute to social change toward a transition to sustainability.

These actors do not exist, however, as atomized units but as integral parts of a whole. This is understood, on the one hand, via their community experience and the way it shapes individual perceptions, and, on the other hand, their relationship with the context(s) outside the community and the way meanings are (re)constructed in this scenario. In this sense, and as already mentioned, the social construction of innovation

implies the existence of a set of reciprocity mechanisms that articulate the micro, meso and macro levels of action development. This is because transitions to sustainability imply that innovation practices are capable of introducing tensions in crystallized structures. For this to happen, there must be mechanisms for the diffusion and dissemination of knowledge and innovation, such as networks.

The network analysis presented here shows that these communities seek to establish these mechanisms of reciprocity through collaboration with a set of other actors. However, this network has a limited internal density, which means that the possible connections within this network could be much larger, taking into account the total number of existing ties. This indicates that there is still work to be done to increase connectivity and collaborative links between these communities and other organizations. The high number of disconnected components in the network ends up confirming this fact even more. However, this can also be understood as a way of reducing its dependence on institutional architectures crystallized in society and, therefore, is a way of keeping its radical cores unchanged. If, on the one hand, this is crucial for these communities to be able to maintain their identity and their disruptive capacity to develop sustainable innovation practices, on the other hand, it also ends up compromising their ability to introduce change to these institutional arrangements.

Based on the premise that innovation, as a social process, is characterized by the existence of reciprocity mechanisms between actors (Edquist 1997; Freeman 1988; Lundvall 1992; Nelson 1993), it is necessary to carefully consider aspects such as values, culture and goals, legal structure, people, knowledge and technology, and, finally, the integration of these elements into the way actors develop their practices (Piteira 2014). In fact, the average number of links that ISCs reported is higher with other communities of the same type or with the national/international networks that aggregate them rather than with governance bodies or knowledge agents. This feeds the idea related to the importance of sharing a set of codes, cultural aspects, values and objectives so that the collaborative relationship can be more effective.

The relationship with other types of actors, such as governance bodies, universities and R&D centers, is one of the crucial mechanisms for the scalability of innovation and above all for adapting these practices to the needs of societies, namely, in terms of sustainability. Fostering these relationships in this context is crucial, because it is the involvement in plural social systems that endorses the human potential of agency, contributing to the reproduction or denial of each particular system (Giddens 1984).

This vision cements the idea of articulation and dependence between agency and structure (Pinto et al. 2021). The focus of innovation is the individual connected with a favorable environment. With their particular knowledge and expectations, actors are central to innovation processes rooted in varying degrees and specific contexts. This means that agency and structure do not exist independently of each other; on the contrary, they are mutually dependent. In this sense, innovation is social as it is composed not only by individual actors, nor by any form of social totality, but by a co-constructed action imbued with meaning, based on the interaction between a myriad of actors, contextual factors and intersubjective rules.

5. Conclusions

ISCs have been demonstrating the importance of their role as active agents for sustainable development. The idea of characterising these communities as civilisational

setbacks and with the resumption of archaic practices is beginning to fade. The importance of looking at and learning from these microscale projects is being increasingly recognized (Temesgen 2020), as ISCs represent a privileged place for the development of experiences focused on sustainability. The main objective of these communities is to develop a sustainable lifestyle that is integrated as effectively as possible with the environment. This sustainable lifestyle is developed according to a holistic approach that considers sustainability in its multiple dimensions. According to these social, economic and environmental dimensions, members guide their actions and build collective meanings.

ISCs, although on a microscale, can contribute to the SDGs. The practices of the European ISCs analyzed in this study corroborate this assumption. The sustainable practices that are most integrated into the daily lives of these communities are directly related to SDG 12—responsible consumption and production, namely through the re-use of resources and a concern with the conscious consumption of goods and services. They also contribute very effectively to SDG 13, mainly due to practices related to the regeneration of biodiversity and the ecosystem and the collective management of resources and activities. However, given the centrality of this SDG, it is safe to say that all the activities they develop have environmental concerns and the fight against climate urgency as a backdrop. Proof of this is its articulation in SDG7, in the experience of renewable energy alternatives with low environmental impact and without fossil fuel resources and their worries about seizing and cleaning cycles and water sources (SDG6).

In addition to the environmental dimension, these communities contribute to SDG 16—peace, justice and strong institutions. The practices that contribute most to this objective are social and translate into the active participation of community members in all tasks and the decision-making process through consensus. Furthermore, it is common practice for ISCs to develop and test new forms of governance, such as sociocracy.

Despite the importance of these practices generated on a microscale, sustainable development and the SDGs lack the structural implementation for them to be effective. The social change they advocate must be developed on multiple scales. No matter how transformative and innovative a practice is, if there are no mechanisms that allow its transfer and scalability to other levels of action, its effectiveness will always be compromised. Data shows that the transferability potential of these micro-based practices is compromised due to the existing gap in the relationships they establish with actors fundamental for the meso-level dynamics (such as universities and other higher education organizations) and macro contexts (such as government bodies).

Furthermore, the network established by the ISCs under analysis has a limited internal density and is excessively dependent on a central organization—the Global Ecovillage Network. It is, therefore, important to understand whether the pressure and change-inducing role that these communities can play is being channeled and centralized by GEN. This would be a way of introducing more structural organization to the movement and could have significant advantages for the contribution of ISCs to transitions to sustainability, namely through the dissemination of a set of good practices that align with the SDGs. Our results do not allow for making a definitive statement about this. To do so, an analysis would be needed that focused only on the role that GEN (and other networks) have played in this regard. This is an important future line of inquiry to understand in detail the role that these actors can play in social change.

Environmental problems and the climate crisis are cross-cutting, multi-actor and multi-level issues, which require innovative approaches. It is counterproductive to think of the climate dimension as isolated from other dimensions. The social challenges that contemporary societies face imply a social transformation, a sustainable transition that must take place in various realms of reality. Practices that emerge on the microscale, at the level of civil society and community action, still need attention from governance bodies and other stakeholders. For the scalability of the innovation practices generated by these communities, and for them to play a role in the long term as agents that contribute to the transitions to sustainability, it is necessary that these mechanisms for disseminating knowledge are strengthened. This strengthening could contribute to the emergence of a European ecosystem of ISCs.

This is where public policy could play a structural role in providing a favorable context for these communities. Issues such as improving and facilitating access to funding sources, developing more flexible and less bureaucratic legislation that reduces the risk and cost of investing in innovation, such as the existence of support programmes, and the support of national, regional governance bodies and locations could be major factors for the development of this ecosystem.

Although this study identifies relevant clues about the connection of these communities with innovation and transitions to sustainability, some important questions still need to be answered. Future research may focus, on the one hand, on the role of individual actors. This would be important to deepen the understanding of individual behaviors for the development of innovation, the idea of the social capital of the community itself and even the perception of the communities themselves about collaborative networks. On the other hand, comprehending the perspectives of the government bodies, regional, national or European, about the role that ISCs can play in contributing toward the SDGs is fundamental to unlock their potential for scalability.

Notes

1. The Ecovillage Impact Assessment is a survey with two levels: Level 1—the Personal Community Assessment measures the subjective opinions of community members about their shared lives and practices; Level 2—the Collective Community Assessment measures the presence, scale or frequency of specific practices for cultural, economic, ecological and social regeneration in a community. More information on this tool is available at the GEN website (<https://ecovillage.org/sustainable-development-the-ecovillage-way/>)

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