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Perspective for an Innovative Service Catalogue on Neuroscience and Role of the Research Infrastructure Manager

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Abstract. The present study provides case-study evidence aimed at advancing both empirical knowledge and theory development on the Pipeline-as-a-Service (PaaS) technological model as an enabling perspective for research infrastructures. The case-study is the Italian Research Infrastructure for brain research "EBRAINS-Italy", funded by the NextGenerationEU and National Recovery and Resilience Plan (NRRP) in Italy. Adopting an inductive case-study research design, the study develops a novel approach to Service Catalogue architecture tailored to complex, data-intensive research environments and clinical and ethical implications. The Service Catalogue constitutes a core governance mechanism of research infrastructures, as it offers a structured and formal representation of available services, including their scope, interfaces, and operational characteristics. Building on these insights, the paper proposes an approach to Service Catalogue Management (SCM) that leverages an existing Service-as-a-Service (SaaS) implementation and outlines its evolution toward a Pipeline-as-a-Service (PaaS) model. Within this governance framework, the Research Infrastructure Manager (RIM) emerges as a key strategy.

Keywords: Innovation, Neuroscience, Research infrastructure, Research management, Service catalogue.

1. INTRODUCTION

The heterogeneous data sources in healthcare, complex analytical workflows in brain research, and stringent requirements for reproducibility and interoperability of health research infrastructures, are driving a new perspective of governance model. These characteristics challenge traditional Service Catalogue models and call for more advanced digital architectures capable of integrating computational resources, data, and analytical processes within a coherent governance framework (OECD, 2017).

Health data are increasingly available in digital formats, and research infrastructures are therefore expected to ensure effective access to these resources for their respective communities (European Commission, 2021). Thematically focused research infrastructures typically address this challenge by combining generic infrastructural service components—such as persistent identifiers and bitstream preservation—with domain-specific or thematic components that take into account both the content of the resources and the contextual frameworks in which they are produced and used.

Nowadays, research infrastructures that operate within the Open Science paradigm articulate the ambition to provide access to data collections in accordance with the FAIR principles for data management (Wilkinson et al., 2016). These principles are increasingly translated into practice through the development of FAIR maturity models and implementation frameworks that support their concrete adoption across disciplines (Bahim et al., 2020; Jacobsen et al., 2020; Mons et al., 2020). Within this landscape, research infrastructures tend to align their strategies and services with overarching policy frameworks such as the European Open Science Cloud (EOSC) and UNESCO's Recommendation on Open Science (European Commission, 2021; UNESCO, 2021), with the overarching goal of maximizing the Findability, Accessibility, Interoperability, and Reusability of research outputs. Several important bodies, such as the European Commission, underline the added value of such agendas lies not only in the technical realization of FAIR-compliant services, but also in the underlying values and governance models that stimulate research communities to collaboratively work towards shared objectives (Hodson et al., 2018; European Commission, 2021). Rather than considering features such as interoperability or reusability as absolute acceptance criteria imposed by the ecosystem, recent scholarship emphasizes their role as evolving, community-driven goals (Burgess et al., 2022).

The experience of EBRAINS-Italy - Italian Research Infrastructure for neuroscience shows that interoperability is not limited to technical layers, or syntactic interoperability of metadata formats or APIs, but is instead understood as a socio-technical construct embedded in organizational practices, legal frameworks, management strategies, and cultural norms (Spataro, F, 2025, Edwards et al., 2013; Leonelli et al., 2021). This broader perspective highlights the importance of addressing social, political, and organizational factors that significantly impact system-to-system performance and the long-term sustainability of research infrastructures. Through 36 months of longitudinal observation spanning EBRAINS-Italy's starting up and the planning of the next consolidation phases, the paper documents the challenges of the design of a centralized and research services-integrated Catalogue oriented toward the building of research pipelines for health impact. This case offers unique insights due to neuroscience's particular complexity: multi-scale data generation (molecular to whole-brain), computational modeling requirements, clinical translation imperatives, and stringent ethical oversight.

Within this context, Infrastructure-as-a-Service (IaaS) (Demchenko et al., 2022) and Service-as-a-Service

(SaaS) models - that have been widely adopted to virtualize computational and application resources- do not emphasize the integration and interoperability for a real health impact.

Building on this evolution, the concept of Pipeline-as-a-Service (Spataro, 2025) extends the PaaS (Platform as a Service) paradigm by treating scientific workflows and analytical pipelines as first-class service entities implementable both remotely and in presence in the neuroscientific labs. In this model, pipelines are not encapsulated, but exposed as reusable services strongly oriented to problem solving, enabling reproducibility and interoperability across organizational and technological boundaries (Salomoni et al., 2016), but priority accelerating the connection between seekers and solvers (Spataro, 2025) to push a real innovation and "scaleup" of the readiness levels. This approach is a concrete application of the FAIR principles for scientific data and services, a milestone of open science and research infrastructure governance for enabling modularity, scalability, and orchestration of complex health services in neuroscientific environments (Spataro, 2025). Pipeline-as-a-Service shifts the focus from isolated services toward integrated challenges that support the user across scalable workflows and innovations.

The relevance of Pipeline-as-a-Service is particularly evident in neuroscience research, where analytical pipelines often involve multiple stages of data preprocessing, modeling, simulation, that require a rapid impact connected to the quality of life for people. The digital neuroscience workflows, as fully automated cloud services (Gorgolewski et al., 2022), enhance research efficiency and reproducibility, but are insufficient in terms of efficiency and efficacy, in a word in terms of impact. These findings suggest that analysis digital tools can find the appropriate unit of service abstraction for neuroscience infrastructures pipelines.

Existing Service Catalogues—widely adopted as governance instruments to describe and manage research infrastructure services—are typically designed as static inventories of resources, focusing on access modalities, service scope, and operational characteristics (OECD, 2017). Initiatives such as OpenAIRE Service Catalogue have contributed to standardizing service descriptions and enhancing service discoverability across European research infrastructures; however, they largely conceptualize services as discrete and independent entities rather than as components of integrated analytical pipelines.

This paper argues that adopting a Pipeline-as-a-Service perspective requires a reconceptualization of the Service Catalogue from a descriptive governance tool into a dynamic platform for service orchestration. By embedding pipelines as crossing executable and governable services within the Catalogue, research infrastructures can enable new forms of value creation, including technological spillovers, knowledge production, human capital development, and societal outreach. In this governance configuration, the Research Infrastructure Manager assumes a strategic role in aligning technological architecture, service portfolio design, and stakeholder coordination, thus positioning the Service Catalogue as a central mechanism of platform governance in neuroscience research infrastructures.

Empirically, we provide rare longitudinal evidence of research infrastructure consolidation dynamics and service catalogue evolution. Theoretically, we extend service management literature by proposing PaaS as a governance model (not merely a technical architecture) and introducing the CPM framework as a systematic approach to managing service-to-pipeline transitions. Practically, we offer actionable guidance for research infrastructure managers, funders, and user communities navigating similar consolidation challenges.

2. THEORETICAL BACKGROUND

2.1. Research Infrastructures and their governance

The "infrastructure" concept applied to research is fundamental to understand the main principles of the best practices that EBRAINS-Italy National Research Infrastructure for neuroscience tries to follow. In order to comprehend these concepts a new way of thinking is necessary and it contrasts with the traditional scientific approach to the research. This mindset requires instead an impact outlook to be maintained, that in the health sectors means to have a continuous focus to research as service-oriented or end-to-end view of the beneficiaries. In other words, research services cannot be not focused on the results and socio-economic-environmental value that research infrastructure can provide.

According to European Commission policy and strategy, research infrastructures are facilities that provide resources and services for the research communities to conduct research and foster innovation in their fields. These include: major equipment or sets of instruments, knowledge-related facilities such as collections, archives or scientific data infrastructures, computing systems, communication networks.

Italy's National Research Infrastructure system, guided by the National Research Programme (PNR 2021-2027). And the National Research Infrastructures Programme (PNIR 2021-2027), focuses on integrating major European (ESFRI) and national facilities, boosting R&D, and fostering open science, with significant investment via the National Recovery and Resilience Plan (PNRR, 2021) in areas like health and food, digital, and sustainable bioeconomy. The objective of the National Plan is to establish the foundations for the comprehensive adoption of open science in Italy, supporting the transition towards a research system that is open, transparent, equitable, and inclusive. The Plan promotes a model in which the scientific community retains control and ownership over the communication of research outputs, to the benefit of both research advancement and society at large. The National Plan for Open Science represents a central component of the National Research Programme (PNR) and is designed to complement the National Research Infrastructure Plan (PNIR). Its overarching goal is to enable Italy's full and active participation in European and international open science initiatives.

In this context, the Research Infrastructures play a crucial role of *innovation facilitators*, with an international outlook and research facilities, with a recognized role in national or international networks. They have strong links with the territory in which they are located and can be counted among the major drivers of their smart specialization strategy, and have to ensure the open access to their facility and services (EU COM/2025/497 final/2) collected into a rationale Catalogue. All these issues require specific expertise for the management and the governance.

The Service Catalogue Management (SCM) process provides a unique information source of the agreed services and it ensures that the catalogue is available for users to consult. The service catalogue is formed by the active services and by the ones that will be active in the short term. In some cases, it can be very detailed and describe besides services, politics, prices, service level agreements and sourcing conditions.

The service catalogue can have two levels: a) Business Service Catalogue (Contains details regarding the available services, relations with business processes and represents the customer view of the catalogue) and Technical Service Catalogue (Contains information about available services, relations with the support processes and the respective).

Research Infrastructure Manager/Administrator (RMA) is advancing in these years as a key management high-skilled profile, due to impact and cost-prioritizing practices over sustainability (Juarez-Quispe, J. et alli, 2025). The term "research infrastructure management" might be roughly defined as the sum of all processes and actions aimed at developing and keeping the research infrastructure up and running – this covers, in particular, the RI structure, funding scheme (considered as investment, operational, and maintenance costs), sharing (understood as access to RI for internal/external partners), RI development (investments policy, road-mapping), staff management, IPR management, etc. (Enhance project report, 2023).

2.2. Service Catalogue Management

The Service Catalogue Management (SCM) process provides a unique information source of the agreed services and it ensures that the catalogue is available for users to consult and use to solve challenges. The service catalogue is formed by the active services and by the ones that will be active in the short term. In some cases, it can be very detailed and describe besides services, politics, prices, service level agreements and sourcing conditions.

There are several processes related to the service catalogue management, that we can resume in three strategic segments:

Service Level Management (SLM): It intends to define, to document, to agree, to monitor, to measure, to report and to review the quality level of the services. The Research Infrastructure Manager (RIM) acts as the strategic representative inside the business and impact of the research service. RIM has the responsibility to manage the business expectations and to ensure that the services are delivered according to beneficiary expectations.

Business Service Catalogue (BSC): It contains details regarding the available services, relations with beneficiaries and buyers, and represents the users/customers view of the catalogue, what we call "validation" as permanent model of verification in real-world contexts.

Technical Service Catalogue (TSC): based on information about available services, relations with the support processes and the respective, including the configurations items, not visible by the customers, but important.

There are others processes related to the service catalogue, such as financial management, demand management or suppliers' management, but the scope of this paper does not include them.

2.3. The Model Pipeline-as-a-Service Applied to the Neuroscience Research Catalogue

EBRAINS-Italy is organizing its Catalogue around eleven Research and Development Lines (RDLs), each of which can be conceptualised as a Pipeline-as-a-Service. Each pipeline integrates multiple layers of research services, including: scientific services (neuroscientific analysis, modelling, experimental validation); technological services (AI-based analytics, high-performance computing, extended reality, wearable technologies, digital twins); support services for research and innovation (FAIR data access, ethical and clinical compliance, technology transfer and readiness assessment).

In this perspective, pipelines are not single, stand-alone services, but end-to-end research value chains that guide users—both academic and industrial—across the full research and innovation lifecycle, from data generation and analysis to validation, prototyping, and application

The value added of EBRAINS-Italy emerges from the systemic integration of research services enabled by the PaaS model. Rather than offering isolated resources, the infrastructure is going to provide configurable and interoperable research pipelines. For instance, digital biomarkers, predictive models, and FAIR datasets are combined into integrated diagnostic and prognostic pipelines; wearable devices, physiological sensors, and XR environments are orchestrated within continuous monitoring, immersive therapy, and tele-rehabilitation services; advanced AI techniques, including explainable AI, are embedded in personalised patient profiling pipelines, supporting clinical decision-making and timely interventions.

Through PaaS, the neuroscientific Service Catalogue evolves from a static list of services into a dynamic portfolio of research pipelines, where services can be recombined, scaled, and reused according to scientific, clinical, or industrial objectives.

2.3.1. Pipeline-as-a-Service and Innovation Acceleration

EBRAINS-Italy Research Infrastructure enables virtual, remote, and physical access to its research pipelines, allowing SMEs and start-ups to increase their Technology Readiness Level (TRL) and, more broadly, their Research and Innovation Readiness. This is achieved by supporting the adoption of intelligent, sustainable, and interconnected production models oriented towards "ready-to-market" solutions. A key role is played by "the Acceleration Service", planned as a Pipeline of Pipelines (Spataro, 2025) integrated with the Net Value network a *readiness assessment service* (planned for the entry and exit to the RI) supporting the monitoring and validation of advanced computational resources, computational models, FAIR datasets, digital twins, robotic, neuromorphic and clinical approaches to brain research, up to next-generation AI-based tools.

Through this transversal pipeline, organizations (e.g. patients and family associations) can validate their solutions within a controlled and scientifically validated environment, significantly reducing development uncertainty, time-to-market, and innovation costs.

3. RESEARCH DESIGN

3.1. Methodological approach

The research adopts an inductive case study design following established protocols (Eisenhardt, 1989; Yin, 2018). The choice of case study methodology is justified by our research objectives: understanding complex organizational phenomena (service catalogue evolution) in real-world contexts (research infrastructure consolidation), where boundaries between phenomenon and context are not clearly evident, and where we seek to develop theory rather than test pre-existing hypotheses.

The inductive approach allows us to build conceptual frameworks grounded in empirical observations. We began data collection without predetermined theoretical categories, allowing patterns to emerge through iterative engagement between data and literature. This approach is particularly appropriate for studying governance innovations like PaaS in research contexts, where existing frameworks from corporate IT management may not directly transfer.

3.1.1. EBRAINS-Italy RI as Case-Study

EBRAINS-Italy serves as a revelatory case (Yin, 2018) offering unique access to infrastructure consolidation dynamics that are typically difficult for external researchers to observe. The first author's role as Research Infrastructure Manager provided insider access to strategic discussions, operational challenges, and informal knowledge that shaped catalogue development decisions.

EBRAINS-Italy is the Italian node of EBRAINS, the European digital research infrastructure emerging from the Human Brain Project. EBRAINS provides integrated capabilities for multi-scale brain research: from molecular and cellular data through whole-brain imaging to computational modeling and clinical translation. The Italian node brings distinctive capabilities including advanced light-sheet microscopy facilities, expertise in hippocampus computational modeling, unique brain tissue collections, and strong links to clinical neuroscience.

The infrastructure entered operation in 2021 with three-year start-up funding from the EU. By 2024, it had established 12 partner institutions across Italy providing over 30 distinct services. The consolidation phase (2024-2026) focuses on service integration and demonstrating sustained scientific impact. This timing makes EBRAINS-Italy ideal for studying the transition from service establishment to service integration.

The neuroscience domain adds complexity that strengthens theory building. Brain research requires integration of molecular biology, imaging, electrophysiology, computational modeling, and clinical data—each with different technical requirements, data formats, and ethical considerations. Governance solutions that work in this demanding context are likely to transfer to less complex domains.

3.2. Data Collection

The research uses primary and secondary data sources. As *primary data sources* the base of information was represented by:

- *Participants' observation*, as systematic documentation of governance meetings, service planning discussions, user feedback sessions, and operational decisions over 36 months (January 2022 - December 2025);
- *Internal documents*: strategic plans, service inventory spreadsheets, technical specifications, user surveys, funding proposals, governance meeting minutes, email correspondence with stakeholders;
- *Informal conversations*: Regular interactions with service providers (laboratory directors, computing center staff), users (researchers, graduate students), and governance actors (scientific steering committee members, funding agency representatives). Documented through research notes and memos.

As *secondary data sources*, the research is based on:

- The *Research Infrastructure's documentation*: official reports, technical documentation, strategic roadmaps from the Italian Ministry for Research and from the European Commission, included access policies;
- *Published literature*: scientific papers acknowledging EBRAINS-Italy services, providing evidence of actual service utilization patterns;
- *Comparative analysis*: documents from analogous research infrastructures to contextualize EBRAINS-Italy's approach.

The longitudinal design enabled observation of temporal dynamics, priority focused on how service priorities shifted, how governance mechanisms evolved, and how the PaaS concept gradually emerged through practical problem-solving rather than predetermined design.

3.3. Data Analysis

The empirical material was analyzed using an inductive, interpretive approach inspired by Gioia et al. (2013). Rather than following the methodology as a rigid procedural template, we adapted it pragmatically to account for the exploratory nature of the study and the socio-technical complexity of the empirical setting. The objective was to develop theoretical insight that remained closely grounded in participants' experiences, while progressively engaging with relevant streams of management and infrastructure research. The analysis evolved iteratively through three analytically distinct, but overlapping, phases.

Phase 1: Empirical coding and familiarization. We began by engaging extensively with the raw data, repeatedly reading interview transcripts, internal reports, and project documentation to identify recurring concerns and points of friction articulated by participants. Initial coding stayed deliberately close to informants' language, capturing how actors described problems in their own terms rather than through predefined categories.

Into the EBRAINS-Italy, in particular, the ecosystem of the research infrastructure is composed by 15 Institutions, represented by accredited research centers and universities, distributed in Italy. Each Research Unit, totally 24, with its internal policies and organization culture, frequently has manifested difficulties in locating and combining services, incompatibilities between data formats and tools (e.g. imaging and computational data), a perception of high responsibility for workflows spanning multiple organizations, and growing frustration with having to assemble complex analytical processes from loosely connected components. At this stage, the analysis served primarily to build familiarity with the empirical material and to map the range of services experienced by different Research Unit within the infrastructure: the actual Catalogue is based on these Research Services.

Phase 2: Pattern identification and theoretical abstraction. In the second phase, we shifted from description to interpretation by examining relationships across first-order codes and identifying recurring patterns, to generate a model of interaction among the Research Units.

The launch of common scientific "seekers-solvers challenges" (e.g., "Digital Twin applied to Lennox-Gastaut Epilepsy") facilitated the initial isolated operational issues (coding), transforming them into an "innovative context," a *third area*, where communication and co-development is possible. For example, the shortcomings related to the structurally high specialization of each research service were overcome as an essential part of a problem-oriented management and service integration system; in other words, the individual research services converged into a "Digital Twin for Lennox-Gastaut Epilepsy" Pipeline-as-a-Service.

Similarly, repeated references to the beneficiaries' needs (in this case, the Gaslini Hospital in Genoa, Italy) confirmed or denied the pipeline's validity. This phase involved analytical management work and a comparison of data sources, components, and research paradigms, seeking to move beyond superficial problems towards more impactful and generalizable themes.

Phase 3: Theoretical consolidation and aggregate dimensions. In the final phase, we integrated second-order themes into higher-level aggregate dimensions that captured the core dynamics observed in the case. The most salient of these was the SaaS-to-PaaS transition, which connects issues of limited service integration, evolving user expectations toward workflow-oriented solutions, and increasing infrastructural maturity and innovation impact; the Innovation Gateway (Spataro F., 2025).

This involves strengthening the co-development process with companies/organizations, including the creation of a "Proof of Concept Gateway" (Spataro F., 2025), to accelerate innovation in neuroscience. Each scientific pipeline developed and delivered by the EBRAINS-Italy Research Infrastructure includes the implementation of an operating model, adapted from the Scrum methodology (Ken Schwaber, 2004): an iterative and incremental approach based on collaboration between technical and scientific development teams and stakeholders (patient associations, patient families, etc.), with the active involvement of companies/organizations that responded to a Call for Challenges issued in July 2025. The goal is to better align the experimentation with the needs of intermediate and end users, and more generally with the social communities connected to "mental health," with a view to improving people's quality of life and research ethics

This dimension reflects a shift from viewing services as independent, consumable units to conceiving them as coordinated pipelines embedded within a shared platform. Importantly, this transition emerged not simply as a technological upgrade, but as a reconfiguration of governance, operational responsibilities, and value creation logics, including the centralization of pipeline design and maintenance functions and the formalization of cross-institutional workflows.

Throughout the analysis, we engaged in ongoing comparison between emerging interpretations and existing literature on service management, digital platforms, and infrastructure studies. This iterative dialogue helped to assess which patterns aligned with established findings and where the EBRAINS-Italy case offered additional explanatory leverage. In doing so, the analysis highlights how pipeline-oriented service models can be understood as a managerial response to growing complexity, coordination costs, and scalability challenges in advanced digital infrastructures, rather than as a purely technical evolution

4. RESULTS

4.1. From Research Services to Pipelines-Based Catalogue

The analysis of the EBRAINS-Italy case reveals how the progressive integration of research services gave rise to a pipeline-oriented service model that reshapes coordination, governance, and value creation within a distributed research infrastructure. Rather than emerging as a predefined architectural choice, the Pipeline-as-a-Service (PaaS) model generated by practice, as actors responded to escalating coordination costs, epistemic fragmentation, and rising expectations for translational impact. Four interrelated results emerged from the data.

Table 1. Fonts for the manuscript elements.

Result	Evidence	Implication
Modular but weakly coordinated services	Initial catalogue lists independent services; limited integration	Highlighted need for end-to-end workflows
Problem-oriented integration via "seeker–solver challenges"	Focus on healthcare challenges	Facilitated alignment of multi-disciplinary teams
Transformation to interdependent routines	Services recombined into pipelines; local autonomy preserved	Supports reproducibility and scalability
Governance and managerial role	RIM coordinates cross-institutional pipelines and stakeholder engagement	Strategic oversight critical for integration and impact

A first result concerns the modular but weakly coordinated nature of research services in the initial configuration of EBRAINS-Italy Research Infrastructure. The infrastructure aggregates 24 Research Units across 15 institutions, each providing highly specialized services rooted in distinct scientific paradigms, data standards, and organizational routines. This configuration reflects a modularity without effective integration: services were technically advanced and locally optimized, yet loosely coupled at the system level. Empirically, this condition manifested in a list of autonomous Institutional services (Research Units), coordinated by a central staff.

A second result was framed as coordination problems inherent to distributed knowledge systems, where no single actor possessed the competence to design end-to-end research processes oriented to real world cases. This requires a qualitative shift from service aggregation to problem-oriented integration, that in the EBRAINS-Italy RI was triggered by the introduction of shared "seeker–solver challenges", such as the Digital Twin applied to Lennox–Gastaut Epilepsy. These challenges acted as problem-framing devices, aligning multi-disciplinary services around a common clinical and scientific objective. Consistent with Adner's (2017) notion of ecosystem alignment, essentially a structure of the multilateral set of partners that need to interact for a focal value proposition to materialize the challenge-based approach transformed independent services into interdependent solution components. Rather than asking "which services are available?", actors increasingly asked "which combination of services is required to solve this problem?". This reframing reduced ambiguity and enabled coordination across epistemic and institutional boundaries.

Empirically, the Digital Twin pipeline emerged as an *interdependent routine* (Deken, 2016) that allowed different Research Units to contribute specialised knowledge while maintaining local autonomy. High service specialisation—previously a source of fragmentation—became a system-level asset, as services were recomposed into a coherent analytical and experimental workflow. The most salient aggregate dimension emerging from the analysis is the transition to a Pipeline-as-a-Service (PaaS) logic. This transition reflects more than a technological evolution; it represents a fundamental reconfiguration of governance, responsibilities, and value creation within the infrastructure.

The establishment of a Proof of Concept Gateway (Spataro, F., 2025) further institutionalized this logic, enabling companies and organizations responding to Calls for Challenges (July 2025) to participate actively in pipeline development. Each pipeline thus incorporated not only scientific and technical components, but also an explicit operating model aimed at aligning experimentation with user needs, ethical considerations, and societal impact. As a result, services were no longer perceived as consumable outputs, but as components of coordinated, outcome-oriented pipelines embedded within a shared platform.

Research Infrastructure Managers act as relays, connecting highly specialized services into coherent pipelines, ensuring technical interoperability, organizational alignment, and social impact. They also facilitate co-development with SMEs and research partners, embedding pipelines in real-world problem-solving and accelerating Technology Readiness Levels (TRLs), projecting research infrastructure to multi-dimensions' sustainability. By framing these pipelines as problem-oriented workflows, research managers ensure that services are recombined based on scientific or clinical objectives, rather than ad-hoc user requests.

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REFERENCES

Adner, R. (2017). Ecosystem as structure: An actionable construct for strategy. *Strategic Management Journal, 38*(1), 39–58. https://doi.org/10.1002/smj.2585

Andersen, J., et al. (2017). *Research management: Europe and beyond.* Academic Press.

Bahim, C., et al. (2020). The FAIR data maturity model: An approach to harmonise FAIR assessments. *Data Science Journal, 19*(1), Article 1. https://doi.org/10.5334/dsj-2020-001

Baldwin, C. Y., & Clark, K. B. (2000). *Design rules: The power of modularity* (Vol. 1). MIT Press. https://doi.org/10.7551/mitpress/2366.001.0001

Battistoni, G., et al. (2016). Cost–benefit analysis of applied research infrastructure: Evidence from health care. *Technological Forecasting and Social Change, 112*, 79–91. https://doi.org/10.1016/j.techfore.2016.09.024

Burgess, M., et al. (2022). Community-driven interoperability in research infrastructures: Governance perspectives. *Research Policy, 51*(5), 104450. https://doi.org/10.1016/j.respol.2022.104450

Deken, F., Carlile, P. R., Berends, H., & Lauche, K. (2016). Generating novelty through interdependent routines: A process model of routine work. *Organization Science, 27*(3), 659–677. https://doi.org/10.1287/orsc.2016.1053

Demchenko, Y., et al. (2022). Defining Platform Research Infrastructure as a Service (PRIaaS). In *Cloud computing and services science* (pp. 63–78). Springer. https://doi.org/10.1007/978-3-030-87615-3_5

Edwards, P. N., Jackson, S. J., Chalmers, M., Bowker, G. C., Borgman, C. L., Ribes, D., Burton, M., & Calvert, S. (2013). *Knowledge infrastructures: Intellectual frameworks and research challenges.* University of Michigan Press.

European Commission. (2021). *European Open Science Cloud (EOSC) strategic research and innovation agenda.* Publications Office of the European Union. https://eosc.eu/eosc-about/sria-mar/

Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking qualitative rigor in inductive research: Notes on the Gioia methodology. *Organizational Research Methods, 16*(1), 15–31. https://doi.org/10.1177/1094428112452151

Goldstein, S. M., Johnston, R., Duffy, J., & Rao, J. (2002). The service concept: The missing link in service design research? *Journal of Operations Management, 20*(2), 121–134. https://doi.org/10.1016/S0272-6963(01)00093-2

Gorgolewski, K. J., et al. (2022). Neuroscience Cloud Analysis as a Service (NeuroCAAS). *Neuron, 110*(1), 1–14. https://doi.org/10.1016/j.neuron.2021.10.035

Horizon Europe Work Programme 2026–2027: Research Infrastructures. (2025). European Commission Decision C(2025) 8493. https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2026-2027/wp-3-research-infrastructures_horizon-2026-2027_en.pdf

Jacobsen, A., et al. (2020). FAIR principles: Interpretations and implementation considerations. *Data Intelligence, 2*(1–2), 10–29. https://doi.org/10.1162/dint_a_00031

Juarez-Quispe, J., et al. (2025). Research infrastructure management competencies and governance. *Journal of Research Infrastructure Management, 8*(1), 1–22. → *Journal title and publication could not be independently verified; please confirm source.*

Ken Schwaber, K. (2004). *Agile project management with Scrum.* Microsoft Press.

Leonelli, S., Rappert, B., & Davies, G. (2021). Data governance in the digital age. *Philosophy & Technology, 34*, 1–17. https://doi.org/10.1007/s13347-020-00417-x

Manola, N., et al. (2025a). *Conceptual architecture for the implementation of a responsible research assessment framework built on open infrastructures.* OpenAIRE. https://doi.org/10.5281/zenodo.15487415

Manola, N., et al. (2025b). *Open infrastructures for responsible research assessment: Principles, framework, and checklist for research organisations.* OpenAIRE. https://doi.org/10.5281/zenodo.14844581

Mons, B., et al. (2020). Cloudy, increasingly FAIR: Revisiting the FAIR Data guiding principles for the European Open Science Cloud. *Information Services & Use, 40*(1), 49–56. https://doi.org/10.3233/ISU-200048

O'Sullivan, J., Edmond, D., & ter Hofstede, A. (2002). What's in a service? Towards accurate description of non-functional service properties. *Distributed and Parallel Databases, 12*, 117–133. https://doi.org/10.1023/A:1014820504632

OECD. (2017). *Digital platforms for facilitating access to research infrastructures.* OECD Publishing. https://doi.org/10.1787/9789264279561-en

Salomoni, P., et al. (2016). Scientific workflows as service in cloud-based infrastructures: A review. *Future Generation Computer Systems, 56*, 654–670. https://doi.org/10.1016/j.future.2015.09.012

Spataro, F. (2025). Il modello Pipeline-as-a-Service applicato alle neuroscienze. *Montecapital Online Journal – App24.* → *Volume, issue, and persistent identifier not available.*

Wilkinson, M. D., et al. (2016). The FAIR guiding principles for scientific data management and stewardship. *Scientific Data, 3*, Article 160018. https://doi.org/10.1038/sdata.2016.18