Building Research Communities through Communication: The Case of FOSSR

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Abstract. In the age of Open Science, research communication within Open Research Infrastructures (RIs) should evolve beyond traditional dissemination models. Rather than merely transferring knowledge, communication should serve as an enabling mechanism for community-building, ensuring long-term engagement with research outputs. Open Science RIs depend on active and engaged communities to achieve their mission of collecting, curating, and sharing research data. Without sustained interaction between researchers, policymakers, stakeholder groups, and the public, infrastructures risk becoming static repositories rather than dynamic spaces for knowledge exchange.

This paper explores how research infrastructures can foster collaborative, participatory, and sustainable Open Science. We present the conceptual design and mid-term results of the communication strategy developed for the NRRP-funded FOSSR (Fostering Open Science in Social Science Research) Research Infrastructure, showing how communication can be reframed as an infrastructural function rather than an auxiliary activity.

By examining FOSSR's communication strategy, this paper contributes to ongoing discussions about the evolving role of communication in Open Science research infrastructures. It argues that research infrastructure communication must move beyond knowledge transfer to actively shaping collaborative research environments. This shift is critical for ensuring the sustainability, inclusivity, and long-term impact of Open Science initiatives.

1 Introduction

In the current era of Open Science, the way research is shared within Open Research Infrastructures (RIs) and with the public is expected to undergo a transformation that transcends conventional dissemination models. This evolution is concomitant with the discourse that has emerged over the preceding decades concerning the limitations of the deficit model of science communication (Bucchi & Neresini, 2008). The prevailing

paradigm is characterized by an increased respect for the unique knowledge contributions of individuals and, more broadly, for the characteristics of diverse audiences, fostering multidirectional exchanges and knowledge co-production (Trench, 2008).

The emergence of Open Science, proposed as a transformative framework for contemporary research, is oriented to significantly reshape the epistemic, institutional, and communicative dimensions of scientific practice. Emphasizing transparency, accessibility, and collaboration, Open Science challenges the contemporary shift of knowledge production and circulation towards privatization and compartmentalisation (Ziman, 2000), calling for subsequent coherent choices on how research is organized, shared, and evaluated (Nosek et al., 2015).

Open RIs depend on active and engaged communities to achieve their mission of collecting, curating, and sharing research data. Without sustained interaction between researchers, policymakers, stakeholders, and the public, infrastructures risk becoming static repositories rather than dynamic spaces for knowledge exchange.

A focus on engaged communities necessitates continuous attention to the sustainment and care of a group comprising a diversity of epistemic cultures (Knorr-Cetina, 1999), encompassing disciplinary and transdisciplinary actors engaged with open science and research infrastructures. Such a focus demands a sustained effort to adapt and care for the human component of the RI, including training, networking, and the opening of reflexive spaces.

In this evolving landscape, the understanding of the role and purpose of communication evolves from being a peripheral, service-like activity confined to the dissemination of results, as in most institutional or promotional communication (Nisbet & Markowitz, 2016) to become a core infrastructural and relational component of research itself, and is necessary to the building and maintenance of the engaged community.

Conventional models of scientific communication have predominantly emphasised the unidirectional transmission of information from researchers to external audiences, frequently conceptualised in terms of dissemination or outreach, and this is also true for the communication efforts of research institutions (Claessens, 2018; Trench, 2008). Nevertheless, this model is increasingly recognised as inadequate in capturing the complex communicative ecologies that characterise contemporary science-society interplay, and it is unsuitable for sustaining the complex circulation mechanisms that feed open environments. It also suffers from being grounded to clear demarcations between scientists and the public, while the community supporting a research infrastructure is hybrid and multi-actor by election, blurring clear distinctions among social groups. In these settings, communication cannot be regarded as an endpoint service to promote the dissemination of research outputs, but rather as a process that mediates collaboration, fosters knowledge exchange among the diverse layers of the community,

supports the establishment of relations, and ultimately sustains the sociotechnical systems upon which research depends.

As such, communication becomes infrastructural: it underpins the very possibility of collective knowledge production, while also reflecting broader shifts in the governance, organization, and evaluation of science (Cerroni, 2006; Davies & Horst, 2016). Rather than merely transferring knowledge, communication serves in this context as an enabling mechanism for community-building, ensuring long-term engagement with research outputs.

This paper explores how research infrastructures can foster collaborative, participatory, and sustainable Open Science by assigning a prominent role to community-building through communicative actions. We present the conceptual design and mid-term outcomes of the communication strategy developed for the NRRP-funded project FOSSR (Fostering Open Science in Social Science Research), showing how communication can be reframed as a structural function rather than an auxiliary activity.

Our central aim is to explore how communication functions as both a relational and infrastructural element within FOSSR Open Cloud. Specifically, we will describe the design of communication practices and their first operational phase at the midpoint of the project duration, highlighting how communication transforms its role to focus on mediating relationships among researchers, policymakers, and civil society actors. We will also explore how a more structural and strategic role of communication could contribute to the broader goals of Open Science, particularly in the context of social research.

2. Theoretical Framework

The development of science communication theory over the last few decades offers a critical perspective on describing the changes occurring in the field of communication in Open Science and Research Infrastructures (RIs). Traditionally, the dominant model of science communication was the 'Public Understanding of Science' model, which posited that public scepticism or disengagement with science stemmed from a lack, or 'deficit,' of knowledge on the part of citizens (Bodmer, 1985; Cortassa, 2016; Miller, 2004). According to this view, the role of communication was to transfer scientific facts from experts to lay audiences in a unidirectional flow (Nisbet & Scheufele, 2009), with features similar to those of basic school education. However, this model has been the object of scholarly criticism for its technocratic and paternalistic assumptions and its poor capacity to include the social, cultural, and political dimensions of public engagement with science (Davies & Horst, 2016; Jasanoff, 2003). In response, scholars have proposed and developed a reflection focusing on dialogic and participatory models that emphasize mutual learning, co-production of knowledge, and the legitimization and inclusion of

diverse epistemologies in both the understanding and resolution of science-based issues (Funtowicz & Ravetz, 1993; Jasanoff, 2004b; Wynne, 1992).

For the purposes of our research, we adopt the definition of Open Science as provided by UNESCO (2021), which significantly lists open science infrastructures, science communication and the engagement of societal actors among the pillars of open science: 'an inclusive construct that combines various movements and practices aiming to make multilingual scientific knowledge openly available, accessible and reusable for everyone, to increase scientific collaborations and sharing of information for the benefits of science and society, and to open the processes of scientific knowledge creation, evaluation and communication to societal actors beyond the traditional scientific community. It comprises all scientific disciplines and aspects of scholarly practices, including basic and applied sciences, natural and social sciences and the humanities, and it builds on the following key pillars: open scientific knowledge, open science infrastructures, science communication, open engagement of societal actors and open dialogue with other knowledge systems'.

The dialogic models in science communication share a common ethos with Open Science, in that they both seek to democratize knowledge production and foster an inclusive research ecosystem (Hecker et al., 2018; Jasanoff, 2004a). In both contexts, communication is not merely about informing the public and disseminating research outputs; it is also about facilitating meaningful and long-term interactions among a diverse array of actors, including researchers, policymakers, civil society, and communities. This shift is especially relevant in the context of RIs, which function not only as technical platforms but also as social and organisational entities oriented to facilitate collaboration and knowledge exchange across institutional and disciplinary boundaries.

Within academic research, the concept of 'productive interactions' was introduced by Molas-Gallart & Tang (2011) is particularly relevant to capture the relational features of communication. This approach moves beyond linear models of impact assessment to focus on the interactions between researchers and stakeholders that can produce socially relevant outcomes. *Productive interactions* can be direct (e.g., face-to-face meetings), indirect (e.g., through documents or tools), or financial (e.g., funding collaborations), and they are understood as essential mechanisms through which research acquires meaning and utility beyond academia, in broader societal contexts. A key aspect of the FOSSR communication strategy's design was to consider communication practices that support such interactions as core strategic assets, rather than merely 'ancillary' to the infrastructure's mission and sustainability.

When communicative practices are considered to be of such central importance to the development and long-term sustainability of RIs, the dynamics related to the shaping and interplay of communities acquire a central role. In a context centered on knowledge production, the interplay among the diverse 'epistemic cultures' (Knorr-Cetina, 1999), or

the specific ways in which different scientific communities construct and validate knowledge, is of notable relevance. These cultures shape not only the methods and instruments of research but also the communicative norms and expectations that govern interaction within and beyond the scientific community. The concept of communication is intricately interwoven with the epistemic fabric of research, a phenomenon that is particularly evident in the field of social science RIs, where the physical components of the infrastructure, although present and crucial to ground it, are less visible than big science laboratories. Consequently, the human components and the aspects related to the development of a robust interplay among all actors are vital. The function of communicative actions extends beyond the mere transmission of information, encompassing the negotiation of meaning, the establishment of trust, and the harmonization of diverse perspectives.

The central dimension of communication within Ris can also be highlighted by organizational and sociotechnical theories. Star and Ruhleder (1996) argued that infrastructure becomes visible only upon breakdown, stressing its embeddedness in everyday practices. Communication, in this sense, could be considered 'infrastructural' when it enables the seamless coordination of distributed activities, supports interoperability, and sustains the institutional ability to preserve and recollect the past within research organizations. As RIs represent structures in the research realm where the general trend towards increasing complexity, hybridization, and transnationality prevails, the design of communicative processes within RIs, ranging from digital platforms to governance protocols, becomes a critical site of sociotechnical negotiation and potential innovation.

Contemporary research communication is also assigned a central role in linking scientific practice to broader questions of citizenship, policy, and institutional legitimacy, especially concerning issues positioned at the superposition of different disciplinary and sectoral perspectives and worldviews, such as the governance of socio-ecological problems or the conditions for fostering inclusive sustainability. Scholars have emphasized the importance of public communication in shaping the social contract of science, particularly in contexts where public funding and political accountability are at stake (Benessia et al., 2016; Irwin, 2015; Jasanoff, 2003, 2005; Wynne et al., 2007). Nowotny et al. (2001) argue that science must become more socially robust by engaging with the values, expectations, and uncertainties of society. This requires communicative practices that are not only transparent but also dialogic and responsive, able to foster the exercise of the emerging right to scientific citizenship, or the right to appropriately exercise the right to the governance of scientific knowledge in the knowledge society (Cerroni, 2020). Funtowicz and Ravetz (1993) advocate for an 'extended peer community' in which laypeople and non-traditional actors participate in the evaluation of the quality of scientific knowledge, especially under conditions of uncertainty, complexity, urgency, values at stake, and when science is socially distributed and policy-relevant.

The communication of research cannot be framed reductively as a means of enhancing institutional or project visibility or demonstrating compliance with Open Science mandates; it is a constitutive element of scientific citizenship and institutional longevity. It enables RIs to articulate, synthesize, and propose their core values, establish alliances, and gain the ability to reflexively adapt to changing political and epistemic environments.

These theoretical perspectives underscore the need to reconceptualize communication within RIs as both relational and infrastructural (Fecher et al., 2021). It is through communicative actions that RIs, such as FOSSR, enact their epistemic cultures, foster productive interactions, and position themselves within broader socio-political environments. This theoretical framework guides our empirical analysis of the FOSSR project, focusing on how communication is implemented, shaped by institutional arrangements, and experienced in everyday practice.

3. Methodology

This study adopts a case study approach to investigate the evolving role of communication within an Open Science Research Infrastructure, focusing on the FOSSR project (Fostering Open Science in Social science Research) based on the implementation of an Open Cloud – a kind of meta-research infrastructure developed under Italy's National Recovery and Resilience Plan (NRRP), provides a manifold context for examining how communication can be first conceptualized and then implemented at the service of social science research. Specifically, the analysis focuses on FOSSR's dedicated communication and community-building work package, from the design phase through to the realization of strategic activities.

The case study approach is particularly suitable for exploring complex and context-dependent phenomena, such as the infrastructural role of communication. It's focused on an in-depth exploration of social processes within their contexts, allowing researchers to identify the factors driving organizational dynamics, such as situated practices, institutional logics, emerging challenges, tensions, and networks of actors.

In the FOSSR case, the communication strategy (Reale & Fabrizio, 2024) represents not only a technical function but a strategic and epistemic point of negotiation, where the meanings, roles, and boundaries are continuously constructed and negotiated within broader research and governance frameworks. The empirical material for this study was drawn from various sources, allowing a comprehensive understanding of the case. First, internal documentation – a total of 30 documents, including the project proposal (1), deliverables (5), milestones (11) and periodic reports (13) – was explored to trace the formal articulation of communication goals, strategies, and features. These documents, analysed with repeated close readings guided by some basic operational questions (e.g.: 'What was the frame for communication activities within FOSSR?' 'Which communicative

tools, practices and channels were proposed by design?' 'Which audience segments were considered, for what purpose, and which were the tailored tools to address them?' 'Which external and internal actors the specific communication practice was meant to address?'), provided insight into how communication is framed within the broader objectives of the RI and how it is embedded in institutional planning.

Second, communication plans and strategic frameworks were examined to understand the operationalization of communication within FOSSR. These materials outlined the intended audiences, key messages, channels, and evaluation metrics, offering a window into the infrastructure's communicative rationalities. Particular attention was paid to how these plans addressed stakeholder engagement and community-building, supporting the knowledge circulation principle of Open Science.

Third, the digital community – including interactions on FOSSR social media channels and newsletter subscribers – was analyzed to assess how community-building is enacted in practice. These outputs were treated as both communicative channels and performative acts that contribute to the construction of FOSSR's community identity and epistemic legitimacy.

Fourth, public events, such as workshops, webinars, and in-person meetings, were considered crucial contexts where communicative practices contribute to community building. Basic participation data were acquired: the number of events organized, the number of participants to events and their institutional affiliation category, the number of papers presented at conferences. However, these events were examined not only for their content, but also for their design and format, structure, participation dynamics, and facilitation strategies, allowing to obtain an early assessment of the extent to which FOSSR's communication practices incorporate dialogic and participatory principles.

A distinctive feature of this study lies in its collaborative and reflexive methodology, grounded on the dual positionality of the researchers as both academic analysts and actively involved practitioners, allowing for a reflexive engagement with the empirical material, facilitating the identification of tensions, contradictions, and emerging practices that might otherwise remain unnoticed. Field notes, informal conversations, and reflexive annotations were used to capture and reconstruct experiential knowledge, integrating it into the analytical process.

This collaborative approach is consistent with recent perspectives in science and technology studies (STS) and organizational sociology, calling for more engaged, situated, and participatory forms of inquiry that can appreciate the features pertaining to the performative nature of research. Research methods do not simply represent the social world, they help enact it, thus requiring reflexive and inclusive approaches in order to account for the multiplicity and complexity of social realities (Law & Urry, 2004); situated knowledge and relational practices are crucial factors to consider in order to capture all the nuances of social situations, hence methodologies that are embedded,

responsive, and attentive to the dynamics of collaboration across diverse contexts are necessary. By situating the researcher within the communicative lifeworld of the RI, the study was able to capture the lived realities of communication work, including the affective labor, institutional constraints, and creative improvisations that characterize everyday practice.

Despite its strengths, the study also shows some limitations. As a single case study, it sheds light on the in-depth dynamics of social structures; however, the findings are not intended to be generalizable in a comparative sense. Rather, they aim to provide analytical insights that can be applied to other contexts with similar characteristics. In addition, the embedded nature of the research required a careful consideration of researchers' positionality. Reflexivity was employed to mitigate these aspects, and the double role of researchers inevitably shaped the selection, interpretation, and presentation of data.

This study focuses on the internal and institutional dimensions of communication within FOSSR, while subsequent studies will be able to highlight the reception and impact of these practices among external stakeholders and the broader community.

Finally, the temporal range of the study is limited to the early phases of FOSSR's implementation, and is meant as an early indicator of design-related choices. As the infrastructure grows, its communication practices may evolve in response to new challenges, opportunities, institutional, and contextual learning. Longitudinal studies will be necessary to explore these development dynamics in order to understand the role of communication in sustaining the infrastructure over time.

4. The FOSSR Open Cloud

FOSSR's strategic aim is to integrate with a unique access point the country's nodes of key European research infrastructures: CESSDA-ERIC (Consortium of European Social Science Data Archives), SHARE-ERIC (Survey of Health, Ageing and Retirement in Europe), and RISIS (Research Infrastructure for Research and Innovation Policy Studies). Its overarching goal is to establish an Italian Open Science Cloud for the social sciences, inspired by the European Open Science Cloud (EOSC), to enhance the accessibility, interoperability, and reusability of social science data.

This kind of 'meta-infrastructure' is designed as a distributed network of data centers and virtual platforms, coordinated by the National Research Council (CNR) and involving nine institutional partners. At its completion in 2026, after 3.5 years of activity, it will provide tools and services for data collection, curation, and analysis, including support for longitudinal surveys and the possibility to explore social science issues with probability panels.

The key rationale behind FOSSR's early investment in community-building lies exactly in the recognition that research infrastructures are not only technical systems but also social constructs.

Considering RIs as sociotechnical platforms means recognising their vital role in conducting high-quality research, which often involves processing significant amounts of complex data from various sources (Watson & Floridi, 2018). They integrate technological components, human expertise, and organizational processes to enable scalable, reliable, and collaborative knowledge production (Ibidem).

The survival of any RI is contingent on the individuals operating it; however, in the context of social science RIs, which are less tangible than those in hard science, the notion of research infrastructures as socio-technical objects assumes particular significance.

The sustainability and impact of a research infrastructure depend on the robustness and vitality of the communities that use, maintain, and evolve it. Consequently, soft features such as data curation, the provision and maintenance of services to interpret and extract meanings from data, and a community controlling and validating the quality of data and the production of high-quality research are at the heart of Social Science RIs.

Accordingly, FOSSR has prioritized the development of communicative and participatory mechanisms that support building of a network of knowledge exchange and infrastructure 'co-building' by means of collaborative practices among its stakeholders. This approach acknowledges that Open Science is not merely a matter of open data or open access, but a cultural and institutional transformation that requires sustained engagement and mutual learning.

FOSSR's target users span a broad ecosystem: academic researchers, public administrations, policymakers, civil society organizations, and even engaged citizens. This diverse stakeholder landscape reflects the project's commitment, alongside to provide robust datasets and services to the scholarly community, to democratize the access to scientific knowledge and to foster a widening of the participation in research processes. By lowering technical and institutional barriers to data access and analysis, FOSSR seeks to empower a wider range of actors to engage with and contribute to social science research, in addition to exploit evidence-based outputs.

5. Communication Strategy: From Visibility to Engagement

FOSSR's communication strategy is based on a model comprising four levels of engagement that are dynamically related: Inform, Involve, Collaborate, and Empower. This multilevel model (Yang & Shen, 2015) is implemented in the RISIS communication approach, which has successfully structured its user engagement around similarly graduated levels of interaction. Different audiences are progressively activated through

training, seminars, and policy dialogues (Fabrizio et al., 2023). The concept of this model reflects a progressive deepening of interplay between the infrastructure and its stakeholders, allowing for the overcoming of conventional dissemination towards co-creation and shared governance.
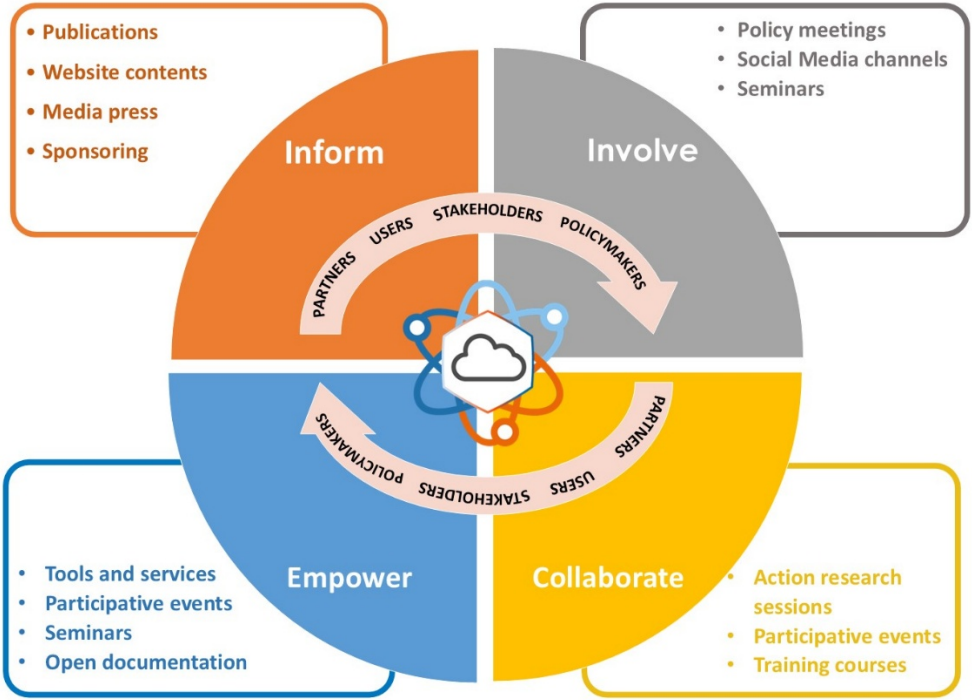

Figure 1: FOSSR Engagement Chart (FOSSR Communicaton Plan, January 2023)

The social actors that comprise the FOSSR infrastructure are understood as comprising different actors, who are involved according to their roles and levels of engagement. The *actual users* are defined as individuals or organisations that are already utilising FOSSR resources, such as scholars in the social sciences, data scientists, and doctoral holders. The *potential users* are groups that may benefit from FOSSR but are not yet fully engaged, including public managers, NGOs, and innovation companies. Finally, *producers* are defined as actors involved in building or maintaining the infrastructure, such as the FOSSR partners, other RIs, and statistical officers.

This classification echoes the tripartite division adopted in RISIS communication strategy (scholars, stakeholders, policymakers), allowing FOSSR to benefit from a tested segmentation that guided targeted communication actions (Ibidem).

The actors are further grouped into four main categories. The target user base comprises academics and data experts who actively use or have the potential to use the infrastructure. Stakeholders include organisations and institutions with an interest in the infrastructure's outputs (e.g., open data repositories, foundations). With the term 'policymakers' within FOSSR, we refer to public agencies, EU officers, and political actors

who may shape or benefit from research-informed policy; 'FOSSR Partners', finally, are core institutions that develop and operate the infrastructure.

A significant proportion of these actors are affiliated with multiple categories, thereby reflecting the interconnected, multi-actor nature of the research infrastructure community.

The success of the engagement strategy depends on several organizational conditions. Internally, FOSSR has established a cross-institutional communication team with expertise in science communication, digital media, institutional communication and stakeholder engagement. Regular coordination meetings, shared editorial calendars, and collaborative tools support the integration of communication across work packages. Training and capacity-building for communication staff are also prioritized, recognizing that effective engagement requires both technical skills and reflexive awareness.

These internal practices reflect and expand the RISIS experience of a centralized but collaborative communication model, which integrates various expertise and ensures a coherent project voice across channels.

FOSSR's strategy also addresses the challenges of epistemic diversity and digital inequalities. As Grand et al. (2015) argue, science communication must account for the plurality of knowledge systems and the uneven distribution of digital access and skills, challenges that FOSSR addresses by adopting inclusive language, offering multilingual content, and carefully selecting communication channels to facilitate participation.

The inclusive and accessible communication principles align with the lessons learned in RISIS, especially during the post-pandemic phase, when online accessibility and multilingual dissemination were crucial in reaching broader, more diverse audiences.

6. Outcomes and Reflections

At approximately the midpoint of the project duration, it is possible to present and analyse some mid-term results, deriving from the indicators collected during and after communicative actions (both in person events and digital activities). These outcomes are useful in terms of providing some early indications regarding the community-building-related objectives and the ability to foster participation and support Open Science.

From a quantitative point of view, FOSSR's outreach and community-building efforts have shown increasing engagement on a range of diverse channels selected in the communication strategy.

With regard to digital communication, FOSSR's visibility on social media appears well established, even though the communication style is shaped on very institutional features, publishing information and details mainly about events and outcomes of the project, hence stimulating few bi-directional exchanges (Giuffredi et al., 2024). These platforms are important as informal communication channels to inform the community

about the day-by day life of the project, particularly for the research community and the digitally active stakeholders. The project's YouTube videos have garnered nearly 1,500 views, while the Facebook and LinkedIn channels are experiencing consistent growth in their followers. Given necessary adjustments for the different longevity and nationality/internationality of the platforms, the figures align with the order of magnitude observed in analogous social science research infrastructures at the European level.

The infrastructure's mailing list comprises 826 subscribers at the time of writing, primarily acquired in the context of organised events, suggesting a solid base of recurring interest. The events attracted over 1,000 attendees, reflecting that the communication strategy has succeeded in creating a shared interest in the project's activities. With regards to the dissemination of scientific outputs, over 4500 downloads from Zenodo suggest that FOSSR's digital products are being actively accessed and downloaded by the relevant target audience, a key indicator of knowledge circulation and impact.

We integrated quantitative evidence from the participation to events organised by the project (summarised in Table 1) to substantiate the interpretation of community-building processes. Across training and communication events, we registered 1213 participations from 418 different organisations, demonstrating that engagement extended far beyond the project consortium. A stable core group of participants attended between 10 and 12 events each, signalling the emergence of an active community rather than one-off information transfer. Participation was balanced by gender (604 F, 578 M) and spanned multiple profiles (researchers, PhD students, professors), with events distributed across training, networking and dissemination, showing multidirectional interaction patterns. The annual growth – from 67 participants in 2022 to 746 in 2024 – further confirms the consolidation of this community. The challenges identified qualitatively are also reflected quantitatively: for example, incomplete preference-of-participation data (935 missing entries) and the wide organisational dispersion (418 institutions) illustrate structural difficulties in standardising engagement pathways.

After normalising all university-related entries, universities represent the second largest group of participants (276 entries), immediately after the CNR. Their internal heterogeneity is remarkable: participation comes from more than forty Italian and international universities, with no single institution dominating. The breakdown shows a long tail pattern, with medium and small universities participating alongside larger ones (e.g., Catania, Bologna, Roma Tre, Molise, Trento, Urbino, Sapienza). This confirms that community building extended across a highly decentralised academic ecosystem and did not concentrate engagement in only a few institutions.

The analysis of the available data shows that 525 unique participants took part in the project, revealing a strongly uneven distribution of attendance that reflects different roles and levels of engagement within the emerging community. The distribution is highly asymmetric: while a large share of participants attends only one or two events, a smaller

but very active core engages repeatedly throughout the project. Several individuals appear in more than ten events, with peaks of 14 participations. This core group represents the most dynamic segment of the community, surrounded by an intermediate layer of participants who join between five and ten events and constitute a stable backbone that follows the project over time. Alongside these groups, the majority of participants attend only a limited number of events, contributing to broadening the community and diversifying the stakeholder landscape, even if they are less involved in co-design and collaborative activities.

A closer look at the types of events attended further clarifies the nature of this distribution. Participation is relatively balanced across the three main formats – Training (301 participations), Networking (359), Policy dialogue (168), Service Demo (108) and Dissemination (277) – indicating that stakeholders are not only receiving information but also engaging with one another and building competencies. Activities such as Policy Dialogues and Service Demonstrations attract fewer participants, yet they tend to involve the most committed members of the community, who return across multiple events and contribute to shaping discussions and identifying needs. Taken together, these patterns point to a multi-layered engagement structure and show that the project has been able to mobilise a broad audience while simultaneously consolidating a core group of highly active participants who drive collaborative and co-creative processes.

Indicator	Value/Typology
Total participations	1213
Unique participants	525
Organisations involved	418
Gender distribution	604 F – 578 M (25 n.a.)
Events participants[1]	Training (301) Networking (359) Dissemination (277) Policy dialogue (168) Service Demo (108)
Annual growth of the FOSSR community	67 (2022) → 746 (2024)

Table 1: Indicators of participation in events organised by the project. Data available at 31/12/2024.

This level of involvement points to a sustained demand for knowledge and capacity-building in Open Science practices, particularly in the field of social sciences. To further support the reinforcing of the community around FOSSR and the infrastructure's relational ethos, these sessions were designed not only as moments of knowledge transfer but also as spaces for dialogue and mutual learning.

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[1] Participants profiles: Researchers, PhD students, Professors.

Policy engagement was designed within FOSSR as a specific area of emphasis, identified as a primary target social sector for the research infrastructure to achieve a substantial societal impact, sharing the Open Science approach among relevant communities. FOSSR has hosted dedicated policy sessions with 169 overall registered participants, and related materials – policy briefs and policy-makers sessions presentations – have been downloaded over 500 times. These figures suggest that the FOSSR work at the science-policy interface is starting to stimulate interest and attract an interested audience.
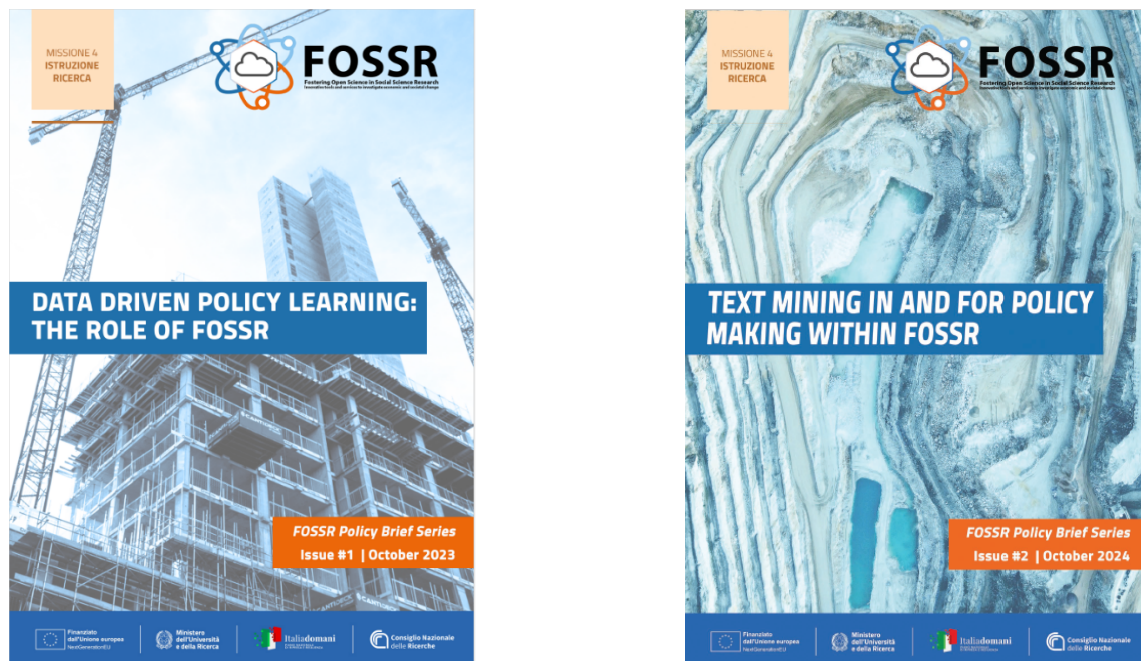

Figure 2. Policy Brief Issues

These indicators suggest the emergence and early stabilisation of a community built around FOSSR's datasets, services and research advancements and outputs, with the peculiar physiognomy of an interconnected community. The infrastructure, indeed, appears not to be only reaching diverse audiences but also facilitating sustained interaction among them in terms of scientific, technical and strategic reflexive exchanges on the themes and developments of the project, laying the grounds for long-term support and infrastructure co-creation.

The qualitative analysis was particularly focused on the design features of communication, with reference to its positioning in relation to community-building and to the support of knowledge circulation, which is notably relevant in Open Science contexts. The communication plan, developed in consideration of prior experiences with European-wide infrastructures (RISIS in particular), included a full acknowledgement of the crucial relevance of existing communities, primarily composed of scholars and stakeholders, and of the communicative practices targeted at supporting engagement with the new RI. In

addition, the importance of internal and external networking, as well as the active involvement of scholars in the field of social sciences, was emphasised as a key approach to be pursued. A key target group in terms of societal impact, policy-makers, were targeted with specific activities and communication products (policy-makers sessions and a policy brief series), with the attention to employ a suitable language – rigorous but not cryptic –, pointing out pragmatic and reusable outputs.

A particular attention was devoted to the realisation of a coordinated and recognisable image for the RI, as well as for transparent, coherent and continuous communication practices, responsiveness to feedback on all channels, and the consistent attention on communication coherence, both in terms of style and contents, in all activities with the public. Another key outcome related to the development of a recognised network among all the diversified actors of the community refers to the establishment of trust in the audience, supported by field observations on the establishment of recurring interactions (in terms, for example, of returning participants to trainings, informal feedbacks at public events). A trustworthy community underpins users' willingness to contribute data, participate in proposed events, and provide feedback to governance choices, and possibly contribute to sharing the infrastructure within their own networks.

However, the implementation of the communication strategy has not been without challenges, which can in part be understood as intrinsic to the innovative and transformative character of Open Data research infrastructures in the social sciences, requiring an effort of understanding and adaptation to all members of the community. A persistent challenge, testified by field observations, concerns the time investment required for meaningful engagement, in particular for what concerns participatory formats that demand significant preparation, facilitation, and subsequent follow-up from the communication group, in addition to a willingness from the part of participants to actively contribute and reflexively adapt. This is particularly acute in the context of academia, where the significance of communication is still persistently underestimated concerning technical or scientific work.

Institutional expectations also pose challenges, particularly regarding the exploratory research work of the communication staff. While funders and host institutions increasingly recognize the importance of communication, they may still prioritize visibility metrics and traditional one-way communication over deeper, and potentially game-changing, forms of engagement. This can create pressure to produce high volumes of content at the expense of a real engagement of the audience, oriented to long-term community-building. Moreover, disciplinary asymmetries persist; while some fields within the social sciences are well-versed in participatory methods, others may be less familiar or less inclined to engage in co-creative practices. In addition, any inter- or trans-disciplinary confrontation requires additional effort of the facilitation staff, since it's necessary to consider and engage with implicit disciplinary assumptions regarding

methodologies and the research process and diverse backgrounds influencing the meanings assigned to research.

Despite these tension knots, it's possible to witness encouraging signs of community consolidation. Field observation corroborates mid-term outcomes on the fact that informal networks have begun to form among participants in FOSSR events, and several collaborative initiatives have emerged from these interactions. These include joint training proposals, shared data projects, and cross-institutional working groups. Such developments suggest that the FOSSR approach is not only disseminating knowledge but also catalysing new forms of collective action.

These emerging dynamics echo those observed during the RISIS project, where sustained investments in integrated communication and community engagement laid the groundwork for a lasting, interdisciplinary network. FOSSR, by drawing upon this legacy and adapting it to the context of Open Science in the social sciences, is demonstrating the potential of research infrastructures not only to produce and share knowledge but to convene, empower, and transform communities of practice.

7. Discussion

The analysis of the design and mid-term results of the FOSSR communication strategy underscores that the understanding of communication within Open Science research infrastructures should add to a conventional institutional communication perspective, aimed at informing the public, boosting the visibility of the project and reinforcing the strategic and promotional objectives of the institution, the awareness of its infrastructural function related to community-building necessary to long-term sustainability, overcoming the persistent representation as a mere support activity to scientific activities. This reconceptualization has significant implications for how RIs are designed, governed, and evaluated.

Considering communication infrastructural is to recognize its role in enabling the establishment and maintenance of lively, continuous, and coherent relations among all the actors involved within the project, supporting coordinated research activities, full stakeholders' engagement and societal robustness. Communication practices – whether in the form of documentation, dialogue, or digital mediation – serve as the fundamental binding elements uniting the diverse components of an RI, considering both internal and external actors. They facilitate interoperability and collaboration not only at the technical level but also at the epistemic and organizational levels. In FOSSR, communication has served to align expectations, translate between disciplinary languages, and mediate with institutional logics.

This infrastructural role also entails a shift in how communication is understood, valued, and resourced. Rather than being treated as a service function or a PR office, as it often

happens especially with institutional approaches (Claessens, 2018), communication should be integrated into the strategic architecture of RIs. This includes dedicated staffing, strategic planning in close connection with the scientific and organisational coordination functions, and mechanisms for continuous learning and adaptation. FOSSR's experience shows that such integration can enable communication to shift from a service role to a co-creative practice, where stakeholders and the research community are not passive recipients but active contributors to the infrastructure's development, thereby laying the groundwork for long-term relevance.

Such a change in perspective has wide implications for the identities and boundaries of research. As communication becomes more participatory and dialogic, and in parallel as research becomes hybrid, contextual and commissioned (Benessia et al., 2012; Gibbons et al., 1994; Ziman, 2000), traditional distinctions between producers and users of knowledge are challenged. Researchers are called upon to engage in meaningful conversations with publics, policymakers, stakeholders and practitioners not only as audiences but as collaborators, while the public is often asked to participate in co-designing research objectives and governance, especially on societally relevant topics (Bucchi & Trench, 2021). This reconfiguration of roles is an ongoing process, driven by the increase in importance of social contexts of knowledge production with features of interdisciplinary and intersectoral hybridisation, as it happens in Research Infrastructures or transdisciplinary research endeavours, which in themselves require notable efforts of communication (Davies & Horst, 2016; Harris et al., 2024). Perceiving the blurring of roles can be unsettling, particularly in disciplines where the authority of expertise is closely guarded. Yet it also opens up new possibilities for relevance, legitimacy, and impact (Cash et al., 2002; Marenko, 2021).

The transformation of communication practices reflects and contributes to the transformation of research itself, rethinking the processes, relationships, and values that underlie knowledge production. Communication is central to this transformation because it intrinsically has a relational personality, positioning itself in a suitable position to mediate and contribute to shaping the very conditions under which knowledge is produced, shared, and institutionalized (Davies & Horst, 2016).

The FOSSR community-oriented perspective, which is described here in its early stages of implementation and is considered an ideal final aim, is able to amplify and support the development of features that are already visible within the experience in the current RI.

The attention to reference communities, although foundational to science communication (especially for what concerns the inclusion of different epistemic communities or lay knowledge producers, Collins & Evans, 2002; Wynne, 1992), is recently losing ground to strategic orientation for communicative practices, especially within research institutions (Kessler et al., 2022; Nisbet & Markowitz, 2016; Orthia et al., 2021). Our results show that in the case of a Social Science Research Infrastructure, the actual community,

grounding the RI's same existence and survival, extends to all actors involved in the RI, abolishing the traditional clear demarcation between science and society and promoting all actors to co-responsibility in their diverse roles in the infrastructure. The objective of promoting all 'stakeholders' (with all the limitations beared by this term, as argued in Reed et al., 2024) to active actors and possibly co-builders of the RI, overcoming the conventional distinction between the inside and the outside of the research endeavour, was addressed by design in FOSSR in a variety of ways, and especially within the diverse committees – stakeholders, strategic, scientific, etc. – involved in the governance of the project. The contributions of experts and community members, who are often excluded from direct participation in defining and refining the project, are considered essential for the collaborative development of the project's evolution and outcomes in FOSSR.

Such a transformative effort necessitates a community effort to understand and act on a reflective paradigm shift. Drawing from the reflections of scholars on the changes in the contemporary system of knowledge production, both from STI and from STS, FOSSR proposed some activities specifically targeted to foster in the involved members of the community a rethinking of the implicit consolidated attitudes towards the research system and its positioning in society, also to positively integrate any tension line during the project development which could be understood as lying on different pre-existent views of research clashing with others'.

FOSSR's experience offers several lessons for other Open Science infrastructures, as well as development paths to be incorporated in the second phase of FOSSR and in the post-project evolution.

First, communication strategies must acknowledge the delicate and ever-changing interface between research and society on which they lie, be context-sensitive, and be attuned to the specific epistemic cultures, stakeholder landscapes, and institutional constraints of each RI. The communication group is of pivotal importance in identifying gaps or deficiencies in frame-setting, information, process-related or organisational exchanges, and in facilitating the emergence and confrontation of these issues.

Second, communication strategies should include by design spaces of reflexivity, opening to the emergence and mediation of tacit expectations and concerns, and allowing informal exchange among the diverse actors participating in the infrastructure. Furthermore, the projectual strategy must be sufficiently flexible to incorporate the outcomes of these reflections, allowing for learning from feedback and adaptation to change.

Finally, the case of FOSSR suggests that communication, as a strategic infrastructural function that grounds and supports the building of communities, can serve as a lever for institutional change in the research sector. By embedding participatory practices into the infrastructure's design, FOSSR has begun to shift organizational cultures and expectations within the existing community. Although this is, by its own nature, a slow

and ever-evolving process, it holds promise for building more resilient, responsive, and democratic research systems.

8. Conclusion

Drawing on sociological and STS perspectives, we have argued that communication in RIs is well positioned to evolve its understanding towards the valorization of relational and infrastructural functions, enabling collaboration, sustaining the mediation of different epistemic cultures, and supporting the transformation of research institutions.

FOSSR's communication and engagement strategy, structured around the levels of informing, involving, collaborating, and empowering, is designed to allow communication to move beyond visibility to foster meaningful awareness and long-term support. Through a combination of digital tools, participatory formats, and reflexive practices, FOSSR is in its early stages of building a diverse extended research community around the infrastructure. Early outcomes indicate the stabilization of a network and the emergence of collaborations, even as challenges related to navigating a transformative process, both for researchers and the community, persist.

The development of this new perspective has broader relevance for the governance and design of Open Science research infrastructures, especially for those sharing with FOSSR the focus in the field of social sciences. A key suggestion is that communication should not be viewed as an auxiliary function, but rather as a core strategic component of the infrastructure. This requires investment in knowledge and skills oriented to inter- and trans-disciplinary exchanges, enhanced coordination, and the practice of inclusive and participative actions, as well as a willingness to rethink traditional roles and boundaries in research.

Looking ahead, future work should focus on evaluating the long-term impacts of communication strategies on community-building, knowledge co-production, and institutional sustainability, especially in comparison with analogous Research Infrastructures in different contexts. Comparative studies across RIs could help identify common issues and best practices, share reflections and research on the processes, and develop cross-infrastructure models for participatory communication oriented to community-building. As Open Science continues to evolve, the ability of infrastructures to serve as a lever of change, communicating effectively and inclusively, will be central to their long-term societal impact, relevance, and sustainability.

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