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TF-2: Our Common Digital Future: Affordable, Accessible and Inclusive Digital Public Infrastructure

Equitable Digital Transformation: Harnessing Data Cooperatives and Digital Federation Platforms to Empower SMEs and Small Communities - A Strategic Roadmap for the G20

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ABSTRACT

Digital resources and capabilities are increasingly concentrated due to network effects and economies of scale, limiting equitable digital entrepreneurship and job creation, particularly in small communities and SMEs. In response, this policy brief advocates for the establishment of data cooperatives to ensure secure and sovereign data exchange, promote digital entrepreneurship, protect digital rights, and contribute to community well-being.

In the post-pandemic era, community and/or SME-led cooperatives can secure resilient and decentralized supply chains, supporting digital commons and data sovereignty. Through such cooperatives, communities can access affordable information and collectively negotiate data-related decisions, supporting self-determination in an AI-driven world. Effective governance is key to accelerate digital transformation and overcome challenges.

The brief presents diverse case studies demonstrating the transformative potential of cooperative data governance across sectors worldwide. It proposes a framework for a digital federated and sovereign reference architecture, providing a blueprint for sustainable development globally.

It concludes with six key recommendations for the G20 to foster inclusive and sustainable digital ecosystems: establishing digital federation platforms and data cooperatives; harmonizing supportive policies and legal frameworks; facilitating funding and resources; strengthening capacity building and skills development; fostering international cooperation and knowledge sharing; and implementing robust monitoring and evaluation mechanisms. This approach will enable small communities and SMEs to effectively participate in the digital economy and contribute to achieving the Sustainable Development Goals.

THE CHALLENGE

Challenges that must be overcome

This Policy Brief addresses key challenges such as the concentration of digital resources in few dominant players, resulting erosion of digital entrepreneurship and job opportunities, and the negative effects on small communities and SMEs. These issues impede progress towards Sustainable Development Goals (SDGs) 8, 9, and 11, which focus on inclusive economic growth, innovation, and resilient communities. Data and platform cooperatives can effectively address these challenges:

1. **Market Concentration:** Large tech companies benefit from network effects, economies of scale, and lock-in effects, leading to an increased concentration of digital resources and hindering competition and innovation, particularly for SMEs and small communities.
2. **Digital Exclusion:** The monopolistic digital environment often leaves small communities and SMEs without affordable and accessible digital resources, leading to digital exclusion and inequality.
3. **Insufficient Data Governance:** Many small communities and SMEs lack proper data governance structures and open standards, limiting their ability to fully utilize data-driven insights.
4. **Underdeveloped Skills and Capacity:** The concentration of resources in the digital landscape results in a skills gap in small communities and SMEs, hindering their participation in the digital economy and adaptability to technological advancements.
5. **Eroding Self-Determination and Data Sovereignty:** The rising influence of AI and dominance of a few major players undermine small communities' and SMEs' self-determination and data sovereignty, restricting their ability to shape their digital futures.

This policy brief proposes establishing open digital federation platforms and data cooperatives to address the challenges of market concentration, digital exclusion, inadequate data governance, skills gap, and eroding self-determination. These cooperatives, emphasizing democratic governance and equitable benefits, empower small communities and SMEs, aiding in the achievement of SDGs 8, 9, and 11. However, hurdles such as legal and regulatory constraints, funding and sustainability issues, scalability, technology infrastructure, and governance must be overcome. Additionally, cooperatives need to address user awareness, interoperability, data privacy, competition, and the need for supportive regulatory frameworks. A thorough exploration of these challenges can inform the development and adoption of these cooperative models.

Definitions of key concepts

Data sovereignty refers to the right of individuals, organizations, or governments to have control and ownership over their data, including how it is collected, processed, stored, and shared. This emphasizes the importance of local legal compliance in data privacy, cross-border transfers, and cloud computing.

An open digital federation platform is an online system that encourages data sharing and collaboration while maintaining individual autonomy and data sovereignty. This structure boosts transparency, innovation, and promotes new applications and services, fostering economic and sustainable growth.

A data cooperative (Fig. 1) is a member-owned organization that democratically manages and shares data while allowing members to retain control over their data. They provide a platform for individuals and micro-entrepreneurs to negotiate data processing terms and conditions, promoting data sovereignty, equitable data access, and data-driven innovation. These cooperatives aim to create trust and cooperation, producing economic, social, and environmental benefits for members and the community.

A platform cooperative (co-op) is a digital platform owned and governed by its members, often users, workers, or stakeholders. This contrasts with conventional digital platforms usually owned by private corporations. Platform co-ops prioritize democratic governance, fair profit distribution, and member welfare, operating on cooperative principles. They appear across sectors like ride-sharing, e-commerce, social networking, and offer more equitable, sustainable alternatives to traditional platforms. Data cooperatives are a sub-category of platform cooperatives.

Digital commons are shared virtual spaces where digital information and assets are collectively managed and made accessible by a community. They include open-source software, creative works, research data, and educational materials. Operating on collaboration, openness, and participatory governance, they challenge traditional intellectual property models, promoting open access, knowledge sharing, and collaborative innovation, thereby advancing democratization of knowledge and sustainable digital ecosystems.

Digital rights are the human and legal protections applied to individuals and organizations in digital contexts, extending traditional rights like privacy and freedom of expression to the digital realm. They involve protection of personal information, online information sharing and access, protection of digital creations, and use of digital technology without fear of surveillance or harassment. Advocacy for these rights counters challenges like government surveillance, corporate data collection, and online censorship, striving for a more democratic digital environment.

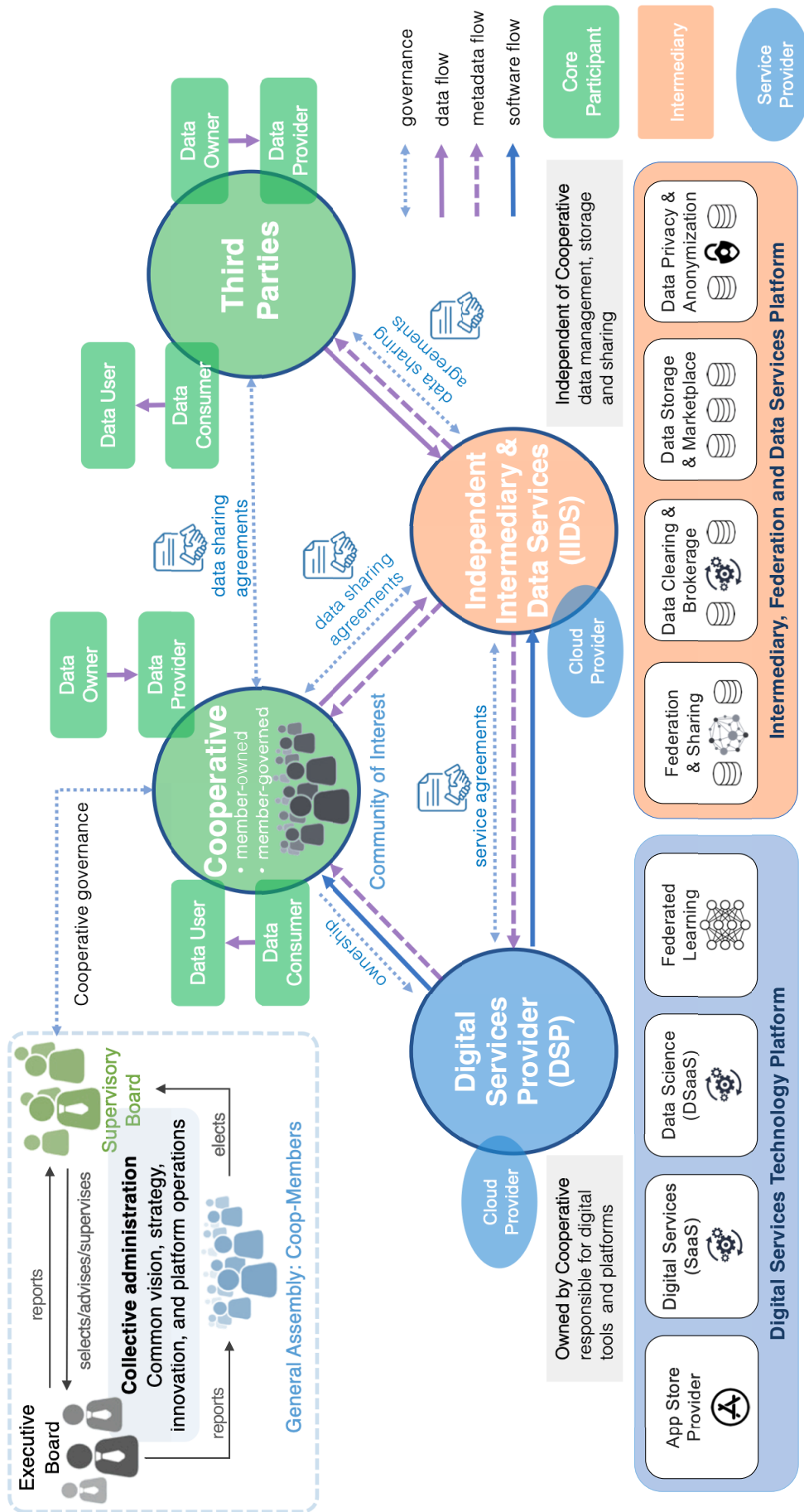


Figure 1: Example of the organizational structure of a data cooperative

Economic, social and environmental impact of data cooperatives

Implementing digital federation platforms and data cooperatives can yield significant economic and social benefits for small communities and/or SMEs. In the modern knowledge economy, data is a reusable, non-depletable capital with potential for significant value creation when shared and repurposed. These structures promote trust, informed consent, and data-driven innovation, generating direct, indirect, and induced impacts for data providers, users, and the broader economy. However, quantifying these benefits is challenging. Recent studies suggest data access and sharing can create substantial value for holders, users, and the wider economy, contributing up to 4% of GDP when including private-sector data. Despite potential reductions in producers' surplus, sectors with low productivity and digital maturity may see the most significant growth potential. Data cooperatives are key in unlocking this value by leveraging collective strength (Fig. 2).

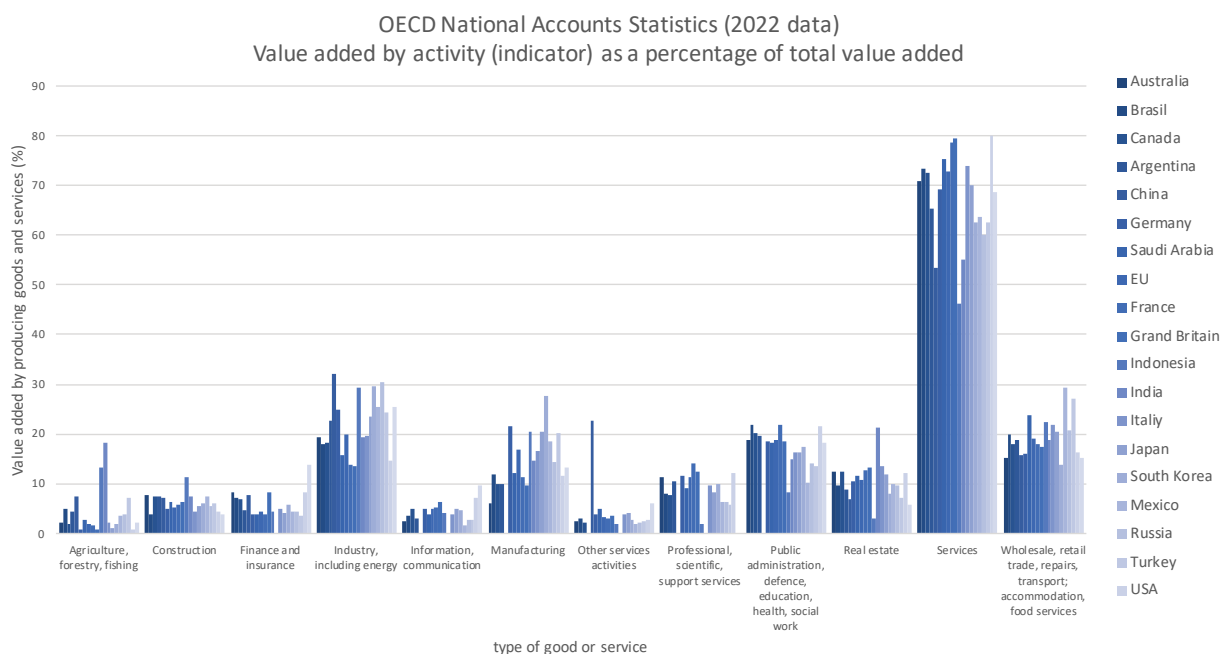


Figure 2: Value added, in the context of all G20 economies, signifies the net value generated from producing goods and services, calculated as output value minus intermediate consumption. It represents the income available for labor and capital contributions in production.

Data cooperatives pool resources (Fig. 3, A) to improve resource allocation, create jobs, and foster community development, thereby strengthening social cohesion. They improve resource efficiency, promote sustainable practices, and collect better data due to members' direct involvement in data governance. They also establish fair compensation systems, rewarding members appropriately for their contributions. This creates a virtuous cycle of collaborative resource pooling, innovation, market expansion, and return on investment, which reinforces positive economic, social, and environmental impacts, promoting a sustainable, inclusive future for members and their communities.

Cooperative innovation (Fig. 3, B) within data cooperatives harnesses the power of collaboration to drive novel ideas and solutions. Members can make well-informed decisions and address challenges creatively by leveraging shared knowledge and resources. This collaboration fuels technological advancements, sustainable practices, and enables tackling complex global issues while promoting a culture of creativity and sustainability.

Cooperative data market expansion (Fig. 3, C) emphasizes the role of data cooperatives in facilitating greater market access and empowering members, including individuals and SMEs. Through resource pooling and knowledge sharing, cooperatives help members tap into new opportunities beyond geographical limitations. They also foster growth in environmental monitoring and management markets, driving sustainable development for the benefit of members and the environment.

Cooperative ROI (Return on Investment, see Fig. 3, D) underscores the shared value creation and inclusive growth from sustainable investments within data cooperatives, such as in zero-carbon data centers. It ensures equitable distribution of economic gains and reinvestment into the cooperative, promoting sustainable and inclusive growth. The economic, social, and environmental impacts of digital federation platforms and data cooperatives present a strong case for G20 support, emphasizing their potential benefits for inclusive and sustainable growth in small communities and SMEs.

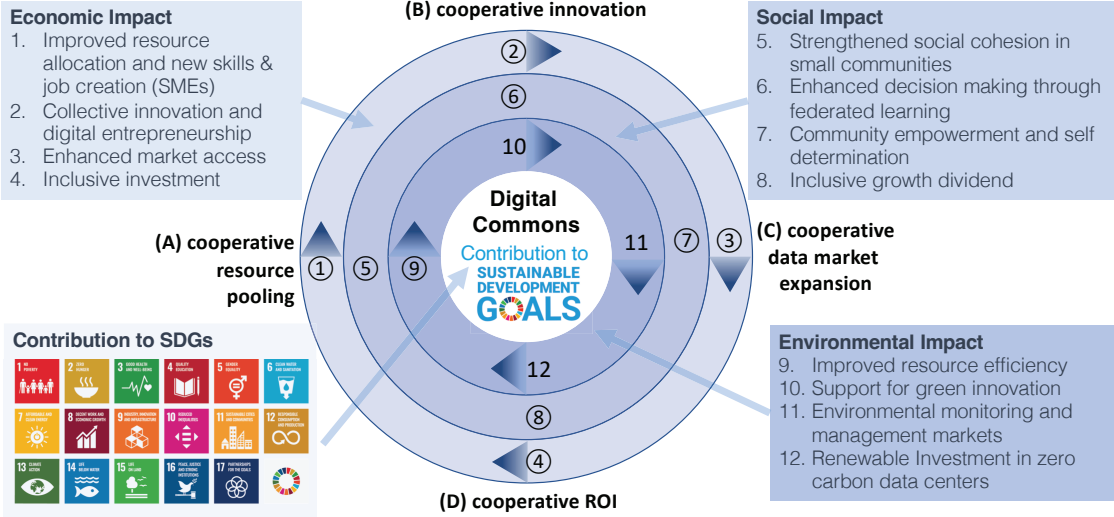


Figure 3: virtuous cycle of economic, social and environmental impact of data cooperatives

Pathways to transformation: Ten inspiring Case Studies driving meaningful change

This section demonstrates the practical application of our recommendations by showcasing transformative use cases and case studies from Asia and Africa, with limited examples from Europe and America (Tab. 2). It highlights the barriers and shortcomings that demand policy action proposed in sections 5 and 6.

Table 1: Exemplary transformative case studies

<p>Case Study 1: Mobile Money in Africa (Kenya's M-Pesa platform)</p>	<p>M-Pesa, a mobile money platform launched in Kenya, revolutionized financial inclusion by providing affordable, accessible, and secure digital financial services to millions of unbanked individuals. This example illustrates the transformative potential of a digital platform that effectively empowers small communities and businesses. However, the challenge remains to extend the benefits of such platforms to other sectors, including education, healthcare, and supply chain management, by establishing data cooperatives and adopting open standards.</p>
<p>Case Study 2: Digital Agriculture in Asia (India's eKutir data coop)</p>	<p>eKutir, a social enterprise in India, leverages digital technologies to empower smallholder farmers through data-driven agricultural advice, access to finance, and market linkages. By pooling data and resources from various stakeholders, eKutir demonstrates the potential of a data cooperative to drive sustainable development in rural communities. Yet, scalability and replicability of this model require supportive policies and a robust digital governance framework.</p>
<p>Case Study 3: Collaborative Land Management in Africa</p>	<p>Farmerline, a Ghanaian agriculture technology company, provides smallholder farmers with timely and accurate agricultural information through mobile technology. By pooling data from various sources, Farmerline exemplifies the potential of data cooperatives to drive sustainable development and food security in rural areas. To scale and replicate this model, supportive policies and</p>

<p>(Ghana's Farmerline data coop)</p>	<p>a strong digital governance framework are essential, along with financial support from international partners.</p>
<p><u>Case Study 4:</u> Decentralized Renewable Energy in Asia (Bangladesh's SOLshare data coop)</p>	<p>SOLshare, a peer-to-peer energy trading platform in Bangladesh, enables rural communities to access affordable, clean energy by connecting solar home systems in a decentralized network. The platform exemplifies the transformative potential of data cooperatives in promoting sustainable development. Nevertheless, the broader adoption of such models requires the development of open standards, APIs, and legal frameworks that support data sharing and collaboration.</p>
<p><u>Case Study 5:</u> Fintech for Financial Inclusion in South America (Brazil's Nubank platform)</p>	<p>Nubank [81], a Brazilian digital bank, has successfully expanded access to financial services for millions of underserved individuals in the region. By leveraging digital technologies and data-driven solutions, Nubank illustrates the potential of innovative platforms to empower small communities and businesses. Further development of data cooperatives in this sector can facilitate better credit access and risk assessment for SMEs, requiring supportive policies and collaboration between stakeholders.</p>
<p><u>Case Study 6:</u> Telemedicine in Asia (Indonesia's Halodoc platform)</p>	<p>Halodoc, an Indonesian telemedicine platform, connects patients in remote areas with healthcare professionals through digital consultations, improving access to quality healthcare services. This initiative demonstrates the value of digital platforms in addressing critical challenges faced by rural communities. The expansion of such platforms, combined with the establishment of data cooperatives, can empower local communities and healthcare providers to make more informed decisions. However, this requires the development of robust data governance structures and open standards.</p>
<p><u>Case Study 7:</u> Community Networks in Africa (South Africa's Zenzeleni data coop)</p>	<p>Zenzeleni, a community-owned telecommunications network in South Africa, provides affordable internet access to rural communities by leveraging cooperative ownership and management. The initiative highlights the importance of local ownership and collaboration in bridging the digital divide. However, regulatory barriers and limited resources impede the expansion of such initiatives, calling for policy interventions and financial support from G20 countries.</p>
<p><u>Case Study 8:</u> Construction Industry in Bavaria, Germany (Germany's GemeinWerk data coop)</p>	<p>GemeinWerk proposed the first construction data cooperative in Munich, Germany. The case study of this Bavarian Construction Data Cooperative, which was launched by the Bavarian Construction Industry Association and GemeinWerk Ventures and will be operated by cooperative members, aims to provide small and medium-sized enterprises in the construction industry with access to shared services and construction data via a digital collaborative platform and data cooperative. This platform improves collaboration and organization within the construction value chain. The project primarily targets governance innovations to intensify industry collaboration, enable trust-based data sharing among stakeholders, and create a pre-competitive space of trust that drives productivity and innovation among SMEs through ecosystem collaboration.</p>
<p><u>Case Study 9:</u> Smart City Initiatives in Europe (Barcelona, Spain and Salus Coop, Spain)</p>	<p>Barcelona's smart city initiatives leverage digital technologies and data-driven solutions to improve urban services and enhance the quality of life for its residents. By utilizing data from various sources, such as sensors and citizen feedback, the city has implemented projects related to transportation, waste management, and energy efficiency. This case study demonstrates the potential of data cooperatives and digital federation platforms to facilitate collaboration among stakeholders in urban environments i.e. Salus Coop. However, the expansion of such initiatives requires the development of open standards, robust data governance structures, and the active involvement of citizens in decision-making processes as the case of Barcelona has shown reverting the technocratic approach to smart city paradigm.</p>
<p><u>Case Study 10:</u></p>	<p>Driver's Seat Cooperative is a driver owned cooperative that operates in a number of cities in the US. It enables gig-economy workers working in the ride-</p>

Ride-hailing platform initiative. **(Driver's Seat data coop, US)**

hailing sector to collect, pool and analyse data collected on a smartphone whilst undertaking work for ride-hailing platforms such as Uber and Lyft. The pooled data allows insights to be fed back to members so that they can optimise their incomes. The cooperative also sells data and insights to city agencies to enable better policy decisions with the profits from sales being redistributed back to members.

Barriers and Shortcomings of data cooperatives and digital federation platforms

1. **Regulatory Barriers:** Existing regulations in many countries may not adequately support or even hinder the establishment and operation of data cooperatives and digital federation platforms, limiting their potential impact.
2. **Limited Resources:** Small communities and SMEs often face resource constraints that restrict their ability to develop and implement digital governance structures, open standards, and cooperative models.
3. **Digital Divide:** Unequal access to digital infrastructure, skills, and resources exacerbates existing inequalities, making it more challenging for marginalized communities to participate in and benefit from digital transformation efforts.
4. **Data Privacy and Security:** Ensuring data privacy and security is critical for the success of digital federation platforms and data cooperatives, requiring the development of robust governance frameworks and technical solutions.

These case studies underscore the transformative power of data cooperatives and digital federation platforms in tackling issues faced by small communities and SMEs worldwide. However, addressing the identified obstacles calls for targeted policy interventions. Examples from South America, Europe, and the US demonstrate these models' potential across diverse sectors. Realizing their full benefits necessitates overcoming hurdles through policy action, capacity building, and the establishment of supportive regulatory frameworks.

THE G20'S ROLE

As a pivotal entity in international economic cooperation, the G20 is uniquely equipped to tackle policy challenges and create opportunities for small communities and SMEs in the digital sphere. The G20's role in supporting data and platform cooperatives can be summarized as follows:

1. **Policy Harmonization:** Encourage member countries to align policies that enhance digital inclusion, support data cooperatives, and foster an equitable digital economy. This includes incentives for SMEs' cooperative participation and adoption of open standards and APIs.
2. **Financial Support:** Facilitate funding access for developing digital federation platforms and data cooperatives, especially in resource-limited regions, through grants, low-interest loans, or other financial instruments.
3. **Capacity Building:** Support capacity and skills development for small communities and SMEs to effectively participate in the digital economy. This involves collaborating with various stakeholders to deliver relevant training programs and leveraging established cooperative groups' knowledge.
4. **Knowledge Sharing:** Promote knowledge exchange and best practice sharing among member countries regarding digital federation platforms and data cooperatives implementation.
5. **International Cooperation:** Foster international partnerships to support the development of digital federation platforms and data cooperatives, including collaboration with multilateral organizations and regional development banks.

6. **Monitoring and Evaluation:** Implement mechanisms to monitor and evaluate the impact of digital federation platforms and data cooperatives on small communities and SMEs, ensuring these initiatives contribute to achieving SDGs 8, 9, and 11.

By engaging in these efforts, the G20 can foster a conducive environment for digital federation platforms and data cooperatives' growth, contributing to a more inclusive digital ecosystem and advancing the global digital economy.

RECOMMENDATIONS

To ensure the equitable development of digital entrepreneurship and promote community well-being, we present the following recommendations to the G20 (Fig. 5 and Tab. 3). These recommendations are supported by strong arguments and evidence from the case studies discussed earlier.

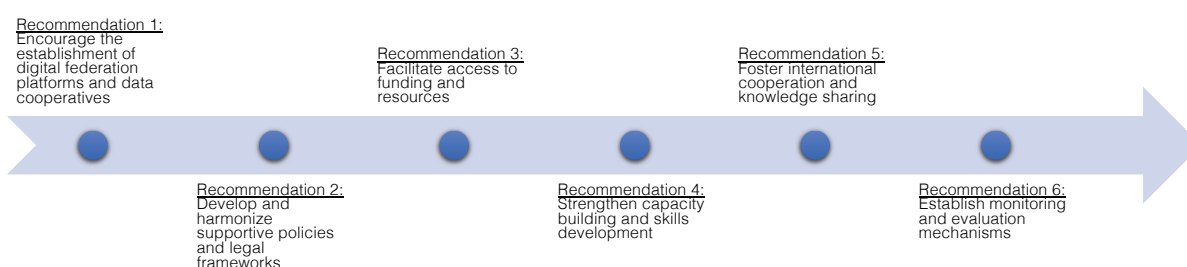


Figure 5: Proposed chronological order of recommendation implementation

Table 2: Recommendations to the G20

Recommendation 1: Encourage the establishment of digital federation platforms and data cooperatives	G20 nations should advocate for digital federation platforms and data cooperatives, empowering small communities and SMEs with resources, information, and decision-making capabilities. G20 should foster knowledge sharing, provide technical aid for these platforms, and spur initiatives like 'Digital Innovation Hubs' to cultivate local, collaborative digital solutions and nurture a culture of digital innovation and entrepreneurship.
Recommendation 2: Develop and harmonize supportive policies and legal frameworks	G20 nations should harmonize policies and legal structures to advance digital inclusion, open standards, and cooperative data governance. They should motivate member countries to eliminate regulatory obstacles impacting data cooperatives and digital federation platforms. To this end, G20 could establish a 'Digital Policy Innovation Lab,' a collaborative space for stakeholders to co-create, test, and refine policy solutions that foster digital entrepreneurship and create a fair and inclusive digital ecosystem.
Recommendation 3: Facilitate access to funding and resources	The G20 should introduce funding mechanisms like grants or low-interest loans to aid the creation and implementation of digital federation platforms and data cooperatives, especially in resource-limited areas. They should seek partnerships with multilateral entities, regional banks, and the private sector to gather resources and foster capacity building. A 'Digital Entrepreneurship Challenge' could be launched globally to incentivize SMEs and communities to devise innovative digital solutions, providing winners with financial backing, mentorship, and resources, thereby promoting innovation and collaboration.
Recommendation 4: Strengthen capacity building and skills development	The G20 should facilitate capacity building and skills development for small communities and SMEs to better participate in the digital economy. This could be achieved through partnering with international organizations, educational institutions, NGOs, and the private sector to design and implement relevant training initiatives. Furthermore, the G20 could encourage innovative learning by endorsing the creation of "Digital Skill-Share Networks." These peer-to-peer platforms would enable SMEs, communities, and experts to exchange knowledge and best practices in digital technologies and data governance, fostering a collaborative and dynamic learning environment.
Recommendation 5: Foster international	The G20 should advocate for international collaboration and knowledge exchange among members to disseminate best practices concerning digital federation platforms and data cooperatives. This involves partnering with multilateral organizations, regional development banks, and other stakeholders for insights and experiences sharing. An

cooperation and knowledge sharing	annual "Global Digital Commons Summit" could be instituted by the G20, gathering representatives from member countries, SMEs, communities, and the private sector. This summit would spotlight innovative projects, foster best practice exchanges, and encourage new partnerships, thus bolstering the global digital ecosystem.
<u>Recommendation 6:</u> Establish monitoring and evaluation mechanisms	The G20 should devise methods to track and assess the influence of digital federation platforms and data cooperatives on small communities and SMEs, using this data to pinpoint improvement areas and ensure these initiatives contribute to SDGs 8, 9, and 11. The G20 could introduce a "Digital Impact Dashboard," a publicly accessible tool illustrating the progress and effect of these platforms on small communities and SMEs. This dashboard would enhance transparency, accountability, and facilitate the discovery of success stories and areas for growth, thereby promoting continuous learning and adaptation within the digital ecosystem.

By adopting these recommendations, the G20 can cultivate a conducive environment for the expansion of digital federation platforms and data cooperatives. This would nurture a more equitable and inclusive digital ecosystem, which would further the sustainable development of small communities and SMEs.