TNO innovation for life

Bridging the Financing Gap for Data Sharing Initiatives

How Public-Private Partnerships Enable Scalable and Secure Ecosystems

TNO Public ⟩ TNO 2025 P12826

1 December 2025

ICT, Strategy & Policy
www.tno.nl
+31 88 866 00 00
info@tno.nl

TNO 2025 P12826 – 1 December 2025

Bridging the Financing Gap for Data Sharing Initiatives

How Public-Private Partnerships Enable Scalable and Secure Ecosystems

Author(s)	Kristiina Sau, Laura van den Aarssen, Gijs van Houwelingen, Marianne Schoenmakers
Classification report	TNO Public
Title	TNO Public
Report text	TNO Public
Number of pages	43 (excl. front and back cover)
Number of appendices	0

Contents

1 Executive summary

Data spaces, or, more broadly, data sharing in initiatives (DSIs) hold strategic value for Europe's competitiveness, innovation capacity, and digital sovereignty. By enabling trusted, cross-sectoral data exchange, they create shared infrastructure for innovation, catalyze collaboration between public and private actors, and offer alternatives to platform-based market dominance. Yet most DSIs remain dependent on temporary public funding, exposing them to political shifts and budget cycles. The absence of clear business models discourages sustained private participation, while decentralized governance structures—though aligned with sovereignty principles—add complexity and slow decision-making. For industry, these conditions translate into fragmentation, uncertainty, and missed opportunities for innovation and market access.

This report addresses the persistent financing gap that constrains the sustainable development of Data Sharing Initiatives (DSIs) across Europe. Despite significant public investment in recent years, few data spaces have transitioned to financially viable operating models. Public-Private Partnerships (PPPs) offer a promising solution by combining public legitimacy with private sector innovation and market discipline. Drawing on three Dutch real-world cases, the report provides practical recommendations for policymakers, industry actors, and program leaders seeking to design and scale resilient data ecosystems.

Several key insights emerge:

- Hybrid models are essential: PPPs are proving to be the most viable approach for ensuring financial sustainability within different sectors.
- Balance is critical: successful PPPs combine public credibility and alignment with policy objectives with private agility and innovation capacity.
- Governance and financing are interdependent: stable governance structures underpin trust, monetization, and sustained collaboration.
- Success depends on fundamentals: structural long-term funding, clear value propositions for members, and inclusive, representative governance are key enablers of continuity and growth.

Based on these insights, the report recommends establishing stable governance early and designing it for long-term continuity; building focused coalitions of motivated and aligned partners before broadening participation; developing tangible value propositions for end users and suppliers linked to measurable outcomes; and introducing tiered membership models to balance inclusivity with financial sustainability.

Companies and public institutions should articulate clear internal benefits, including efficiency gains and compliance readiness; offer in-kind support when financial contributions are constrained; participate actively in working groups to shape shared standards and tools; and avoid symbolic membership by aligning internal priorities with the initiative's objectives.
Policymakers should commit to structural, long-term financing frameworks that combine public and private investment; facilitate SME participation through targeted subsidies or sponsorship mechanisms; promote alignment and interoperability between emerging trust frameworks; and provide high-level political and institutional support to strengthen legitimacy and accelerate adoption.

Adopting PPP-based governance- and finance model is not optional for Europe: it is likely a strategic necessity for scaling many, if not most, DSIs and safeguarding European data sovereignty. Sustainable financing and governance must move from experimental phases to systemic implementation. Industry and government now share a responsibility to act. Building sustainable, interoperable, and trusted data ecosystems will require coordinated investment, shared governance, and mutual commitment to long-term objectives. Acting now will ensure that Europe's data economy grows on foundations of openness, accountability, and resilience.

At the same time, the transition from subsidy-dependence to sustainable financing is rarely direct. Operators often find themselves navigating between incomplete public commitments and participant communities not yet ready to fund operations. Based on our analysis, we propose a stepping-stones approach: progressing through discrete, testable stages rather than attempting a single leap to full cost recovery. Each stone—whether seed grants, long-term public investment, intermediary funding, membership models, or service monetization—creates conditions for the next, but their sequence depends on context. The common thread is that hybrid models emerge through transitions, not sudden pivots. Governance maturity, adoption visibility, and financing readiness develop unevenly, and operators must interpret when a move is viable without perfect information. This approach acknowledges that sustainable financing is less about finding the right model than building the conditions—trust, tangible value, inclusive structures—that make multiple funding streams possible over time.

2 Introduction

2.1 Why financing data spaces remains a challenge

Since the launch of the European Strategy for Data in 2020, the concept of Common European Data Spaces has gained central importance in Europe's pursuit of digital sovereignty and innovation capacity. These sectoral and cross-sectoral initiatives intend to enable trustworthy data sharing across domains while maintaining European values of privacy, fairness, and interoperability. However, the establishment of Data Spaces has relied heavily on public funding through national and EU programs such as Horizon Europe and the Dutch Growth Fund.[1] While this initial support was essential to kickstart experimentation, continued dependence on subsidies is financially unsustainable and exposes initiatives to political uncertainty and discontinuity.

As many projects move from pilot to operational stage, two interconnected challenges have surfaced:

- **Financing gap:** Over 85 % of European Data Spaces face difficulties securing stable, long-term funding.[2] This uncertainty hampers private investment and limits scalability.
- **Governance complexity:** At the same time, decentralized governance models (though aligned with sovereignty principles) create coordination costs, shifting responsibilities among multiple actors.

For industry, such fragmentation results in uncertain returns, inconsistent standards, and slow adoption, ultimately threatening Europe's ability to turn regulatory ambition into competitive advantage.

In contrast to centralized platforms such as Amazon and Microsoft, which thrive on well-defined revenue streams like advertising, subscriptions, and integrated services, in practice Data Spaces are not always able to articulate a clear value proposition for participants. This gap has hindered the development of sustainable business models. Many data spaces aim for participant-driven financing, where members contribute to operational costs. While involving private actors could bring innovation, funding, and networks, few initiatives have successfully made this transition. They face a dilemma: attracting new members often requires offering incentives, yet charging fees may deter participation. Moreover, private actors perceive investments as risky due to unclear longevity and governance complexity, creating an unfavorable environment for newcomers and limiting growth potential.

From an industry perspective, the stakes are economic as much as strategic. Sustainable data ecosystems underpin interoperability, market access, and innovation across sectors including mobility, health, manufacturing, and energy. Yet without predictable revenue streams and

[1] Bisière, C., Crémer, J., Jullien, B., & Lefouili, Y. (2025). The economics of data spaces (Policy Paper). Toulouse School of Economics. https://www.tse-fr.eu/sites/default/files/TSE/documents/DigitalCenter/policy_paper/the_economics_of_data_spaces_july_2025_policy-paper.pdf [tse-fr.eu]

[2] Moonen, N., Mollee, N., Wentzel, V., van den Born, A., & Vossen, A. (2025). Sustainable revenue models for data sharing initiatives. Government of the Netherlands.

viable participation models, many Data Space Initiatives (DSIs) risk stagnation once public funding phases out. In the absence of structural financing, the business case for participation remains weak, discouraging companies from committing resources or aligning their systems with emerging standards.

To close this gap, hybrid financing models, particularly Public-Private Partnerships (PPPs), offer a pragmatic path forward. PPPs combine public legitimacy and infrastructure investment with private-sector agility and innovation capacity. When well-designed, they enable risk-sharing, align incentives[3], and coordinate investment in interoperability frameworks, reducing duplication and accelerating adoption.[4] [5]

However, PPPs pose their own governance challenges: balancing public-interest objectives with commercial considerations and ensuring fair representation of all stakeholders[6]. The power dynamics and governance structures between the different actors can make or break these initiatives, and it is important that both interests are represented. As such, we studied three successful cases to showcase best practices, and provide advice to policy makers, data space participants and data space operators. This leads us to the research question: *How can hybrid financing models help ensure the long-term economic resilience of data sharing initiatives?*

2.2 Purpose and scope of this report

This report analyses three successful cases of hybrid financing to distil lessons for decision-makers involved in developing and scaling Data Spaces. It identifies key governance mechanisms, financing strategies, and partnership designs that have proven effective in sustaining operations beyond initial grants. The report concludes with actionable recommendations for policymakers, participants in data spaces, and data space operators seeking to build resilient data ecosystems. Our overarching aim is to help industry and policymakers co-create sustainable and competitive European data ecosystems—where innovation and sovereignty reinforce each other rather than compete.

[3] Iossa, E., & Martimort, D. (2015). The simple microeconomics of public-private partnerships. Journal of public economic theory, 17(1), 4-48.

[4] Runeson, P., Olsson, T., & Linåker, J. (2021). Open Data Ecosystems—An empirical investigation into an emerging industry collaboration concept. Journal of Systems and Software, 182, 111088.

[5] Klievink, B., Bharosa, N., & Tan, Y. H. (2016). The collaborative realization of public values and business goals: Governance and infrastructure of public–private information platforms. Government information quarterly, 33(1), 67-79.

[6] Susha, I., van den Broek, T., van Veenstra, A. F., & Linåker, J. (2023). An ecosystem perspective on developing data collaboratives for addressing societal issues: The role of conveners. Government Information Quarterly, 40(1), 101763.[2] https://doi.org/10.1016/j.giq.2022.101763

2.3 Reading Guide

Section	What you'll find
1. Executive summary	A concise overview of the report's key findings and actionable recommendations. Start here if you want the essence of the report
2. Introduction: Why financing Data Spaces remains a challenge	Context on Data Spaces, the financing challenge, and why hybrid models matter for industry and policymakers.
3. Summary of recommendations	Practical, solution-oriented guidance for decision-makers, companies, and policymakers. Organized by audience for quick reference.
4. Use case descriptions	Three real-world examples: Edu-V (education), LIFES (science), and Zorgeloos Vastgoed (real estate), illustrating how PPPs work in practice.
5. Analysis and lessons learned	Insights across cases: challenges, solutions, recommendations based on lessons learned
6. Concluding remarks	Broader takeaways for scaling PPPs and aligning governance with financing strategies.
7. Limitations and the need for longitudinal learning	Examines why current findings are provisional, emphasizing evolving cases and the need for time-based evidence to validate transition pathways
8. Methodology	Details on research design, selection criteria, and validation process for readers interested in rigor.
References	Supporting details, sources, and additional context for deeper exploration.

3 Summary of recommendations

This chapter consolidates the main recommendations emerging from the report and translates them into concrete guidance for different stakeholder groups. The recommendations are organized by audience and theme, and each point is accompanied by a brief rationale to clarify why it matters in practice. Together, they provide a practical roadmap for strengthening the governance, financing, and long-term resilience of Data Sharing Initiatives (DSIs)[2].

3.1 Recommendations for decision makers

Among decision makers we count program managers, initiative leads, and strategists responsible for execution and growth of the DSI.

3.1.1 Governance and structure

Decision-makers in DSIs should establish governance structures early and design them with long-term continuity in mind. Clear rules, roles, and decision-making processes are essential for building trust among participants and for underpinning any sustainable monetization model; without such foundations, financing arrangements remain fragile and difficult to scale.

Rather than seeking broad participation from the outset, programme managers and initiative leads are advised to first build coalitions of motivated and strategically aligned partners. Early alignment on objectives, standards, and expectations helps prevent fragmentation, reduces coordination costs, and accelerates adoption once the initiative opens up to a wider group of participants.[7]

3.1.2 Financing and value proposition

Decision-makers should develop tangible value propositions for both end users and suppliers, linked to concrete benefits such as reduced administrative burden, streamlined compliance, or improved data quality. When participants can clearly see how engagement with a DSI solves operational problems or reduces risk, their willingness to invest resources and adapt internal processes increases significantly.

To reconcile inclusivity with financial sustainability, DSIs are encouraged to implement tiered membership models. Such models allow smaller organisations and SMEs to participate at lower cost while ensuring that larger or more intensive users contribute proportionally to the structural costs of technology, governance, and community-building.

[7] European Commission. (n.d.). Private sector data sharing. Digital Strategy. Retrieved December 4, 2025, from https://digital-strategy.ec.europa.eu/en/policies/private-sector-data-sharing

3.2 Recommendations for companies and public institutions

This entails participants in DSI working groups and users of the DSI, but not responsible for strategy or governance.

3.2.1 Engagement and contribution

Companies and public institutions should communicate the concrete benefits of participating in DSIs internally, both to leadership and operational teams. Framing participation in terms of efficiency gains, improved compliance, or access to new data-driven services helps secure internal buy-in and align resources around the initiative.

Where financial contributions are a barrier, organisations can contribute in-kind resources such as expertise, staff time, data, or infrastructure. These contributions can be critical for maintaining momentum in early phases and demonstrate commitment, even when budgets are constrained.

3.2.2 Active participation

Participants should engage actively in working groups, pilots, and governance fora to help shape practical solutions and standards. Direct involvement not only ensures that resulting frameworks are relevant and implementable, but also builds trust between stakeholders and strengthens the legitimacy of decisions.

Organisations are advised to avoid purely symbolic or “token” participation. Aligning internal practices and data management approaches with the principles and rules of the initiative is essential; superficial engagement undermines credibility, slows progress, and weakens the overall ecosystem.

3.3 Recommendations for policy makers

These are recommendations for government bodies, regulators, and public funders who shape the environment for DSIs.

3.3.1 Structural financing and inclusivity

Policymakers should commit to structural, long-term financing arrangements that blend public and private investment, rather than relying solely on short-term project grants. Stable funding frameworks reduce risk for private actors, encourage long-term planning, and enable DSIs to invest in shared infrastructure and governance capacity.

Ensuring that SMEs can participate meaningfully in DSIs is critical for diversity and innovation. Targeted subsidies, sponsorship schemes, or reduced-fee tiers can prevent smaller actors from being excluded while still maintaining viable revenue streams for the initiative.

3.4 Policy and governance support

High-level political and institutional backing remains an important enabler for DSIs. Visible support from ministries, agencies, or EU bodies enhances credibility, signals policy stability, and can accelerate stakeholder buy-in across sectors.

Policymakers should also promote convergence and interoperability between emerging trust frameworks, standards, and certification schemes. Supporting harmonisation reduces duplication, lowers compliance costs, and allows data spaces in different sectors or countries to interconnect and scale more effectively.

3.5 Cross-cutting principles

Across all stakeholder groups, transparency in decision-making is a foundational principle. Clear documentation of rules, processes, and criteria for decisions fosters accountability and trust, making it easier for new participants to understand how the DSI operates.

Interoperability should be treated as a design principle rather than an afterthought. Prioritising common standards, reference architectures, and reusable components from the outset reduces integration costs and supports scaling across sectors and borders.

Finally, the human factor is central: effective leadership, trust-building, and sustained collaboration determine whether technical and legal frameworks will succeed in practice. Investing in capable governance teams, community management, and stakeholder engagement is therefore as important as investing in technology or legal tools.

4 Case studies

4.1 Conceptualizing our cases as data spaces

In line with European guidance[8], we understand a data space as an interoperable, governed framework—grounded in common rulebooks, standards, and enabling services—that enables trusted data transactions between participants[9]. Crucially, data spaces are typically federated (data remains at source; exchange is controlled by shared policies) and may be implemented over one or more infrastructures; they do not presuppose a centralized platform or a marketplace as the organizing logic. Our cases adopt this federated architecture and governance orientation, which fits the broad, consensus definitions used by the Data Spaces Support Centre, the European Commission's Staff Working Documents, Gaia-X[10], and the International Data Spaces Association[11].

4.2 Edu-V: Innovating in the educational sector

The main goal of Edu-V is to ensure safe and secure data exchange in the educational sector, which is challenged with providing reliable and secure services involving sensitive data. Edu-V[12] was created from its predecessor Edu-K, a collaboration between similar stakeholders running projects together. One of the most successful results to come out of Edu-K was the education privacy covenant, however, stakeholders noticed discussions getting stuck on a number of strategic dossiers and progress halting. *'It was hard to get real commitment from parties, because the initiative did not have legal status and was fairly non-binding'* states Marcel Dol, a founding member of Edu-V.

The industry associations of IT suppliers, the PO Council, the VO Council, and the MBO Council then successfully applied for financing through the National Growth Fund[13] to turn it into a framework of agreements. They were able to secure a funding of nearly 33 million spread over 9 years, with a yearly reporting process on outcomes. The funding comes from the Ministry of Economic affairs but is managed by the Ministry of Education, whom Edu-V is in close contact with.

There had been criticism from the public side regarding the educational market being dominated by few large IT suppliers. The Edu-V initiative helps to strengthen and create a well-functioning educational market by being independent and including both small and large suppliers in the working groups and decision making. They established the Edu-V quality mark

[8] European Commission. (2022). Staff working document on common European data spaces (SWD(2022) 45 final). European Commission. https://digital-strategy.ec.europa.eu/en/library/staff-working-document-data-spaces
[9] Data Spaces Support Centre. (2023). Key concept definitions (Version 1.0). https://dssc.eu/space/bv15e/766061638/1+Key+Concept+Definitions
[10] Gaia-X. (n.d.). What is Gaia-X? Retrieved from https://gaia-x.eu/what-is-gaia-x/
[11] International Data Spaces Association. (2019). IDS – The standard for data sovereignty and an indispensable element of data ecosystems (Version 1.0) [White paper]. International Data Spaces Association. https://internationaldataspaces.org/wp-content/uploads/IDS-The-Standard-for-Data-Sovereignty-English.pdf
[12] Edu-V. (n.d.). Edu-V: Samen digitaal onderwijs mogelijk maken. https://www.edu-v.org/
[13] Rijksoverheid. (n.d.). *The National Growth Fund*. Nationaal Groeifonds. Retrieved September 9, 2025, from https://www.nationaalgroeifonds.nl/english/the-national-growth-fund

in the market for suppliers that adhere to the Edu-V agreements, by which they are recognizable for schools as trustworthy and qualitatively sound IT partner.

By now almost all IT suppliers in the Dutch educational sector have joined Edu-V and the diversity in suppliers size is large, which shows that Edu-V helps to create a level playing field in the educational sector. A collaboration with Authority for Consumers and Markets (ACM)[14] has been established, further enhancing the trustworthiness and credibility of the initiative.
Although the Growth Fund ensures funding for 6 years to come, structural financing is still essential. In the second quarter of 2025, the initiative was officially established as a Foundation, approved and backed by the government, marking the start of a new phase for Edu-V where they continue on their path to further supporting the educational sector to become more successful through the use of data.

4.2.1 Edu-V's financing model

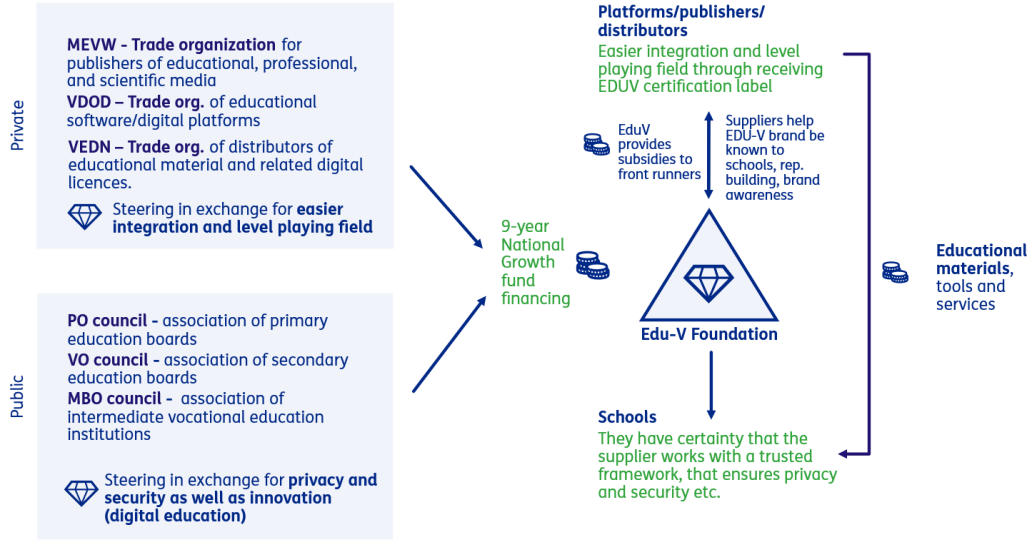

Figure 1. Financing model of Edu-V

Here we look at how Edu-V provides value for its stakeholders, as well as show interactions between participants (see Figure 1). Edu-V's overall value proposition entails secure, seamless data exchange in the educational sector, levelling the playing field, building trust through transparent standards and providing a recognized quality mark. They also have a value proposition for each stakeholder:

- Trade organizations (MEVW, VDOD & VEDN) represent private parties. They have members in publishing, software and distribution of educational material. The organizations are able to represent their member's interests through the Program Council of Edu-V, where, together with public parties, they provide advice and liaison for the needs of the industry. The members gain easier integration and a level playing field for smaller and larger suppliers. Furthermore, in the working group, individuals for relevant companies can come up with new technical solutions to existing issues, whilst gaining insights from school representatives.
- On the public side, the PO, VO and MBO council represent the interests of educational institutions ranging from primary school to intermediate and vocational education. They

[14] Netherlands Authority for Consumers and Markets. (n.d.).Authority for Consumers & Markets. https://www.acm.nl/en/authority-consumers-and-markets

are able to push the needs for privacy, security as well as innovation in the sector. This is done through the Program council and working groups for example. The ministry of education is also part of the program council, and aims to support the collaboration, whilst advancing innovation in the educational sector.

- Individual platforms, publishers and distributors receive a Edu-V certification label that allows them to prove that they follow the principles of Edu-V's trust framework, protecting the privacy rights of students, whilst allowing them access to innovative educational tools. Edu-V also provides subsidies to front runner suppliers, allowing them to innovate at a lower cost (the costs are not fully covered), whilst suppliers help to advance the Edu-V brand to schools.
- Schools gain certainty that the supplier works with a trusted framework and is able to select various suppliers that offer attractive packages.

Overall, Edu-V currently remains primarily publicly funded, but provides value for both the public and private sector.

4.3 LIFES: Building the Future of FAIR and Equitable Science

The Leiden Initiative for FAIR and Equitable Science (LIFES)[15] was launched in 2024 to support the practical implementation of FAIR data principles—Findable, Accessible, Interoperable, and Reusable—with a strong emphasis on equitable access and real-world application. As explained by the founding director prof. Barend Mons: "Essentially, the goal of LIFES is to jointly evolve the ecosystem that we call the Internet of FAIR Data and Services—or the Internet for Machines." While FAIR began as a set of guiding principles in 2014 to improve data stewardship, it has since evolved into a global movement, increasingly aligned with machine-readability and AI-readiness.

LIFES was proceeded by GO FAIR[16], which was established in 2016 as a bottom up initiative by academics. It focused on forming Implementation Networks (INs) to drive adoption via pushing policy change, trainings, and building technical infrastructure. Despite its initial three-year scope, GO FAIR remains active nearly a decade later, with over 30 INs and 8 offices worldwide. It serves as the custodian, watchdog and global coordinator of the FAIR principles, whilst remaining largely academic.

In 2024, eleven organizations, including GO FAIR, founded LIFES to extend FAIR into applied domains, particularly the private sector. The eleven founding members include both public and private organizations, with an almost 50% split. Structured as a non-profit association, LIFES operates with a small core team and a facilitative role. LIFES invites three types of members, namely Application Service providers, users that want qualified Applications and Service providers (ASPs) to deliver FAIR compliant services and recognized expert communities. Currently LIFES already includes around 30 organizations.

"Data visiting is the future. There is no way around it" states prof. Barend Mons. LIFES is designed for people and organizations that are willing to make data visitable, and follows the Data Station Interoperability Protocol (DSIP), adhering to the principles of building on minimal requirements, creating critical mass, and ensuring interoperability. It advances its agenda by facilitating collaboration between forward thinking members that adhere to the FAIR principles.

[15] LIFES Institute. (n.d.). LIFES: Learning Innovations and Future Education Scenarios. https://www.lifes.institute/
[16] GO FAIR Initiative. (n.d.). FAIR principles. https://www.go-fair.org/fair-principles/

Whilst the principles have been around for more than ten years now, LIFES is still a fairly new organization. Yet, it is already showing much potential, as over 40 countries have expressed interest in setting up similar initiatives.

4.3.1 LIFES's financing model

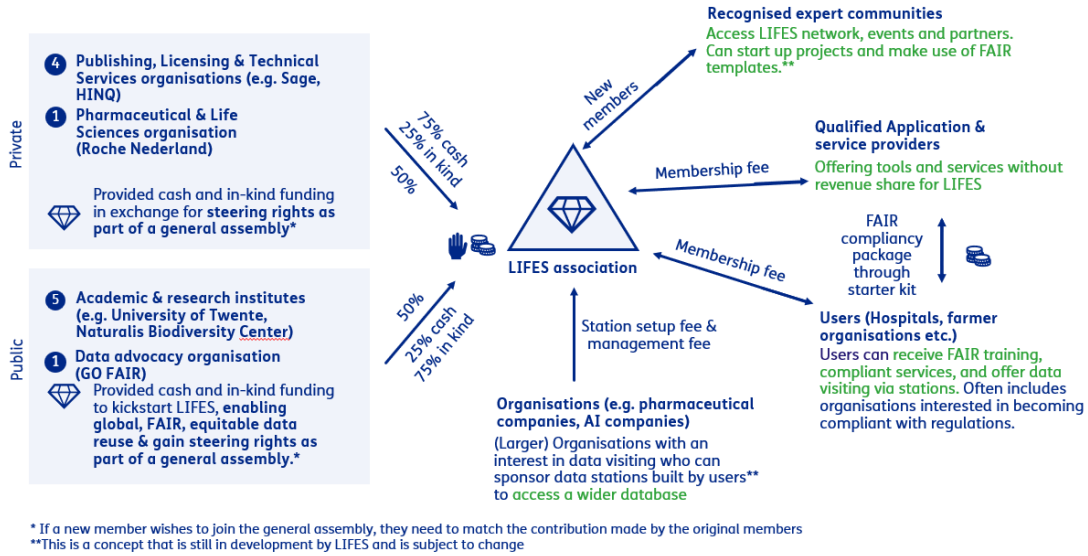

Figure 2. Financing model of LIFES

Next we study how LIFES provides value for its stakeholders, as well as show interactions between participants (see Figure 2). LIFES' overall value proposition is to provide a trusted, neutral platform where organizations and experts committed to FAIR and equitable science can collaborate, co-develop solutions, and access a global network. Here's the value proposition for each stakeholder:

- Here private organizations include publishing, licensing & technical Services organizations such as Copyright Clearance Center (CCC), Sage, and HINQ as well as a pharmaceutical and life sciences organization like Roche Netherlands. Collectively, they input 75% of funding into the initiative, and 25% in kind (e.g. access to network, research etc.). Through the funding, they became a part of the general assembly and have exclusive voting rights on the initiative's strategy and direction together with the public parties that invested,
- Public parties are mainly represented through research organizations, as well as GO FAIR, the predecessor of LIFES. Their contributions were 75% in kind and 25% in cash, providing knowledge offerings and credibility to the LIFES association. In exchange for their contributions, they steer decisions towards enabling FAIR and equitable data reuse and advance innovation in the healthcare sector, as well as upcoming sectors.
- On the right side, the first group to benefit from LIFES is recognized expert communities. LIFES offers them access to the LIFES network, events and partners. Members can start up projects and make use of the FAIR offerings, such as upcoming FAIR templates. In exchange, the communities bring in new members to the organization and omit the membership fee.
- Secondly, we have qualified application and service providers, who pay a membership fee in exchange for offering tools and services via the LIFES association.

- Users, such as hospitals and farmer organizations also pay a membership fee and are able to receive FAIR training, compliancy services and receive support in setting up data stations. Many of the users are motivated by strict regulations in the healthcare industry, where sharing patient data is not an option. LIFES offers a solution through the data visiting concept, where data stays at the source.
- Finally, LIFES is exploring the concept of working with organizations such as AI companies or pharmaceutical companies to help them gain access to a wider range of data by sponsoring the building of data visiting stations. This is still a concept under development, as careful considerations need to be made around protecting patient data. Nevertheless, such data is crucial for innovations in the medical sector, and sponsorship for organizations helps to lower the barriers for poorly funded ones worldwide.

Overall, we see that LIFES's original investment came from both public and private parties, but now they are strongly moving towards participant funding by service monetization.

4.4 Zorgeloos Vastgoed: Simplifying Property Purchases

Zorgeloos Vastgoed is a Dutch non-profit initiative established in 2019 with the goal of simplifying the real estate transaction process for consumers. It brings together key stakeholders, namely the Koninklijke Notariële Beroepsorganisatie (KNB), the Kadaster, the Nederlandse Vereniging van Makelaars en Taxateurs (NVM), and the Hypotheken Data Netwerk (HDN) to create a standardized system for the entire real estate chain including parties such as notaries, real estate brokers, insurance providers and appraisers. Zorgeloos Vastgoed (in English "worry-free" real estate) aims to offer consumers a faster and more transparent experience throughout the homeownership journey, while professionals such as brokers, financial advisors, and notaries benefit from reduced manual work and faster, more reliable data exchange. Software providers are supported with open standards and automated Application programming interface (APIs), enabling seamless integration into the digital trust framework.

The initiative is preceded and supported by HDN (Hypotheken Data Netwerk), which laid the groundwork for this kind of collaboration. HDN began over 30 years ago as a project to digitize the mortgage proposal process, evolving into a cooperative platform that now covers 100% of the mortgage market. Its success was driven by open governance, strong stakeholder involvement, and a clear business case that significantly reduced processing time—from several weeks to under 48 hours. It continues to run successfully until present day.

Zorgeloos Vastgoed builds on HDN's legacy but expands its scope beyond mortgages to encompass the entire property transaction chain. Its solution entails creating a single, shared system and set of standards. In practice this means that when a consumer wishes to purchase a house, their documents can be seamlessly shared across all relevant stakeholders, instead of needing to share the same documents to different actors (e.g. the bank, the notary, agent and so forth). The initiative is working on aligning with future regulations such as eIDAS 2 and the Digital Services Act, which promote secure digital identities and trusted data exchange across sectors.

To support its development, Zorgeloos Vastgoed was funded equally by public and private contributions—Kadaster and KNB representing public institutions, and HDN and NVM as private entities. These associations cover the costs of participation, including membership fees,

which are not directly charged to individual members such as SMEs. The governance structure ensures representation across organization sizes, and the trust framework is designed to be implemented primarily through a small number of service providers, making adoption scalable and cost-effective.

Whilst Zorgeloos Vastgoed's framework was established years ago, the association was established three years ago, and still has room to develop. It is challenged with a large amount of shareholders involved and their varied interests. Nevertheless, the readiness and push from the market for such solutions is evident, and Zorgeloos Vastgoed is speeding up processes by digitalizing the purchase agreement. By the end of 2026 they aim to cover 50 % of the market.

4.4.1 Zorgeloos Vastgoed's financing model

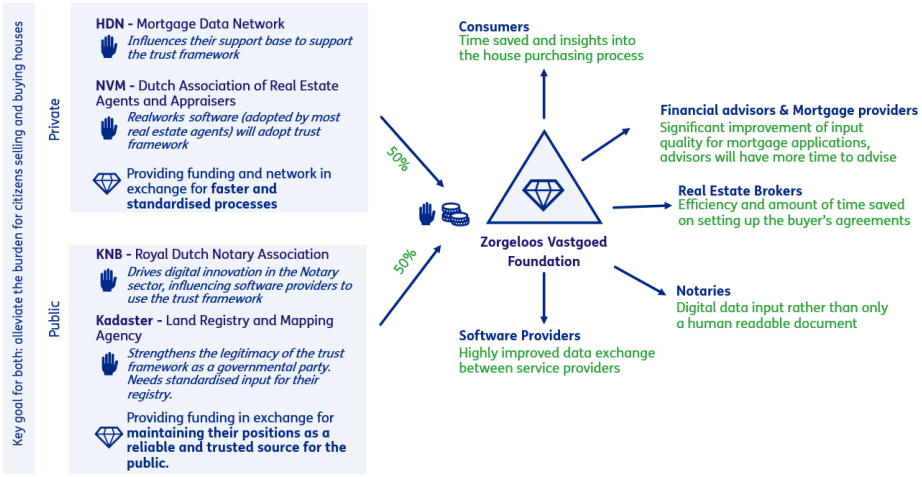

Figure 3. Financing model of Zorgeloos Vastgoed

Finally, we observe how Zorgeloos Vastgoed provides value for its stakeholders, as well as show interactions between participants (see Figure 3). Zorgeloos Vastgoed's overall value proposition entails providing more efficient, accurate, authenticated data sharing in the real estate sector. Above all, they aim to alleviate the burden for citizens selling and buying houses. Below is the value proposition for each stakeholder:

- The private parties consist of HDN, the mortgage Data Network that influences their support base to support Zorgeloos Vastgoed's trust framework, as wel as NVM, the Dutch Association of Real Estate agents and Appraisers. The later is the parent company of Realworks Customer Service Management software, which has been adopted by most real estate agents in the Netherlands, and will adopt Zorgeloos Vastgoed's trust framework. In exchange for funding the foundation, the two founding members from the private sector gain steering rights as well as faster and standardised processes in the sector, which provide a number of benefits to the members of the network, seen on the right side.
- On the public side, KNB drives digital innovation in the Notary sector, influencing software providers to use the trust framework, whilst the Kadaster strengthens the legitimacy of the trust framework as a governmental party. Both parties engaged in funding, with their main benefit entailing one for the public, namely providing a reliable and trusted information for the public.

- On the right side, consumers save time and gain insights into the house purchasing process
- Financial advisors and mortgage providers see a significant improvement of input quality for mortgage application, and advisors have more time to advise because they do not need to worry about issues related to paperwork.
- Real estate brokers gain efficiency and save time on setting up buyer's agreements.
- Notaries gain digital data input, such as a digitally signed document rather than only a human readable document, such as a pdf.
- Finally, software providers see a highly improved data exchange between service providers, enabled by the trust framework.

Overall, the investment to the Zorgeloos Vastgoed's organisation came through an investment and support by both public and private actors. Each of the parties on the right (e.g. consumers or software providers) indirectly pay for the services through taxes or association membership fees. This way, payments are more balanced between bigger, more wealthy participants of the associations, and smaller members.

5 Analysis of Growth and Adoption of Three Case Studies: Recommendations, Lessons and Impact

5.1 Analysis Edu-V

5.1.1 Challenges and solutions

Edu-V encountered significant barriers during its setup and financing. Short project timelines and the absence of binding long-term funding agreements created uncertainty, making stakeholders hesitant to join due to perceived instability. Furthermore, attracting schools as end-users proved difficult; the trust framework was initially seen as abstract, and the early IT infrastructure failed to deliver immediately visible value to their organizations.

To address these challenges, Edu-V implemented strategies focused on sustainability and trust. Supplier subsidies were introduced to support data connections, though intrinsic motivation remained necessary as costs were not fully covered. Crucially, Growthfund financing provided the resources to arrange structural government financing, while the Ministry's decision to establish a Foundation offered a long-term perspective, reassuring contributors. A supplier "quality mark" was introduced to clarify the value proposition, offering benefits like servitization and reduced administrative burden, which incentivized broad participation. To make the initiative tangible, Edu-V involved suppliers' clients in working groups and market exploration. Trust was maintained through transparency, ensuring equal weight for all interests. Strategic partnerships, particularly with ACM and SIVON, expanded reach.

Ultimately, we see that a strong trust framework expertise is a prerequisite before adding sector specialists, and professional marketing is needed to attract end-users. Program teams must drive progress proactively rather than relying solely on stakeholders. With initial funding sources like the Growthfund no longer available, exploring alternative structural financing is essential to sustain operations. For a detailed overview of recommendations and their specific impacts, refer to Table x.

5.1.2 Recommendations and Impact based on Edu-V

Through Table 1 featured below, we present the recommendations derived from the Edu-V case study, providing advice on a stakeholder basis.

Recommendation	Stakeholder	Linked Outcome / Impact
Establish structural long-term financing and formal governance structures	Policy Makers / Decision Makers	Growthfund financing secured credibility and enabled recruitment of top talent. Later, establishing Edu-V as a Foundation provided structural stability, continuity, and signaled reliability to stakeholders.
Design a clear, tangible value proposition (e.g., quality mark, servitization benefits)	Decision Makers	Introducing the Edu-V quality mark made the DSI's value proposition visible and attractive to schools, accelerating adoption and engagement.
Use supplier incentives to encourage participation	Decision Makers	The quality mark incentivized suppliers to join, leading to broad adoption from nearly all IT suppliers (~200–250).
Expand strategically beyond initial stakeholders	Decision Makers	Broad supplier participation, including both small and large players, created a level playing field and strengthened market neutrality.
Ensure transparency and fairness in decision-making	Decision Makers	Collaboration with ACM reinforced trustworthiness and independence, signaling openness and neutrality.
Communicate benefits internally and participate actively in working groups	Companies / Public Institutions	Schools and suppliers engaged in working groups, contributing practical solutions and supporting sector-wide adoption.
Build strategic partnerships to accelerate growth	Decision Makers	Alliances with SIVON and ACM expanded reach and credibility, supporting sector-wide adoption.

Table 1. Recommendations to stakeholders based on lessons learned from Edu-V

5.2 Analysis LIFES

5.2.1 Challenges and Solutions

In its early development phase, LIFES faced several significant challenges that complicated its setup and financing. Unclear investment structures created uncertainty for stakeholders, making it difficult for them to commit resources confidently. High joining fees of EUR 2,500 posed a barrier for smaller stakeholders, limiting inclusivity and slowing network growth. Furthermore, the visionary concept behind LIFES was difficult to explain across a diverse stakeholder base—ranging from large corporations to small startups—resulting in slower engagement.

Limited market awareness of FAIR principles and concepts such as "data visiting" further reduced perceived urgency, particularly in sectors beyond healthcare. Regulatory inconsistencies added complexity: while healthcare faced strict compliance requirements, other sectors lagged behind, creating uneven prioritization. Finally, misunderstanding and

misuse of FAIR principles demanded high commitment from members and increased reputational risks if these principles were not properly enforced.

As a solution, the organization deliberately maintained a lean, non-profit structure, positioning itself as a neutral broker rather than a producer of products or services. To protect its reputation and prevent “fairwashing,” a rigorous vetting process was implemented for new members to ensure genuine alignment with FAIR principles.

For well-funded organizations with regulatory obligations, LIFES introduced premium compliance packages priced at EUR 20,000, creating a sustainable revenue stream while meeting critical needs. Conversely, smaller stakeholders were offered flexible participation models, such as pitching for sponsorship or contributing in-kind, provided they demonstrated readiness and commitment. Furthermore, innovative value proposals that help support poorly funded parties whilst also benefitting large parties are being developed. Several best practices emerged from these strategies, including a focus on building critical mass with motivated, aligned partners ("eagles") rather than trying to onboard everyone, and avoiding those joining solely for subsidies ("turkeys").

In conclusion, leadership proved to be a decisive factor as a credible and charismatic champion was essential to bridge public and private sectors. Openness and neutrality were maintained through transparent governance, and communication was tailored to ensure clarity for corporates, startups, and research institutions alike. These strategic actions delivered tangible outcomes, transforming compliance challenges into research advantages and fostering global momentum. Table x represents recommendations and the impact based on lessons learned.

5.2.2 Recommendations and Impact based on LIFES

Through Table 2 featured below, we present the recommendations derived from the LIFES case study, providing advice on a stakeholder basis.

Recommendation	Stakeholder	Linked Outcome / Impact
Maintain neutrality by acting as a broker, not a producer	Decision Makers	LIFES established itself as a small, non-profit facilitator, ensuring openness and avoiding monopolistic behavior. This credibility secured membership in the World Data System, connecting to 145+ research organizations and unlocking large-scale funding.
Vet members carefully to prevent “fairwashing”	Decision Makers	Reputation strengthened; coalition built on genuine alignment with FAIR principles.
Introduce tiered membership and flexible models for SMEs	Decision Makers	Enabled smaller stakeholders to participate, increasing inclusivity and diversity without compromising quality or integrity.
Build critical mass with aligned, motivated partners (“eagles”)	Decision Makers	Created a strong foundation for scaling, fostering genuine engagement and avoiding superficial participation (“turkeys”). This strategy drove global momentum, growing the network from 11 to 29 active members and sparking interest in 40 countries to replicate the initiative.

Appoint a credible and charismatic leader	Decision Makers	Accelerated adoption and fostered cross-sector collaboration by uniting diverse stakeholders and inspiring trust.
Maintain openness and neutrality through transparent governance	Decision Makers	Built trust and ensured engagement from corporates, startups, and research institutions through clarity and transparency.
Tailor communication for different audiences	Decision Makers	Improved engagement by ensuring clarity for corporates, startups, and research institutions alike.
Support SME participation through sponsorship and in-kind contributions	Decision Makers	Lowered barriers for smaller organizations, broadening the coalition and supporting diversity.
Develop “win-win” value proposals for each participant	Decision Makers	Sparked interest worldwide due to the promise to support less funded institutes whilst also benefitting larger organisations
Promote inclusive governance standards for DSIs	Policy Makers	Encourage DSIs to adopt tiered membership and recognize alternative contributions (e.g., in-kind support) to lower barriers for SMEs, fostering diversity and innovation in data-sharing ecosystems.
Promote regulatory alignment and offer compliance support	Policy Makers	Hospitals are working on adopting FAIR principles to meet GDPR and European Health Data Space requirements, turning compliance into a research asset.
Encourage authentic participation and prevent superficial compliance	Companies / Public Institutions (Participants)	Increased trust and ensured co-development of solutions rather than insincere participation

Table 2. Recommendations to stakeholders based on lessons learned from LIFES

5.3 Analysis Zorgeloos Vastgoed

5.3.1 Challenges and solutions

Zorgeloos Vastgoed faced significant challenges during its setup and financing. Resistance to change was a major obstacle; stakeholders were reluctant to alter existing roles, creating friction and slowing progress. Early on, many mortgage and property companies sought to influence decision-making, complicating efforts to maintain neutrality. Limited board member availability delayed the trust framework's implementation, while COVID-19 complicated trust-building as digital collaboration could not fully replace physical interaction.

Implementation barriers also emerged due to varying digitalization levels. Smaller offices often managed IT internally, whereas larger offices relied on specialized teams, creating tension in adoption. Industry associations were tasked with training members, but efforts were not always sufficient to ensure broad engagement. These challenges underscored the need for strong governance, inclusive strategies, and proactive communication to align diverse stakeholders.

To overcome these barriers, Zorgeloos Vastgoed focused on trust, neutrality, and sustainability. The initiative communicated a clear, shared vision: simplifying real estate

processes through secure data sharing. Frequent communication maintained alignment, while strong governance ensured neutrality. The four founding organizations jointly defined strategy, reserving governance for public institutions and industry associations to represent collective rather than individual interests. Individual companies contributed via working groups, sharing knowledge and co-developing solutions.

For implementation, Zorgeloos Vastgoed strategically leveraged the limited number of software providers in the market. Founding organizations used their influence to accelerate adoption: HDM implemented the framework across all market providers, NVM leveraged its ownership of a major service provider, and the Notary Association worked through a central platform. Additionally, the initiative secured government buy-in by engaging the Ministry of Internal Affairs through high-level talks and recommendation letters, reinforcing credibility.

In conclusion, establishing a foundation with strong governance early on was essential for continuity. A sustainable hybrid funding model was created: management was financed by founding organizations, while future plans included fees for individual firms. Transparency in decision-making, documenting every rationale, was prioritized to build trust. Finally, interoperability with frameworks like DSGO was planned from the outset to ensure scalability. These actions delivered tangible outcomes in operational efficiency and consumer benefits. For detailed recommendations and specific outcomes, refer to Table x

5.3.2 Recommendations and impact based on Zorgeloos Vastgoed

Through Table 3 featured below, we present the recommendations derived from the LIFES case study, providing advice on a stakeholder basis.

Recommendation	Stakeholder	Linked Outcome / Impact
Establish a robust governance model early and plan for permanence	Decision Makers	Creation of a foundation with a solid governance structure ensured continuity and neutrality.
Keep foundation management lightweight and leverage in-kind contributions	Decision Makers	Sustainable funding model with low overhead costs; foundation securely funded by four founding organizations (50/50 public-private)
Communicate a clear, shared vision and align stakeholders	Decision Makers	Strong alignment across industry associations and companies; Achieved critical mass: 100% coverage of mortgage data (HDN), notaries (KNB), and property data (Kadaster), with NVM representing ~74% of real estate transactions. [17] [18]
Organize physical sessions to build trust and collaboration	Decision Makers & Participants	Improved stakeholder relationships; overcame trust-building challenges during COVID.

[17] Van Zwienen, M. (2025). Hoeveel NVM-makelaars zijn er in Nederland? (En hoe verhouden ze zich tot Vastgoed NL?) Kennis over Makelaars & Vastgoed. https://ikzoekdebestemakelaar.nl/kennisbank/hoeveel-nvm-makelaars-zijn-er-in-nederland-en-hoe-verhouden-ze-zich-tot-vastgoed-nl

[18] Note that real estate brokers are not obliged to join an association, so the rest of the market consist of Vastgoed Nederland and unaffiliated brokers.

Use software providers as strategic leverage for implementation	Decision Makers	Full implementation of the trust framework across the mortgage market via service providers (HDM, NVM, Notary Association). Buyers gain transparency and certainty early in the mortgage process, reducing waiting times from 6–8 weeks to near real-time.
Document decisions transparently for onboarding	Decision Makers	Smooth onboarding of new members; increased trust and clarity in governance.
Actively participate in working groups and share domain knowledge	Participants	Co-development of practical solutions led to operational efficiency, significantly reducing administrative work and enabling faster, safer data exchange across the property chain.
Communicate internal benefits and prepare for future contributions	Participants	Increased buy-in; readiness for entrance and recurring fees; efficiency gains across the chain.
Secure high-level political support and structural financing	Policy Makers	Endorsement from the Ministry of Internal Affairs and letters from the Minister of Housing strengthened credibility and trust.
Promote interoperability with related frameworks (e.g., DSGO)	Policy Makers	Future-proof design enabling convergence and scalability.

Table 3. Recommendations to stakeholders based on lessons learned from Zorgeloos Vastgoed

6 Concluding reflections: A stepping-stones approach to bridging the financing gap

We started out this paper by acknowledging that data spaces typically encounter two persistent challenges. The first is a financing gap that opens as projects move beyond initial grant funding and must find ways to sustain operations. The second is governance complexity inherent to neutral, multi-actor collaboration, where no single participant can or should dictate terms. Moving directly to participant-funded models from initial grants and piloting often stalls because trust frameworks, adoption incentives, and operational capacity need time to develop. These obstacles are not merely technical or financial. They reflect deeper uncertainties about who should pay, who should decide, and what value participants can expect in return.

In this chapter we synthesize our findings and propose a stepping-stones model as an approach to deal with these challenges. Our stepping-stones approach treats the transition from subsidy-dependence to sustainable financing as a series of discrete, testable moves rather than a single leap. Each stone represents a financing or governance arrangement that can be combined with others in different sequences. The metaphor is deliberate: crossing from one state to another requires stable footholds, and the route depends on the terrain. Some ecosystems begin with public seed grants, others with motivated communities willing to contribute early. Some settle into long-term hybrids of public and private funding, others eventually reach full cost recovery. There is no universal path.

This chapter offers one transitional approach among several possibilities. It makes most sense where trust, adoption, and operational capacity need time to mature, and where neither immediate cost recovery nor permanent public funding is assured. It is less relevant for ecosystems that can mobilize participant funding from the outset, or where public authorities commit to indefinite support. We recognize that some operators prefer to pursue direct monetization without public backing, while others argue for data spaces as public goods requiring sustained public investment. Our focus is on the space between these positions, where hybrid models emerge through sequenced transitions.

The chapter proceeds as follows. We map six stones (Figure 4) that appear from our case studies in successful transitions, examining the patterns and tensions each creates. We then explore why sequence matters, showing how context shapes the choice of route. Readiness markers help operators interpret when a move might be viable, though these are judgment calls rather than mechanical triggers. We position the three cases we have studied to illustrate how stones combine in practice, before examining common pitfalls and the policy conditions that enable transitions. We close by reflecting on what it means to navigate this terrain without perfect information.

6.1 Six stones: patterns and tensions

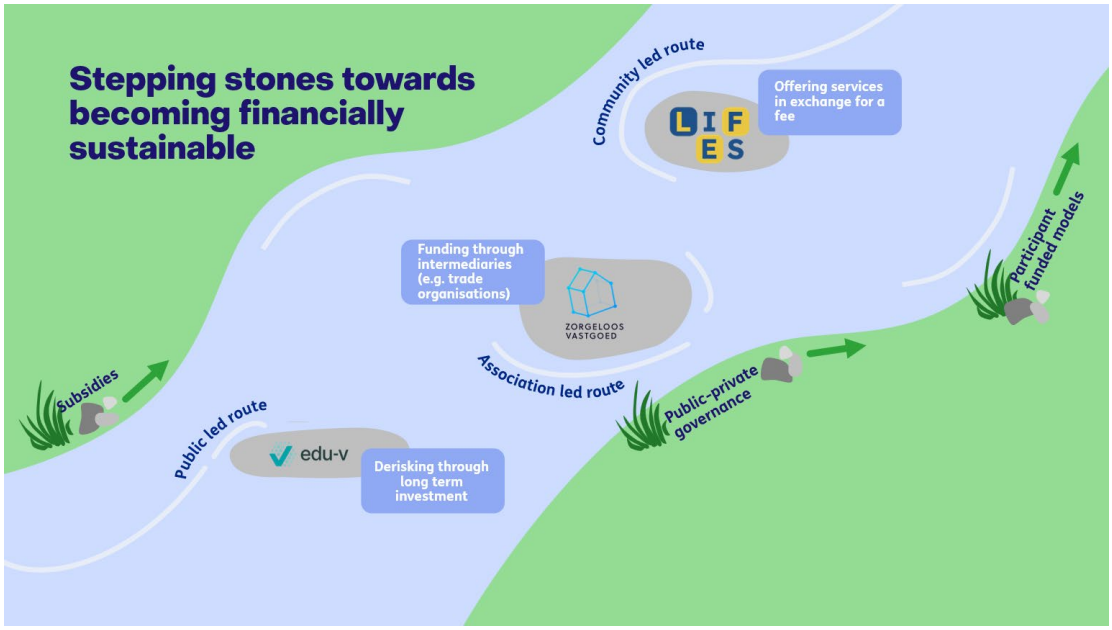

Figure 4. An illustration of the stepping stones model, with the three cases in this paper mapped

6.1.1 Stepping-Stone 1: Subsidies and seed grants

Public seed grants are the most common starting point in practice, though there is no a priori reason they must come first. Time-bound funding allows operators to build what are sometimes called "no-regret" assets: agreement and trust frameworks, participant onboarding flows, implementation of core standards and protocols. These are the shared components that reduce integration friction and signal to potential participants that coordination is possible. Grants also create space to convene an initial coalition without immediate pressure to extract fees, which can be critical when trust is still forming.

The risk is grant dependency. Operators may build more than they can sustain once funding ends, or they may defer difficult decisions about who will pay for what. Some ecosystems plan explicitly for the transition, defining a minimum asset set that should endure and publishing a roadmap for subsequent funding sources. Others find themselves scrambling when grant cycles close, with governance and adoption still too fragile to support cost recovery. The pattern suggests that subsidies work best when paired with clear exit criteria and when used to derisk participation rather than to indefinitely defer hard trade-offs.

Not all ecosystems begin with subsidies. Community-led initiatives sometimes mobilize early membership fees or in-kind contributions without public funding. Others secure long-term public commitments from the outset, bypassing the need for seed grants altogether. The variability reflects different starting conditions: the urgency of the shared problem, the cohesion of the initial coalition, and the willingness of public authorities to anchor a neutral framework.

6.1.2 Stepping-Stone 2: Long-term public investment

Multi-year public investment differs from seed grants in both scale and intent. Where grants derisk initial coordination, long-term commitments signal permanence. They allow operators to professionalize program offices, develop quality marks or trust frameworks, and roadmap integration pathways with predictability. Suppliers and end-users are more likely to invest in adoption when they see sustained backing rather than project-by-project funding that may not renew. We observe this most prominently in our Edu-V case study.

The tensions are different from those of seed grants. Long-term public investment can crowd out private participation if it removes incentives for cost-sharing. It can also lead to complacency if operators are not held to adoption or co-funding targets. The ecosystems that navigate this well tend to pair public funding with explicit expectations: that suppliers will onboard in cohorts, that participant fees or in-kind contributions will grow over time, or that service monetization will eventually offset some public costs. Without these expectations, public investment risks becoming a permanent subsidy rather than a transitional support.

Long-term investment works best when public authorities have a clear mandate to anchor a neutral framework and when supplier fragmentation makes it difficult for participants to coordinate funding on their own. It is less effective in competitive or commercially driven sectors where participants have strong incentives to fund shared infrastructure themselves, or where public legitimacy is contested.

6.1.3 Stepping-Stone 3: Public-private governance: the load-bearing structure

Governance is the stone that bears the weight of all others. Without neutral structures that balance public interest and private agility, other financing arrangements sink under legitimacy questions. Participants need confidence that decisions will not favour one group over another, that rules will be transparent, and that power asymmetries will be managed rather than ignored. This is easier said than done. Formal governance structures can slow innovation, and even well-designed systems struggle to prevent drift as ecosystems mature and new actors join.

In practice, public-private governance takes several forms. Some data spaces establish foundations with balanced boards representing suppliers, users, and public authorities. Others operate through associations with general assemblies and working groups that channel technical input into decision-making councils. The common thread is an attempt to separate assurance functions, like quality marks or standards, from operational or commercial activities. This separation protects neutrality while allowing the program office or service providers to operate with agility.

The tensions are persistent. Power asymmetries do not disappear through documentation alone. Larger participants often have more resources to engage in governance, and their voices can dominate even in formally balanced structures. Transparency helps, but only if decision logs are actually consulted and if appeals mechanisms are credible. Governance also develops unevenly. It often matures in parallel with other stones rather than reaching full stability before financing transitions begin. Some ecosystems formalize governance early and build financing around it. Others begin with loose coordination and only codify structures once monetization pressures mount. Neither route guarantees success, and both require ongoing maintenance to prevent erosion of trust.

6.1.4 Stepping-Stone 4: Funding via intermediaries

Intermediary funding, such as used in the Zorgeloos Vastgoed case, addresses a specific problem: how to reach the long tail of small participants efficiently. Associations, trade bodies, or umbrella organizations pool resources to fund common infrastructure on behalf of many members. This reduces per-entity transaction costs and improves inclusion, since small offices or SMEs often lack the capacity to engage directly in governance or to pay individual fees.

The pattern appears most clearly in fragmented sectors like real estate or construction, where hundreds of small actors benefit from shared standards or data exchange protocols but cannot individually fund their development. Associations negotiate co-funding arrangements, rally software providers, and maintain community management functions. The governance challenge is to ensure that representation remains balanced across sizes and that decisions are transparent. Larger members often contribute more, and without careful design they can dominate working groups or steer decisions toward their own priorities.

Intermediary funding can also obscure accountability. If associations fund the data space on behalf of members, those members may not feel directly invested in governance or adoption. Engagement can be superficial, and renewal depends on the association's continued commitment rather than on tangible value delivered to individual participants. The ecosystems that manage this well tend to combine intermediary funding with visible benefits, like toolkits or events, and with governance pathways that allow smaller voices to be heard.

6.1.5 Stepping-Stone 5: Service monetization

Service fees link revenue to tangible activities: setup support, management of shared infrastructure, or certification and qualification processes. This aligns income with adoption, since fees are paid when participants actually use the services. It complements membership by rewarding active engagement rather than passive affiliation. LIFES provides an example of an approach aiming at service monetization.

The risk is perceived bias. If the same entity that sets standards or manages assurance also delivers paid services, participants may question whether commercial interests are shaping governance decisions. The separation of assurance from operations is critical here. Some ecosystems establish independent bodies to oversee quality marks or trust frameworks, while service delivery remains with a program office or external providers. Others create transparent procurement pathways and publish pricing to maintain fairness.

Service monetization tends to work better once governance credibility is established and once adoption is visible enough to generate demand. Early attempts to charge for services can backfire if participants perceive they are being asked to pay for unproven value or if they suspect the ecosystem is being captured by commercial interests. The ecosystems that succeed with service fees tend to introduce them gradually, starting with low-friction services like onboarding support before moving to higher-value activities like certification (as in the Edu-V case).

6.1.6 Stepping-Stone 6: Participant-funded membership

Tiered membership fees create structural revenue and keep stakeholders invested in the ecosystem's success. By offering different levels of participation, with corresponding benefits like visibility, access to toolkits, or priority support, operators can accommodate both large and small actors. In-kind contribution pathways further reduce barriers, allowing participants to offer expertise, tooling, or venues instead of cash.

The tensions are predictable. Price sensitivity varies widely, and what seems modest to one participant may be prohibitive to another. Membership also risks becoming transactional rather than collaborative if benefits are not tangible or if governance feels closed to ordinary members. Some ecosystems see high initial sign-ups followed by declining renewals as the novelty wears off. Others struggle to assess the maturity of participants, admitting members who lack the technical capacity or strategic alignment to contribute meaningfully.

Membership is harder to implement early unless the community is already cohesive and motivated by a shared problem. It works best once governance has matured enough to demonstrate neutrality and once adoption is visible enough to justify the investment. For this reason, membership often appears later in the sequence, after subsidies or public investment have derisked participation and built initial momentum. Community-led ecosystems are the exception, where membership fees and in-kind contributions can be viable from the start if the coalition is tight and the urgency is high.

6.2 Why sequence matters: dependencies and context

The stones are not interchangeable building blocks that can be assembled in any order. They have dependencies, and their viability depends on context. Governance maturity enables membership and service monetization because participants will not pay into systems they do not trust. Subsidies or intermediary funding often come before membership because they derisk participation and help form the initial coalition. Services work better after adoption is visible because credibility depends on demonstrated value.

These dependencies are not absolute. Some ecosystems formalize governance late, after membership or service fees have already created momentum. Others skip subsidies entirely and begin with participant funding. The variability reflects different starting conditions: the urgency of the shared problem, the cohesion of the initial coalition, the willingness of public authorities to provide long-term support, and the fragmentation or concentration of potential participants. Recognizing these patterns helps operators anticipate which stones are likely to be viable at which points in the transition, even if the specific sequence will vary.

We describe three archetypal routes not as prescriptions but as illustrations of how context shapes sequence. Each route reflects a different set of starting conditions and a different logic for moving from one stone to the next.

Route A: Public-led transitions

In public-led transitions, authorities want to anchor a neutral framework and suppliers are too fragmented to coordinate funding on their own. The sequence typically begins with subsidies to build core assets and convene an initial coalition. Long-term public investment then stabilizes

operations and signals permanence, which attracts suppliers who might otherwise wait to see if the ecosystem will endure. Governance formalizes as working groups and councils take shape, often with light-touch public oversight. Membership and service fees grow as adoption increases and as participants see tangible value in integration support or quality marks.

The logic is cumulative. Public commitment reduces risk for suppliers, which drives adoption, which in turn creates demand for membership and services. The challenge is to avoid prolonged dependence. If co-funding targets are not set or if adoption milestones are not reached, public investment can become a permanent subsidy rather than a transitional support. Ecosystems that navigate this well tend to pair public funding with explicit expectations about supplier onboarding and about the growth of participant revenue over time.

Route B: Association-led transitions

Association-led transitions work best where strong existing associations represent many small actors and where fragmentation is high (the Zorgeloos Vastgoed case offers an illustration). The sequence often begins with subsidies to fund initial coordination, followed by intermediary funding as associations pool resources on behalf of members. Governance develops through association structures, with boards or councils that balance representation across sizes. Service fees appear as the ecosystem proves its value, and membership tiers expand once adoption is visible.

The logic here is efficiency. Associations reduce transaction costs and mobilize participants who would struggle to engage individually. The risk is that association interests may diverge from ecosystem needs, or that representation imbalances allow larger members to dominate. Service fees can prove value before expanding membership, but only if the association maintains neutrality and transparency in procurement and pricing.

Route C: Community-led transitions

Community-led transitions begin with a motivated group of early adopters who can contribute in-kind and pay modest fees without public support. Governance formalizes early to ensure decisions remain transparent and to prevent insider capture. Services grow as the ecosystem demonstrates value, and public co-funding arrives later to strengthen reach and inclusion.

The logic is urgency and cohesion. When the shared problem is pressing and the initial coalition is tight, participants will fund the ecosystem themselves rather than wait for public support. The challenge is inclusion. Community-led starts can be elite or insider-driven if not carefully managed, and broader participation may require public backing to reduce barriers for SMEs or less-resourced actors.

6.2.1 Acknowledging alternatives

Our stepping-stones approach sits between two poles. Some ecosystems pursue immediate cost recovery without public support, relying on strong commercial cases and low trust barriers to mobilize participant funding from the outset. This is less common but viable where the value proposition is clear and where participants have both the capacity and the incentive to pay. Others secure permanent public funding and never transition to hybrid models, treating data spaces as public goods that require sustained public investment. This works where public mandate is clear and where political support remains stable over time.

The stepping-stones approach makes most sense in the middle ground, where neither pole is assured and where transitions must be navigated with incomplete information. It acknowledges that sustainable financing is often a blend rather than a binary choice, and that the path from subsidies to hybrids depends on building the governance and adoption conditions that make multiple funding streams viable.

6.3 Knowing when to move: readiness markers

Operators must decide when to attempt a transition from one stone to the next. These decisions are interpretive rather than mechanical. No set of indicators can fully capture whether governance is mature enough to support membership fees, or whether adoption is visible enough to justify service monetization. The markers we offer below are signals rather than thresholds, and they require judgment in context.

Table 4 summarizes readiness markers across financing, governance, and adoption dimensions for each stone. The markers are qualitative and should be adapted to sector and maturity. They are not bright lines. An ecosystem may show readiness in one dimension while lagging in another, and transitions often begin before all signals are clear. The table is a starting point for deliberation, not a checklist.

Stepping stone	Financing	Governance	Adoption	Transition considerations
Subsidies	Core shared assets funded	Roles and working groups defined	Integrations live	Charter and "no-regret" assets in place
Long-term public investment	Multi-year commitment signaled	Council cadence and reporting set	Assurance recognized by users	Multiple supplier cohorts onboarded
Intermediaries	Umbrella co-funding agreed	Balanced seats across sizes	SME onboarding via umbrellas	Long-tail coverage improving
PPP governance	Neutral legal entity active	Decisions logged, transparency	Cross-ecosystem reuse emerging	External frameworks aligned or partnering
Services	Service catalog published	Assurance vs. operations separated	Service uptake measurable	Fees contribute to operations
Membership	Tiers and benefits published	Admission and voting rules clear	Renewals and engagement visible	Runway supported by member revenue

Table 4. Readiness markers for transitional moves

These markers are not bright lines. Operators must interpret readiness in context, balancing financing, governance, and adoption signals.

The financing column asks whether the conditions for sustainable revenue are forming. Governance readiness concerns whether structures are transparent and balanced enough to prevent legitimacy crises. Adoption signals indicate whether participants see enough value to

justify fees or in-kind contributions. Transition considerations capture the minimum conditions that should be met before attempting the next move.

Some ecosystems track these markers formally, documenting decisions and publishing updates to build confidence among participants. Others rely on informal assessments within working groups or councils. Either way, the goal is to avoid moving too early, which risks failure and erodes trust, or too late, which prolongs dependence and misses opportunities to compound momentum.

6.4 Where the cases sit today

The three cases discussed elsewhere in this report illustrate how stones combine in practice. They are not proofs of the stepping-stones approach, but they show how different starting conditions and sequences lead to different hybrid models.

- Edu-V demonstrates long-term public investment paired with assurance mechanisms. A multi-year public commitment supports a neutral quality mark and structured governance that channels working group outputs to a decision council. Supplier adoption has increased as integration becomes easier for schools, though questions remain about when and how participant co-funding will grow. The case shows how public backing can anchor a framework and drive adoption, but it also reveals the challenge of transitioning away from dependence without risking the stability that attracted suppliers in the first place.

- Zorgeloos Vastgoed illustrates intermediary funding and trust framework governance. Associations pool resources to fund common infrastructure, and software providers help scale adoption across a fragmented sector. Governance balances public interest and industry representation, though maintaining that balance requires ongoing attention to prevent larger players from dominating. The case highlights the efficiency of intermediary models in reaching small actors, but it also underscores the risk of superficial engagement if members do not feel directly invested.

- LIFES operates a participant-funded membership model with service monetization pathways under a neutral association structure. Application and service providers, users, and expert communities contribute membership fees and in-kind expertise. Data-visiting concepts introduce service fees for setup and management, with plans to separate assurance governance from operational delivery to protect neutrality. The case shows how membership and services can sustain a commons when the community is cohesive and when governance credibility is strong, though it also reveals the ongoing challenge of keeping benefits tangible enough to justify renewals.

Each case navigates tensions specific to its sector and starting conditions. None has fully resolved the transition to sustainable financing, and all continue to adjust governance and funding arrangements as adoption evolves. They confirm that hybrid models emerge through iterative moves rather than through fixed plans, and that readiness is always partial and contested.

6.5 Navigating pitfalls

Certain pitfalls recur across data spaces, despite operators' best efforts to anticipate and manage them. Recognizing these patterns does not eliminate the risks, but it helps operators respond more deliberately when tensions surface.

- Grant dependency is common when ecosystems build more capacity than they can sustain after funding ends. Transition planning helps by defining a minimum asset set and a roadmap for subsequent revenue sources, but some dependence may persist if public authorities see value in continued support or if participant funding grows more slowly than expected. The question is not whether to eliminate dependence entirely, but whether the assets built under grants continue to deliver value and whether the governance structures remain credible enough to support eventual cost-sharing.

- Governance drift happens when power asymmetries reassert themselves despite formal structures. Transparency and role clarity reduce the risk, but they do not prevent it. Larger participants often have more resources to engage in working groups or councils, and their priorities can shape decisions even in systems designed to balance representation. Regular reviews of governance arrangements and credible appeals mechanisms help, though they require ongoing attention and cannot be set once and left to run.

- Membership fatigue appears when participants do not see tangible benefits from their fees or in-kind contributions. Toolkits, events, onboarding support, and visibility all help sustain engagement, but expectations vary and some participants will remain passive regardless of what is offered. Recognizing in-kind contributions can broaden participation, but it also complicates governance if it is unclear how to weigh different types of input. The ecosystems that manage this well tend to communicate benefits clearly and to adjust offerings based on feedback, though engagement will still fluctuate.

- Service backlash occurs when participants perceive that commercial interests are shaping governance decisions. Separating assurance from operations is necessary but not always sufficient to maintain trust. Transparent procurement, published pricing, and independent oversight of quality marks or trust frameworks all reduce the risk, but suspicions can linger if participants feel excluded from decision-making or if they see conflicts of interest that are not addressed.

- SME exclusion persists even in ecosystems designed to be inclusive. Intermediaries and tiered membership models improve access, but they do not guarantee that small actors will engage or that their voices will be heard. Reduced-fee tiers and sponsorship mechanisms help, though they also risk creating second-class participation if benefits are limited. Documenting fairness and inviting input from underrepresented groups are ongoing tasks, not one-time fixes.

These pitfalls remind us that sustainable financing is not only a matter of choosing the right stones or sequencing them well. It requires continuous governance work to manage tensions, to adjust arrangements as adoption evolves, and to maintain legitimacy among participants whose interests will never fully align.

6.6 What policy can do

Policy cannot dictate the path to sustainable financing, but it can create conditions that make transitions more feasible. Four areas stand out as particularly enabling, though none guarantees success and all require careful design to avoid unintended consequences.

- Structural public co-funding on multi-year timelines stabilizes program offices and assurance functions. It signals permanence to suppliers and end-users, which reduces the risk of investing in adoption. Co-funding works best when paired with explicit expectations about participant revenue growth or supplier onboarding, so that public support transitions rather than substitutes for cost-sharing. Without these expectations, co-funding risks becoming permanent rather than transitional.

- SME inclusion mechanisms broaden participation but require active design. Associations, reduced-fee tiers, and sponsorship programs all help, though they also introduce governance complexity. If small actors participate through intermediaries, their engagement may be indirect and their voices harder to hear. If tiered models create different levels of access or influence, the ecosystem risks fragmentation. Policy can encourage inclusion mechanisms without prescribing their form, leaving operators to adapt structures to sector conditions.

- Interoperability and assurance alignment reduce duplication and speed adoption. Quality marks, trust frameworks, and shared standards allow data spaces to build on common foundations rather than reinventing coordination mechanisms. Policy support for these shared assets, whether through funding or convening authority, helps ecosystems reach critical mass more quickly. The challenge is to maintain neutrality and avoid entrenching specific technologies or vendors, which can stifle innovation or exclude smaller players.

- Legitimacy and visibility through ministerial backing or predictable reporting attract suppliers and end-users who might otherwise wait to see if the ecosystem will endure. Public endorsement lends credibility, especially in sectors where participants are cautious about coordination or where trust barriers are high. The risk is that public visibility raises expectations that operators may not be able to meet, or that political changes undermine continuity. Policy can provide legitimacy without over-committing, by signalling support without guaranteeing indefinite funding.

These conditions help, but they do not remove the uncertainties that operators face. Policy creates space for hybrid models, but it cannot resolve the governance tensions or adoption challenges that determine whether those models will succeed.

6.7 Choosing a path forward

Crossing from subsidy-dependence to sustainable financing requires stable footholds, each chosen for context. The stepping-stones metaphor captures the iterative, contingent nature of this work. Operators must navigate trade-offs without perfect information, interpreting readiness signals and adjusting arrangements as adoption evolves. Hybrid models emerge through sequenced transitions rather than through sudden pivots, and the path depends on starting conditions that vary across sectors and coalitions.

We have offered one approach among several possibilities. It makes most sense where trust, adoption, and operational capacity need time to mature, and where neither immediate cost recovery nor permanent public funding is assured. It is less relevant for ecosystems that can mobilize participant funding from the outset or where public authorities commit to indefinite support. The approach acknowledges that sustainable financing is less about finding the right model than about building the governance and adoption conditions that make multiple funding streams viable.

The stones we have described, subsidies, long-term public investment, intermediary funding, participant membership, service monetization, and public-private governance, are patterns observed across successful transitions. They are not prescriptions. Their viability depends on context, and their sequence reflects dependencies that operators must interpret rather than follow mechanically. Governance is load-bearing, and without it other stones sink under legitimacy questions. But governance also develops unevenly, often in parallel with financing transitions rather than reaching full stability beforehand.

The cases we have positioned, Edu-V, Zorgeloos Vastgoed, and LIFES, show how different routes play out in practice. They confirm that hybrid models are works in progress, not finished states, and that tensions around power, inclusion, and value persist even in ecosystems that have achieved significant adoption. They also suggest that operators learn by doing, adjusting governance and funding arrangements as they gain experience and as participants provide feedback.

Sustainable financing is not a destination but an ongoing navigation. The finance gap and the governance knot do not resolve neatly. They require continuous attention to maintain legitimacy, to balance competing interests, and to adapt structures as ecosystems mature. The stepping-stones approach offers a way to think about this navigation, breaking the journey into discrete moves that can be tested and adjusted. It does not eliminate uncertainty, but it provides a framework for interpreting readiness and for sequencing transitions in ways that compound progress rather than overstretch coalitions or cash runways.

Operators choosing a path forward will need to assess their own starting conditions: the cohesion of their coalition, the urgency of the shared problem, the willingness of public authorities to provide long-term support, and the fragmentation or concentration of potential participants. They will need to interpret readiness signals across financing, governance, and adoption dimensions, recognizing that these are judgment calls rather than mechanical triggers. And they will need to accept that the path will evolve as they move along it, with some stones proving more stable than expected and others requiring adjustment or abandonment.

In doing so, data spaces can move from subsidies toward resilience, with hybrid models as the pragmatic backbone. The journey is not linear, and the destination is not fixed. But by progressing through sequenced stepping-stones, operators can build the conditions for sustainable financing without losing the neutrality and inclusiveness that make data spaces worth building in the first place.

7 Limitations and the need for longitudinal learning

7.1 What we learned and what remains uncertain

This report offers practical insights from three validated Dutch data spaces and proposes a stepping-stones framework for understanding transitions from subsidy-dependence to sustainable financing. The cases, Edu-V in education, Zorgeloos Vastgoed in real estate, and LIFES in science, illustrate how governance structures and financing arrangements develop together, how public and private funding can be combined in hybrid models, and how different starting conditions shape the paths ecosystems take. These are valuable contributions, but they come with significant limitations that constrain what we can confidently claim.

The most fundamental limitation is temporal. Our evidence is a snapshot of initiatives that are still evolving. We observed them at particular moments in their development, governance structures were being formalized, membership models were being tested, service catalogues were being designed, but we did not follow them through complete transitions. This matters because the stepping-stones framework in Chapter 6 is essentially retrospective. We identified patterns by looking at where these cases are now and inferring the sequences they followed to get there. We have not watched operators use the framework to navigate decisions, nor have we tracked whether the sequences we describe actually lead to durable financing and trusted adoption over time.

We cannot yet say whether the pathways we mapped, public-led, association-led, community-led, represent genuinely viable routes or whether they simply reflect path dependencies and the funding opportunities available at particular moments. The three cases are examples of hybrid models, but they are not yet proven successes. Edu-V still depends heavily on public investment, and it remains uncertain when or how participant co-funding will grow. Zorgeloos Vastgoed has mobilized intermediary support effectively, but questions persist about whether engagement will deepen beyond associations or remain somewhat superficial. LIFES has built a participant-funded membership base, but the model is still being tested and service monetization pathways are only beginning to take shape. All three cases are works in progress, and their long-term viability will only become clear as they mature.

Our methodology combined interviews with operators, participants, and public authorities, desk analysis of governance documents and financing structures, and stakeholder validation of the models we constructed. This approach strengthened our understanding, but it also has limits. Case narratives tend to under-represent failures or setbacks, and cross-sectional designs cannot speak confidently to causality. We can describe what these initiatives have done and how they have combined governance and financing arrangements, but we cannot definitively say that certain governance structures caused certain financing outcomes, or that particular sequences of stepping-stones were necessary rather than contingent.

The cases are also contextually bound. They reflect Dutch policy environments, sectoral dynamics specific to education, real estate, and science, and the institutional landscape of a relatively small, well-networked country. Some patterns may generalize across Europe, but others may not. The role of intermediaries in Zorgeloos Vastgoed, for instance, depends on strong existing associations with the capacity to pool resources and mobilize members. Not all sectors or countries have equivalent structures. Similarly, the long-term public investment anchoring Edu-V reflects a policy commitment that may be harder to secure in other contexts or at different political moments.

Finally, many of the mechanisms we observed are still being refined. Membership tiers, service fee structures, admission and voting rules, these are active experiments rather than settled practices. Their impact will only become clear as they are applied, adjusted, and tested under different conditions. We have described what operators are attempting, but we have not observed whether these mechanisms achieve the outcomes they are designed for: broadening participation, sustaining revenue, maintaining neutrality, or balancing inclusion with financial sustainability.

These limitations are not reasons to dismiss the findings, but they do constrain what we can confidently recommend. The stepping-stones framework is a plausible interpretation of the patterns we observed, and it offers operators a way to think about sequencing transitions. But it remains somewhat speculative. It needs to be tested, refined, and validated through observation of initiatives actually navigating these pathways over time.

7.2 Why transitions require longitudinal observation

Understanding transitional logics requires a longitudinal approach. This is not a limitation specific to our study but a general constraint on all cross-sectional work that tries to make sense of processes unfolding over time. Transitions are sequential, cumulative, and context-dependent. Each stone in the stepping-stones framework creates conditions for the next, but those conditions develop unevenly and their effects may only become visible months or years later. Observing initiatives at a single point in time captures their current state, but it cannot reveal whether that state is stable, transitional, or already beginning to unravel.

Consider the question of when to introduce participant-funded membership. Our framework suggests this works best after governance has matured enough to demonstrate neutrality and after adoption is visible enough to justify the investment. But we have not watched ecosystems attempt membership too early and fail, nor have we tracked cases where delayed membership introductions allowed momentum to dissipate. We infer readiness from the current positions of our three cases, but we do not have evidence of what happens when operators misread the signals or when external conditions shift unexpectedly.

Similarly, we propose that governance maturity is load-bearing, that it enables membership and service monetization by providing the legitimacy and transparency participants need to commit resources. But our evidence for this is correlational at best, not causal. The three cases all invested in governance early or mid-transition, and all have achieved some degree of adoption and revenue diversification. We cannot say whether governance enabled those outcomes or whether both governance and financing were driven by other factors, like the

urgency of the shared problem, the cohesion of the initial coalition, or the availability of public funding at critical moments.

Longitudinal observation would allow the field to separate trend from noise, to see which sequences of stones actually correlate with durable financing and trusted adoption, and to identify the context conditions that make certain pathways more or less viable. It would reveal leading indicators of resilience, the signals that distinguish ecosystems likely to sustain themselves from those that will stall or revert to grant dependency. And it would make visible the pathway shifts that occur when operators encounter obstacles or opportunities they did not anticipate: a public funding commitment that arrives earlier or later than expected, a key participant that exits or a new one that joins, a governance crisis that forces restructuring, or a service offering that proves more or less popular than planned.

Without this temporal view, the stepping-stones framework remains a hypothesis rather than validated guidance. Operators can use it to structure their thinking, but they cannot rely on it to predict outcomes or to know with confidence when a transition is likely to succeed.

7.3 What longitudinal work would need to address

To move from snapshots to systematic understanding, the field needs longitudinal observation that tracks initiatives over time, captures their pathway choices, and documents the financing and adoption outcomes that result. This work should address three pressing questions that emerged from our study but that we could not answer with the evidence available.

First, which sequences of stepping-stones correlate with more durable financing and faster adoption? We have described three archetypal routes, public-led, association-led, and community-led, and we have suggested that their viability depends on starting conditions like supplier fragmentation, the strength of existing associations, and the cohesion of the initial coalition. But we do not know whether ecosystems that follow public-led sequences actually achieve more stable long-term financing than those that begin with community-led membership models, or whether association-led routes reach broader adoption more quickly. Nor do we know whether certain sequences are simply more common because of path dependencies or funding availability rather than because they are more effective. Answering this requires tracking initiatives as they move from one stone to the next, documenting the conditions under which they make those moves, and comparing outcomes across different routes.

Second, when does service monetization strengthen neutrality and when does it risk commercial bias? Our framework emphasizes the importance of separating assurance governance from operational delivery to maintain trust, but we have limited evidence on how well this separation works in practice or on the conditions that make it credible to participants. Some ecosystems may find that service fees create sustainable revenue without undermining legitimacy, while others may encounter backlash even with careful governance design. Understanding this requires observing how participants respond to service offerings over time, whether concerns about bias surface and how operators address them, and whether ecosystems that monetize services early experience different governance challenges than those that delay.

Third, under what conditions do intermediary funding models and tiered membership structures actually improve inclusion rather than creating fragmentation or second-class participation? Our cases suggest that intermediaries can reach small actors efficiently and that tiered models can accommodate participants with different capacities to pay. But we also noted risks: that intermediaries may create indirect engagement where members feel less invested, and that tiered models may produce unequal influence if benefits or voting rights vary by tier. Resolving this requires tracking participation patterns over time, documenting who engages and how deeply, and examining whether inclusion mechanisms achieve their intended effects or introduce new forms of exclusion.

These questions are not exhaustive, but they are foundational. They speak directly to the viability of the stepping-stones framework and to the design choices operators face when constructing hybrid models. Answering them will require observing initiatives across multiple sectors and policy environments, tracking them for at least two years to capture pathway shifts and adoption dynamics, and documenting both successes and setbacks to build a realistic picture of what works and under what conditions.

7.4 An invitation to the field

The stepping-stones framework offers operators a way to think about transitions, but it will only become genuinely useful guidance if it is tested and refined through systematic observation. This is work the field needs, and it could be pursued by researchers, program managers, funders, or coalitions of initiatives working together to share learning.

What would such work require? A commitment from participating initiatives to share a minimal set of signals periodically: pathway milestones like the introduction of membership tiers or service catalogues, headline indicators on financing mix and adoption, and qualitative reflections on governance challenges or unexpected shifts. It would require light-touch coordination to synthesize cross-case learning without imposing heavy reporting burdens on operators who are already stretched. And it would require a willingness to document not only successes but also stalls, pivots, and failures, since those are often the most informative data points for understanding what makes transitions viable.

The outcomes could be valuable for everyone involved. Operators would gain comparative insights on which pathways are working elsewhere and on how to interpret readiness signals in their own contexts. Program managers and funders would see which investments, in governance support, in assurance alignment, in inclusion mechanisms, are most likely to enable durable transitions. Policymakers would have evidence on the conditions that make hybrid models viable and on where structural support is most needed. And the European data space community as a whole would move from working with assumptions and best guesses to building on validated patterns and shared learning.

We propose that this longitudinal learning be organized around periodic synthesis, perhaps an annual report that updates the stepping-stones pathways map, highlights pivotal governance or financing events, and distils lessons across cases. Where feasible, shorter practice notes could be issued when major pathway shifts occur, offering timely insights to operators navigating similar transitions. The goal is not to lock initiatives into a rigid research design but to create space for shared reflection and comparative learning as transitions unfold.

This is an open invitation. The stepping-stones framework is a starting point, not a finished theory. The field can refine it, test it, and adapt it through collective observation and honest documentation of what works and what does not. Sustainable financing for data spaces will not be achieved through static models or one-time interventions. It will emerge through iterative learning, through operators and researchers working together to understand the conditions that make hybrid models viable, and through a willingness to adjust pathways as new evidence becomes available. We hope this report contributes to that learning, and we invite others to join in building the longitudinal evidence base the field needs.

8 Methodology

8.1 Research question and approach

This research addresses the question:

“How can hybrid financing models help ensure the long-term resilience of data sharing initatives (DSIs)?”

The research was designed to provide actionable insights for industry stakeholders and policymakers by examining real-world examples of Public-Private Partnerships (PPPs) in Data Sharing Initiatives (DSIs).

We adopted a case study methodology because practical examples offer the most relevant lessons for stakeholders seeking to implement sustainable financing models. Case studies allow us to identify success factors, governance mechanisms, and challenges that theoretical models often overlook.

8.2 Selection Criteria

To ensure relevance and diversity, we applied three criteria:

- Hybrid financing: Initiatives with both public and private investment, ideally close to a 50–50 split.
- Sector diversity: Cases from education, science, and housing to capture cross-sector lessons.
- Operational maturity: Evidence of governance structures and measurable progress toward sustainability.

Justification: These criteria were chosen to ensure that findings are broadly applicable and grounded in initiatives that have moved beyond conceptual design into operational practice.

8.3 Data collection

Our research combined desk analysis with semi-structured interviews of representatives from selected initiatives. Interviews focused on financing models, governance structures, and success factors. This mixed approach provided both documented evidence and stakeholder perspectives, ensuring a comprehensive understanding of each case.
Justification: Combining qualitative interviews with desk research strengthens validity and captures nuances that formal documentation alone cannot provide.

8.4 Validation

Draft financing model visualizations were shared with stakeholders for review and refinement. Most validations occurred through follow-up meetings, ensuring accuracy and endorsement from those directly involved in the initiatives.

8.5 Scope and Limitations

Findings are based on three cases (Edu-V, LIFES, and Zorgeloos Vastgoed) and may not capture all sector-specific dynamics. However, the diversity of these cases provides a strong foundation for generalizable recommendations across multiple domains.

9 References

Bisière, C., Crémer, J., Jullien, B., & Lefouili, Y. (2025). *The economics of data spaces* (Policy Paper). Toulouse School of Economics. https://www.tse-fr.eu/sites/default/files/TSE/documents/DigitalCenter/policy_paper/the_economics_of_data_spaces_july_2025_policy-paper.pdf

Data Spaces Support Centre. (2023). *Key concept definitions* (Version 1.0). https://dssc.eu/space/bv15e/766061638/1+Key+Concept+Definitions

Edu-V. (n.d.). *Edu-V: Samen digitaal onderwijs mogelijk maken*. Retrieved from https://www.edu-v.org/

European Commission. (2022). *Staff working document on common European data spaces* (SWD(2022) 45 final). https://digital-strategy.ec.europa.eu/en/library/staff-working-document-data-spaces

European Commission. (n.d.). *Private sector data sharing*. Digital Strategy. Retrieved December 4, 2025, from https://digital-strategy.ec.europa.eu/en/policies/private-sector-data-sharing

Gaia-X. (n.d.). *What is Gaia-X?* Retrieved from https://gaia-x.eu/what-is-gaia-x/

GO FAIR Initiative. (n.d.). *FAIR principles*. Retrieved from https://www.go-fair.org/fair-principles/

International Data Spaces Association. (2019). *IDS – The standard for data sovereignty and an indispensable element of data ecosystems* (Version 1.0) [White paper]. https://internationaldataspaces.org/wp-content/uploads/IDS-The-Standard-for-Data-Sovereignty-English.pdf

Iossa, E., & Martimort, D. (2015). The simple microeconomics of public-private partnerships. *Journal of Public Economic Theory, 17*(1), 4–48. https://doi.org/10.1111/jpet.12114

Klievink, B., Bharosa, N., & Tan, Y.-H. (2016). The collaborative realization of public values and business goals: Governance and infrastructure of public–private information platforms. *Government Information Quarterly, 33*(1), 67–79. https://doi.org/10.1016/j.giq.2015.12.002

LIFES Institute. (n.d.). *LIFES: Learning Innovations and Future Education Scenarios*. Retrieved December 12, 2025, from https://www.lifes.institute/

Moonen, N., Mollee, N., Wentzel, V., van den Born, A., & Vossen, A. (2025). *Sustainable revenue models for data sharing initiatives*. Government of the Netherlands.

Netherlands Authority for Consumers and Markets. (n.d.). *Authority for Consumers & Markets*. Retrieved December 12, 2025, from https://www.acm.nl/en/authority-consumers-and-markets

Rijksoverheid. (n.d.). *The National Growth Fund*. Nationaal Groeifonds. Retrieved September 9, 2025, from https://www.nationaalgroeifonds.nl/english/the-national-growth-fund

Runeson, P., Olsson, T., & Linåker, J. (2021). Open data ecosystems—An empirical investigation into an emerging industry collaboration concept. *Journal of Systems and Software, 182*, Article 111088. https://doi.org/10.1016/j.jss.2021.111088

Susha, I., van den Broek, T., van Veenstra, A. F., & Linåker, J. (2023). An ecosystem perspective on developing data collaboratives for addressing societal issues: The role of conveners. *Government Information Quarterly, 40*(1), Article 101763. https://doi.org/10.1016/j.giq.2022.101763

Van Zwienen, M. (2025). *Hoeveel NVM-makelaars zijn er in Nederland? (En hoe verhouden ze zich tot Vastgoed NL?)*. Kennis over Makelaars & Vastgoed. https://ikzoekdebestemakelaar.nl/kennisbank/hoeveel-nvm-makelaars-zijn-er-in-nederland-en-hoe-verhouden-ze-zich-tot-vastgoed-nl