

ATARCA

Policy brief

Towards a regenerative digital economy - Policy recommendations to the European Union

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ATARCA

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Towards a regenerative digital economy - Policy recommendations to the European Union

The mismatch between the economic structures and the digital potential

Digitalisation has become the driving force of our economic system with fundamental implications for human interaction and societal power structures. Yet technological development has created novelties which fit poorly together with institutional structures and governance architecture created in the previous era^{1 2}. Our current economic structures and institutions therefore need a fundamental reform to fully leverage digital resources.

The value creation processes in our economic system are based largely on increasing resource extraction. In this way, digitalisation has been used to capture value out of emergent resources including interaction between users on digital platforms. A primary source of the added value is often increased availability of information or some other immaterial and intangible goods (raw data, software, communication, etc.) This increased availability of information is enabled through increased resource sharing, especially when the costs of sharing are minimal compared to its benefits. The emergence of this new reality has rendered some of the traditional paradigms of economic thinking obsolete.

¹ Nikander, Pekka; Elo, Tommi (2019) : Will the data markets necessarily fail? A position paper, 30th European Conference of the International Telecommunications Society (ITS): "Towards a Connected and Automated Society", Helsinki, Finland, 16th-19th June, 2019, International Telecommunications Society (ITS), Calgary;

² P. Nikander, V. Eloranta, K. Karhu, and K. Hiekkänen, "Digitalisation, anti-rival compensation and governance: Need for experiments," Nordic Workshop on Digital Foundations of Business, Operations, and Strategy, Espoo, Finland, p. 7, 2020

A key to reforming the current economic system to better leverage digitalisation is to recognise the centrality of anti-rivalry to the digital economy. Anti-rival goods can be characterised by their positive externalities for the rest of the society. An anti-rival resource (or good) is one that gains value when used, contrary to the typical rival resource, which loses value as it is used. Anti-rival goods can be divided into “*network goods*”, whose subtractability is negative, typically due to network effects, but that are excludable, and “*symbiotic goods*,” whose subtractability is negative and that are non-excludable³. At the moment, our economic structures do not sufficiently recognise and support anti-rival resources. The incompatibility between anti-rivality and our current economic system suggests that fundamental reforms of economic policies are needed to efficiently allocate digital goods and distribute their benefits in a socially optimal and equitable way.

This publication summarises the policy analysis conducted as part of the ATARCA research project in 2021-2023. It includes the policy recommendations and roadmap, which were developed to support the identification and application of anti-rivalry as part of our economic systems.

The recommendations serve as building blocks towards a regenerative digital economy⁴ based on three key shifts (See Image 1):

- New economic paradigms
- New forms of collaboration
- New approaches to value creation

³ Nikander, P., Eloranta, V., Karhu, K. and Hiekkänen, K. (2020). Digitalisation, anti-rival compensation and governance: Need for experiments. In Proceedings of Nordic Workshop on Digital Foundations of Business, Operations, and Strategy, Espoo, Finland.

⁴ This refers both to i) ecological regeneration: societies and economies that are based on giving back to nature instead of taking from it and extracting resources for eternal growth; and ii) social regeneration: people have autonomy, independence and ownership to contribute to economic development individually and collectively.

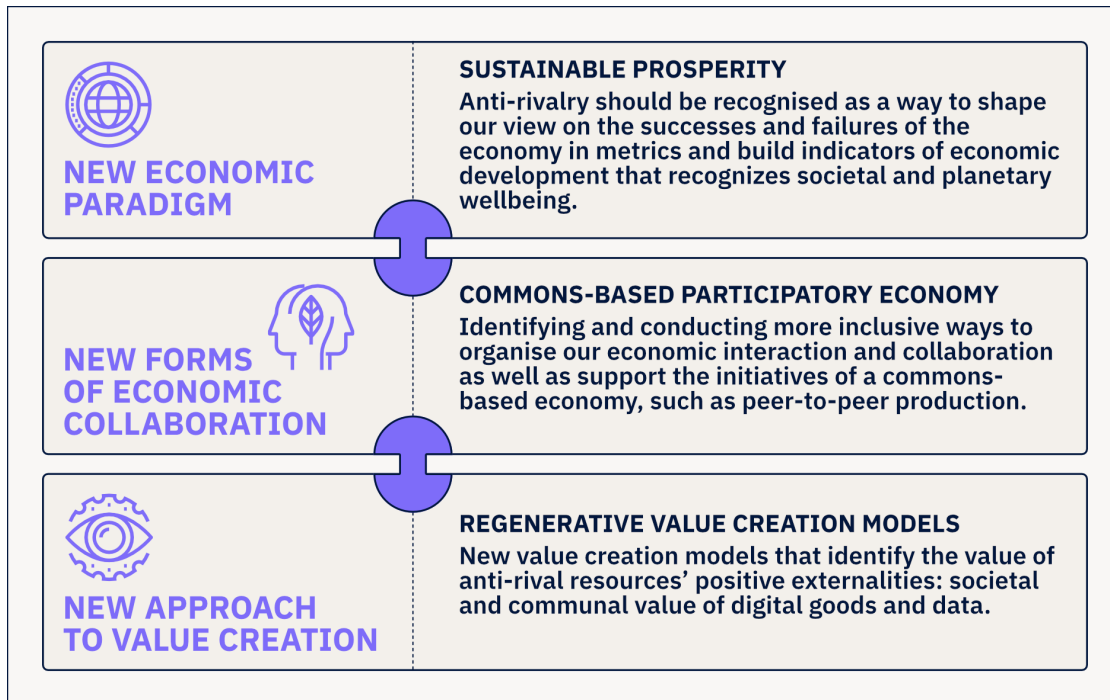


Image 1. Three shifts for regenerative digital economy. © Kirmo Kivelä

We have identified distributed ledger technologies (DLT) such as blockchain as one potential way of intentionally structuring economic interactions towards the shifts for regenerative digital economy.⁵ The first inklings of leveraging DLTs to effect these changes have already become apparent in several initiatives within open source software, community currencies and platform cooperatives. These initiatives can contribute towards recognizing the value of nonprofits, shared resources and community work⁶, thereby fostering economic stewardship of the commons.

⁵ Friedman, N., & Ormiston, J. (2022). Blockchain as a sustainability-oriented innovation?: Opportunities for and resistance to Blockchain technology as a driver of sustainability in global food supply chains. *Technological Forecasting and Social Change*, 175, 121403. <https://doi.org/10.1016/j.techfore.2021.121403>

⁶ Sierra, C. (n.d.). Report on 'Blockchains for Social Good.' In <https://ec.europa.eu/futurium/en/system/files/ged/workshopreport.pdf>

Policy recommendations and roadmap

ATARCA policy recommendations aim to steer economic development towards more regenerative forms by identifying the nature and benefits of anti-rival digital goods and utilising the opportunities of DLT to introduce new economic incentives and mechanisms suitable for the anti-rival economy. The recommendations comprise socio-economic approaches, models and practices and leveraging DLTs for the desired changes. The recommendations are divided into five domains (see image 2):

- Regenerative economy agenda of the EU
- Sociotechnical R&I Investments
- Anti-rival data governance
- Business & value creation models, and
- Local commons experimentation

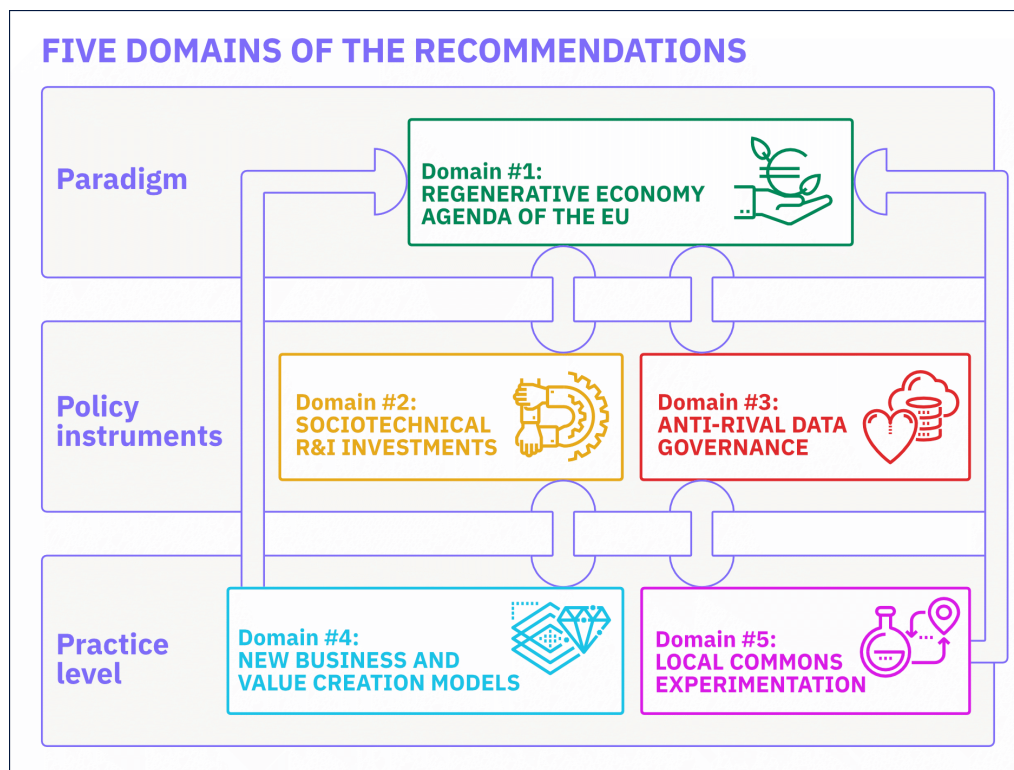


Image 2. Five domains of ATARCA Policy Recommendations © Kirmo Kivelä

These policy recommendations are incorporated on a roadmap starting from the near future, 2023 until 2030 (see Image 3). Weaving through the five domains, these recommendations on the roadmap illustrate that the recommendations need to be considered in a holistic manner without interpreting them as sequential steps.

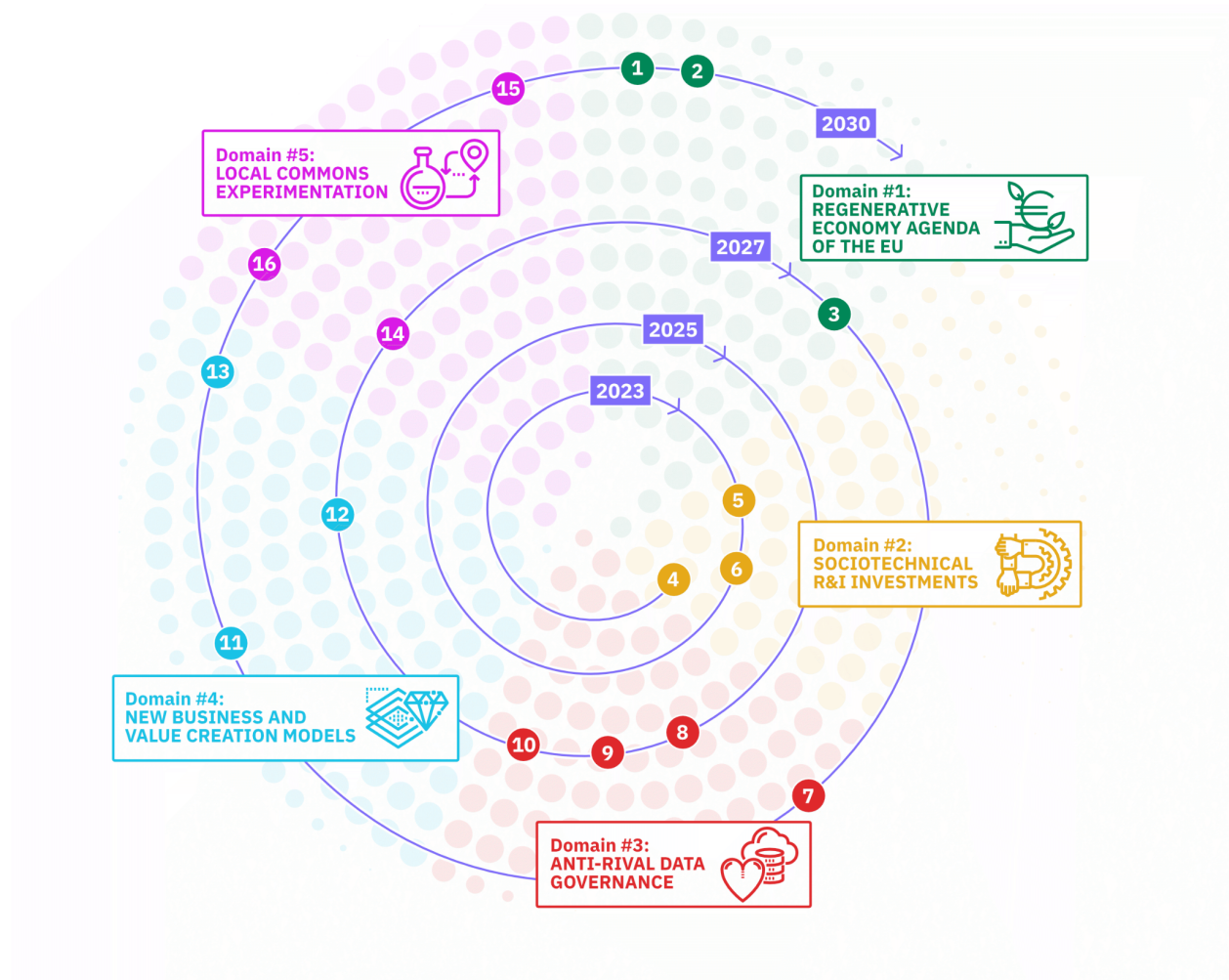


Image 3. The policy recommendations illustrated on a roadmap © Kirmo Kivelä

Domain #1: REGENERATIVE ECONOMY AGENDA OF THE EU



Domain 1: Regenerative economy agenda of the EU

Incorporating values, conditions and approaches of a commons-based economy into the digital and economic policy agenda of the EU and experimenting with new governance methods and models for regenerative digital economy.

To realise the potential and benefits of digital transformation, the European Union needs to conceptualise and experiment with new models and premises for economic and digital governance and policies. Given that currently digital goods are viewed as rival resources, our ability to capture their potential as public goods and realise the transformative possibilities of emerging technology is greatly hindered. Implementing an anti-rival approach to the digital and economic policies of the EU could therefore strengthen access to information and unravel the positive externalities of a commons-based data economy.

1. The EU should actively strengthen the connections and interactions between digitalisation and economic policies, while also extending focus beyond the realm of blockchain

- a. The emergence of digital commons as a means of bridging economic activity and digitalisation should be supported through policies such as the European industrial strategy⁷.

⁷Strategy. (n.d.). Internal Market, Industry, Entrepreneurship and SMEs.
https://single-market-economy.ec.europa.eu/industry/strategy_en

- b. Policy implications generated by the interlinkages of economy and technology, such as taxation of digital goods, should enable anti-rival business models and economic interaction.
- c. The EU should build upon a mission-oriented innovation approach⁸ towards the twin (green and digital) transition, for e.g., by utilising DLTs for material and emission tracking in the context of the Fit for 55 package⁹.

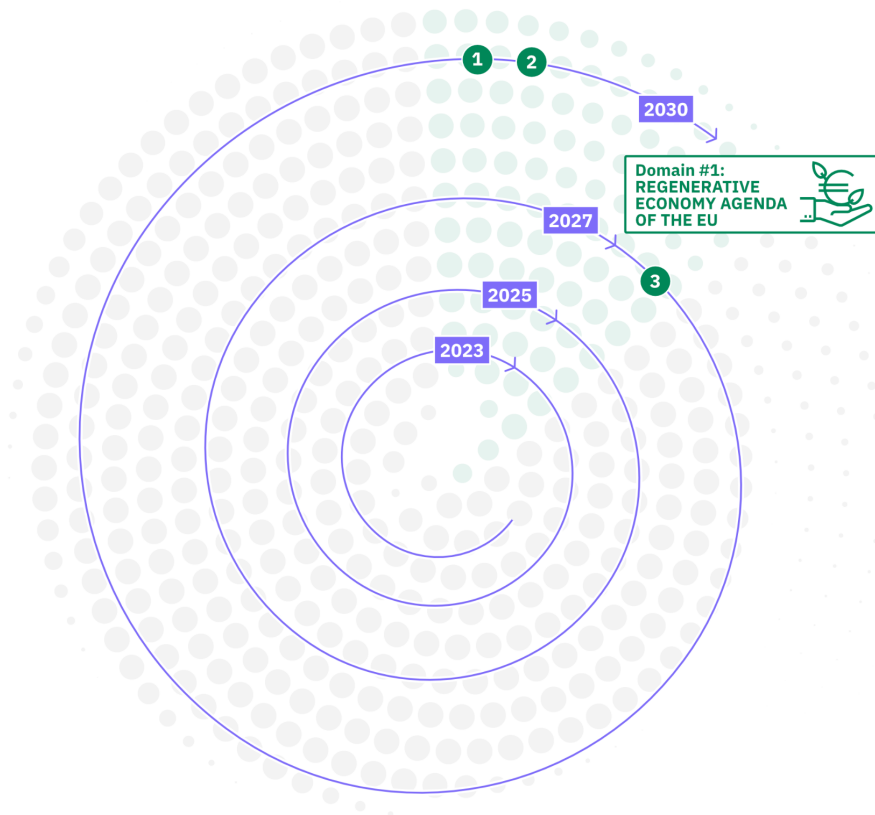


Image 4. The policy recommendations illustrated on a roadmap for 'Domain 1' © Kirmo Kivelä

⁸Tran, S., Vij, M., Kumpf, B., Jhunjhunwala, P., Lee, Y., Hanson, A., C., Tabatadze, M., Kumpf, B., Asplund, V., & O. (2022, April 7). Mission-Oriented Innovation. Observatory of Public Sector Innovation. <https://oecd-opsi.org/work-areas/mission-oriented-innovation/>

⁹Fit for 55. (2023, January 12). European Council. <https://www.consilium.europa.eu/en/policies/green-deal/fit-for-55-the-eu-plan-for-a-green-transition/>

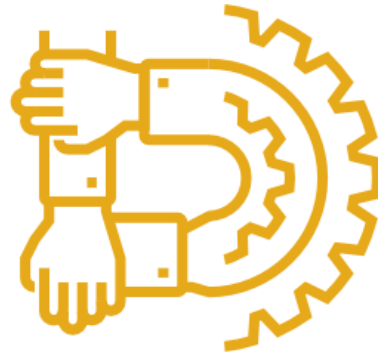
2. Anti-rivalry should be recognised and embedded in economic visions and policies of the EU in a cross-sectoral approach

- a. The EU should promote and expand political imagination for anti-rival economics and recognise the ideological and historical assumptions underpinning the current economic system, such as resource scarcity.
- b. Anti-rivalry should be understood and approached broadly as a perspective connecting data commons, public goods, cooperatives, open-source resources, industry 4.0 development and sustainability issues, across policies.
- c. Anti-rivalry should be incorporated into different policy sectors through experimenting with anti-rival mechanisms in diverse contexts such as green transition and community currencies.

3. Experimental policymaking should test new solutions for the opportunities of data and digital economy

- a. The impact of economic efficiency as a principle should be evaluated through anti-rival experimentation, policy prototyping and test beds, for example in the context of European data strategy and knowledge commons.
- b. The EU should develop capabilities and processes for technology foresight from the perspective of the digital economy to aid long-term economic and digital policy planning.
- c. Experimentation should be designed to incorporate inclusive stakeholder engagement and multi-perspective deliberation in the context of digital policy, e.g. through living labs.

Domain #2: SOCIOTECHNICAL R&I INVESTMENTS



Domain 2: Sociotechnical R&I Investments

Research and innovation investments to support an inclusive sociotechnical approach to anti-rival economics and technologies.

Research and development investments can steer the momentum of DLTs and tokens for facilitating exchange of anti-rival and public digital goods. Funding should incentivise concrete piloting and use cases of anti-rival resource sharing in local communities, while also establishing long-term impact in and for the benefiting communities. Investments should promote inclusivity, whereby the affected groups have an integral role in the development processes.

4. Public funding programmes should avoid falling into techno-solutionism¹⁰ and instead promote inclusive socio-technical perspectives

- A. Technical DLT developers should work in tandem with SSH¹¹ experts and economists to develop socially beneficial anti-rival applications and transition pathways to reform the data economy.
- B. Participatory co-design activities should be required to include the values and perspectives of affected communities and marginalised citizens into the technology design.

¹⁰S. (2021, March 25). Techno solutionism—very few things actually need to be an app. Digital Rights Watch. <https://digitalrightswatch.org.au/2021/03/25/technosolutionism/>

¹¹ Social Sciences and Humanities. (n.d.). In Cambridge Dictionary. <https://dictionary.cambridge.org/dictionary/english/social-science?q=social+sciences>

- C. The European Digital Innovation Hubs (EDIHs)¹² strengthen decentralised technology initiatives, including non-profit, open and diverse projects.
- D. DLT-based piloting should be based on transparency and ensure users' consent and controlling data by better enabling compatibility of blockchain with GDPR¹³ in a privacy preserving manner.

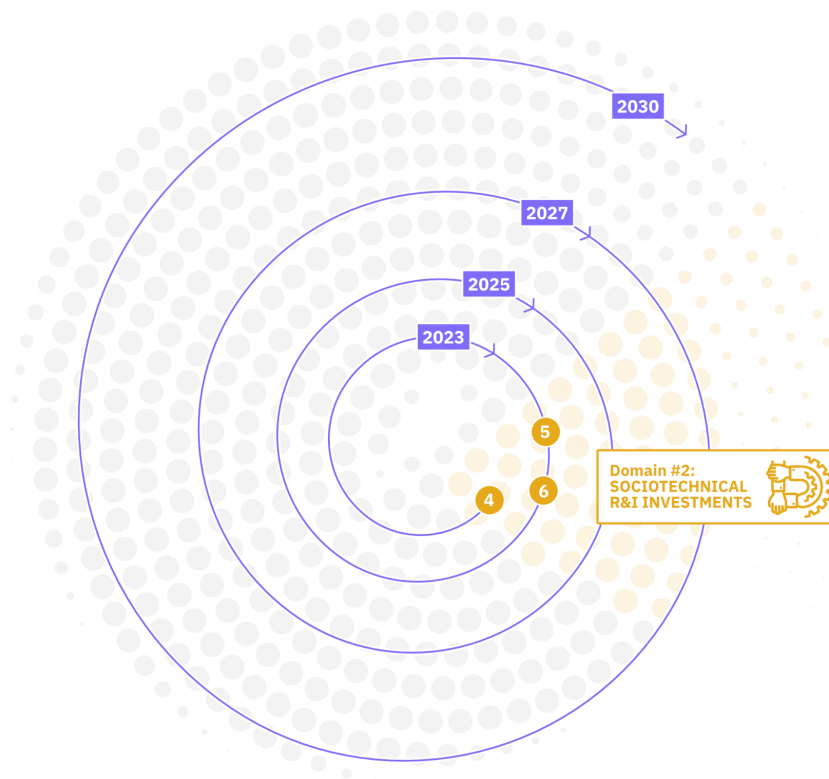


Image 5. The policy recommendations illustrated on a roadmap for 'Domain 2' © Kirmo Kivelä

¹²European Digital Innovation Hubs. (n.d.). Shaping Europe's Digital Future. <https://digital-strategy.ec.europa.eu/en/activities/edihs>

¹³GDPR.eu. (2019, February 19). General Data Protection Regulation (GDPR) Compliance Guidelines. <https://gdpr.eu/>

5. R&I investments through programmes such as Horizon Europe¹⁴ should be steered to explore the anti-rival potential of data and digital goods and to develop tools to capture positive economic externalities of the data economy

- A. Research funding should support research and development of common ownership models to ensure a functioning digital public good infrastructure.
- B. Funding should support the research and construction of free and open source decentralised technical infrastructure to increase ‘evolvability’ of technologies by the users themselves.

6. Investments in DLT should support the development of new business, ownership, and governance models

- A. The European Innovation Council’s (EIC) funding programmes¹⁵ should be used to incentivise radical economic experimentation with DLTs (for example basic income pilots¹⁶).
- B. The funding should support multi-stakeholder partnerships in the development of standards on deployment of smart contracts and digital signatures

¹⁴Horizon Europe. (2023, February 8). Research and Innovation. https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe_en

¹⁵ At the time of writing e.g. Pathfinder, Transition, and Accelerator

¹⁶ Circles UBI | Wallet. (n.d.). <https://circles.garden/welcome>



Domain 3: Anti-rival data governance

Data governance and regulation to support the incentives, mechanisms and coordination of anti-rival resource sharing.

The EU should promote data governance that enables a commons-based data economy and incentivises data sharing in relevant ecosystems in order to utilise the positive externalities of data and digital goods. The market failures of data economy result in the under-provision of societally beneficial data, and a disproportionate concentration of resources on exploitative data uses, such as profiling and surveillance.

7. Develop commons-based data governance such as data commons and unions

- A. Expand the regulatory efforts around data commons such as Open Data Directive¹⁷ into the private setting to support sharing of data for the public good.
- B. Create legal structures to support the establishment of data commons and unions enabling groups and communities (including marginalised and vulnerable groups), and their respective representatives to regulate the use of non-personal community data.¹⁸
- C. Develop and implement the management of data commons for example under the Ostrom's Eight Core Design Principles.¹⁹

¹⁷Open Data Directive. (n.d.). data.gov.ie. <https://data.gov.ie/pages/open-data-directive>

¹⁸https://www.researchgate.net/publication/343555556_Data_Sharing_Requires_A_Data_Commons_Framework_Law_DGN_Policy_Brief

¹⁹ These principles also ensure that the scale of the data commons is appropriately defined and that different data commons cooperate in exploiting synergies among them.

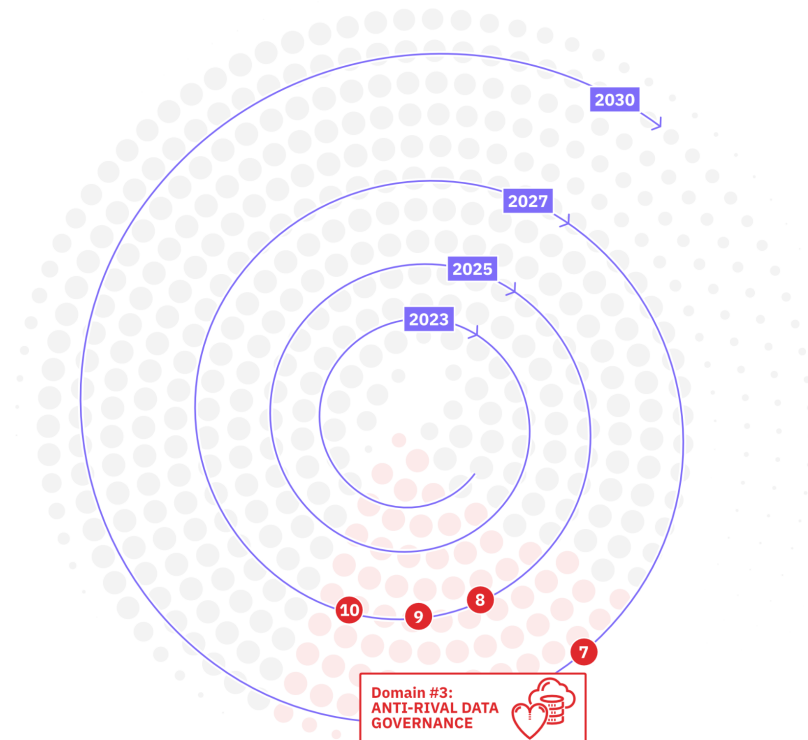


Image 6. The policy recommendations illustrated on a roadmap for ‘Domain 3’ © Kirmo Kivelä

8. The Data Governance Act and Data Act should recognise data as an anti-rival good and conceptualise the data economy beyond market terms

- A. Enhance ‘data altruism’ in Chapter IV of Data Governance Act (DGA)²⁰ into a more overarching concept for the whole regulatory act so that companies can access data donations if the data is collected for ‘general interest’ goals consensually.
- B. The Data Act (DA) and DGA should go beyond current conceptualisations of data as a common-pool or non-rival resource and explicitly recognize the anti-rival nature of data.
- C. Resolve the tension between data minimisation principle in GDPR and ‘business to government’ data sharing rules in the Data Act (DA)²¹ to promote socially beneficial data sharing.

²⁰EUR-Lex - 52020PC0767 - EN - EUR-Lex. (n.d.).

<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52020PC0767>

²¹ https://ec.europa.eu/commission/presscorner/detail/en/ip_22_1113

9. Quality, fairness and privacy of data should be ensured in the context of anti-rival data sharing

- A. The requirements for data quality under the AI Act²² should be mirrored in other legislative endeavours around data sharing such as DA/DGA, as the benefits of data only accrue if the data shared is representative, unbiased and consensual.
- B. Privacy and data rights enshrined in GDPR should include a more collective approach, since personal data protections are not enough when the potential harms are collective and the data is shared widely.

10. The EU regulation of blockchain and tokens should not focus squarely on crypto-assets or digital finance, but also consider other uses and contexts of blockchain

- A. The Markets in Crypto-Assets (MiCA)²³ regulation should better recognise utility tokens and shareable non-fungible tokens (sNFT)²⁴ as non-financial, yet socially valuable goods.
- B. The DLT Pilot Regime for market infrastructures²⁵ ought to foster innovations related to democratic funding, collective ownership and equal digital rights, whether through token credentials or multi-signature wallets, rather than focusing on crypto-assets or securities as an end themselves.

²² <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52021PC0206>

²³ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020PC0593>

²⁴ https://atarca.eu/wp-content/uploads/ATARCA_d21_r2_v2_220624_funding-statement-added-1.pdf

²⁵ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020PC0594>

Domain #4: NEW BUSINESS AND VALUE CREATION MODELS



Domain 4: Value creation and business models

New business and value creation models to enable anti-rival compensation mechanisms that are aligned with regenerative digital economy.

The creation of value through digital resources should enable greater societal benefits. By developing anti-rival compensation mechanisms one can incorporate more actors and features into the value creation processes led by businesses. Business models such as open source and peer-to-peer make decentralised collaboration more efficient, facilitating the capture of positive economic externalities²⁶.

11. Public and private sector organisations should collaborate to build business ecosystems and networks that develop anti-rival business models

- A. Business model patterns that are either a) compatible or b) enablers of anti-rivalry ought to be more widely recognised and utilised. These include models like freemium, open-source, dual-licensing, crowdfunding, differential pricing, peer-to-peer, fractional and cooperative ownership among others²⁷.
- B. Increased cooperation between public and private technology developers, including sandboxes and residencies between organisations would enable better cross-sector understanding of anti-rival DLT solutions.

²⁶ https://atarca.eu/wp-content/uploads/atarca_d22_220930_finalF.pdf

²⁷ See more https://atarca.eu/wp-content/uploads/atarca_d22_220930_finalF.pdf

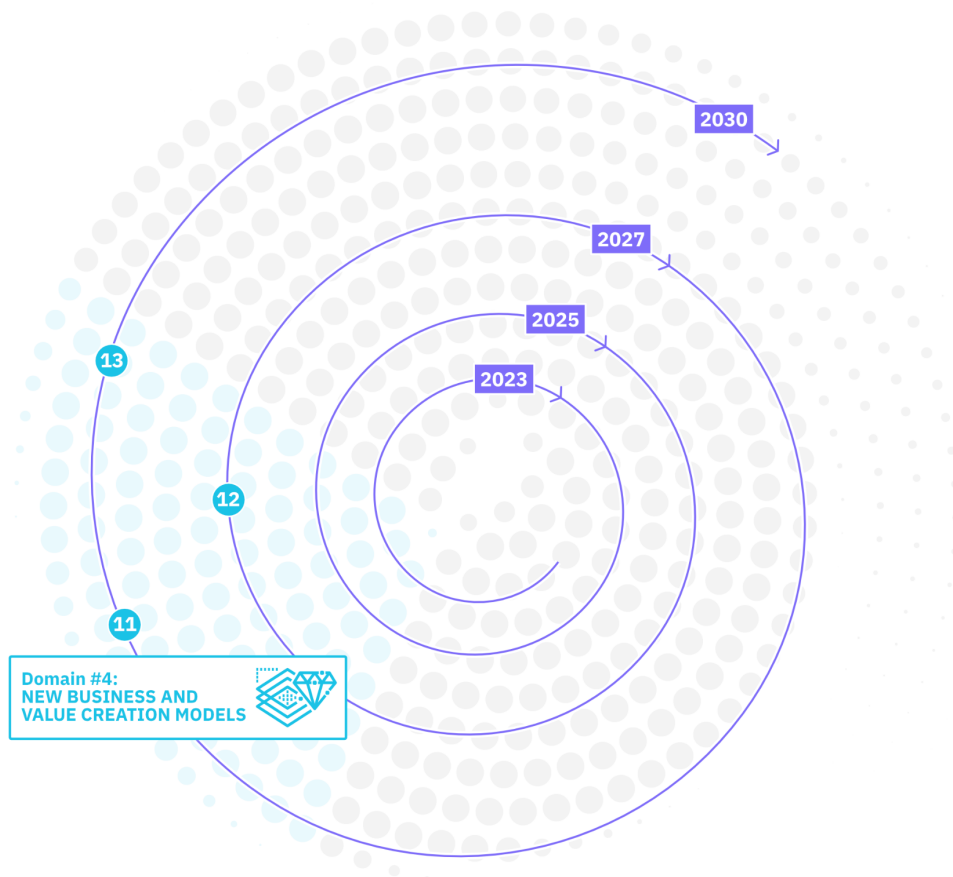


Image 7. The policy recommendations illustrated on a roadmap for 'Domain 4' © Kirmo Kivelä

12. Public institutions should promote and support digital public goods and digital open commons

- A. The EU should promote digital open commons by establishing a 'European incubator for digital commons' as presented by the French presidency of the Council of the EU in June 2022²⁸.
- B. DLTs should be advanced as a common public good infrastructure, instead of speculative financial products. This can mean financing for digital public goods and decentralised governance with broader participation of the relevant user communities through initiatives such as GovStack²⁹.
- C. Public institutions should nurture and consolidate emerging hubs around anti-rival ecosystems and empower trends around open-source DLT repositories, in line with Digital Public Goods (DPG) charter³⁰.

²⁸ https://ec.europa.eu/commission/presscorner/detail/en/ip_22_3898

²⁹ Home. (2023, January 20). GovStack. <https://www.govstack.global/>

³⁰ Digital Public Goods Charter. (n.d.). DPG Charter. <https://www.dpgcharter.org/>

13. Introduce policies and regulation to foster anti-rival business strategies in the domains of digital services, open source and internet commons

- A. Implementation of antitrust policies like the Digital Markets Act (DMA) and Digital Services Act (DSA) should consider how large online platforms may specifically limit the uptake of anti-rival digital goods, and tackle this by incentivising platform cooperatives.
- B. The European Commission should build on and implement its Open Source Software Strategy 2020–2023³¹ to capture anti-rival value through open-source solutions and avoid issues such as vendor lock-in through public code.
- C. Anti-rival goods such as data and distributed ledgers should be seen as central parts of internet commons and more strongly integrated into the Next Generation Internet (NGI) initiative and ecosystem through NGI funding.

³¹ Open source software strategy. (n.d.-b). European Commission.
https://commission.europa.eu/about-european-commission/departments-and-executive-agencies/informatics/open-source-software-strategy_en

Domain #5: LOCAL COMMONS EXPERIMENTATION



Domain 5: Local commons experimentation

Utilising DLTs for decentralised, democratic community collaboration and promoting grass-roots cooperatives through education and resources.

Emerging technologies including DLT and blockchain allow us to intentionally organise economic activity towards a collaborative and commons-based economy. On the local level, they can support the growth and coordination of community initiatives by for example forming data unions and decentralised autonomous organisations (DAOs) or by creating local currencies that recognise domestic labour.

14. Steer DLT pilots and regulatory sandboxes towards community experimentation with platform cooperatives and democratic DAOs

- A. Anti-rival experimentation should make use of the existing communities and platforms working on decentralised local solutions, for example by connecting with projects mapped in the European Commission's DLT4Good³² project.
- B. The public sector should promote platform cooperatives as one way to respond to the needs of local communities.

³²Foresight. (n.d.-b). #DLT4Good Scanning | Knowledge for policy.
https://knowledge4policy.ec.europa.eu/foresight/topic/dlt4good-scanning_en

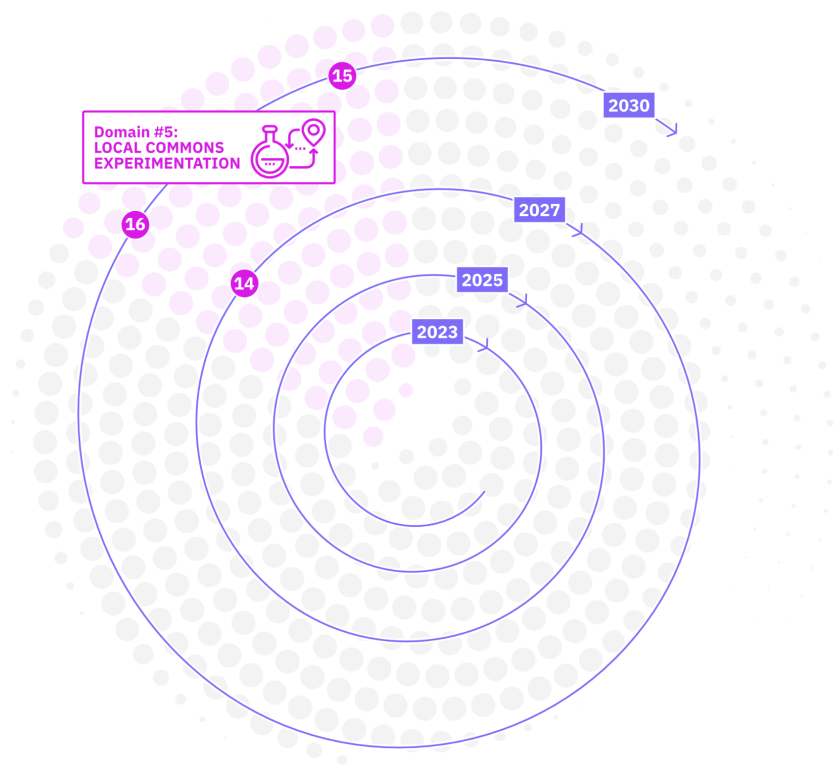


Image 8. The policy recommendations illustrated on a roadmap for ‘Domain 5’ © Kirmo Kivelä

15. Promote educational material, skills and tools for new forms of anti-rival economic experimentation and technologies

- A. Massive Open Online Courses (MOOCs), such as those developed as part of the ATARCA project³³, ought to be used to raise awareness of the potential of anti-rivalry and its technical DLT applications for a wider audience.
- B. The education around anti-rivalry and its decentralised applications should not focus purely on technical, trust-minimising architectures but rather on local, interpersonal forms of trust and human oversight.
- C. Existing networks such as CHAISE, EBSI, EU Blockchain Observatory & Forum and INATBA³⁴ should be utilised in educating and improving skills of practitioners about anti-rival use of DLT and blockchain technology.

³³An Introduction to Anti-rivalry – ATARCA. (n.d.). <https://atarca.eu/courses/introduction-to-anti-rivalry/>

³⁴Blockchain Strategy. (2023d, February 14). Shaping Europe’s Digital Future. <https://digital-strategy.ec.europa.eu/en/policies/blockchain-strategy>

16. Anti-rival mechanisms ought to be experimented with and adapted in accordance with different use cases and contexts of sustainable economy

- A. In the context of sustainability, tokens should be used to capture anti-rival value by measuring and tracking the environmental effects of different services, firms, organisations and citizens to incentivise responsible and informed behaviour, e.g., through open CO₂ registries.
- B. Anti-rival tokens like sNFTs signalling reputation and trustworthiness should be applied to solve public good problems like the prisoner's dilemma³⁵ and to promote greater coordination between actors, e.g., in supply chains and liability issues.
- C. In an economic context, anti-rival tokens and networks should be utilised to create new institutions. These institutions would promote redistribution and exchange, such as how surplus marketplaces and community currencies could facilitate economic transformations, e.g., a universal basic income.

³⁵ The prisoner's dilemma presents a situation where two parties, separated and unable to communicate, must each choose between cooperating with the other or not. The highest reward for each party occurs when both parties choose to co-operate:

<https://www.investopedia.com/terms/p/prisoners-dilemma.asp#:~:text=Understanding%20the%20Prisoner's%20Dilemma&text=The%20prisoner's%20dilemma%20presents%20a,parties%20choose%20to%20co%20operate.>

Conclusion

Regenerative digital economy, which builds on the recognition of anti-rivalry, is rooted in equitable generation, sharing and governance of data. Considering its economic, political and social potential, data can be regarded as the most valuable resource of our time. However, we have still not figured out how to manage data and digital goods in a fair and sustainable way. Resolving this issue is crucial, because how we gather, control, and use data and digital technology affects the very foundations of our societies and economies. Currently, the institutions that gather and control data wield unprecedented power in the business and political realms.

As presented in this publication, the EU is well placed to create the approach and policies for data economy that support sustainable prosperity, commons-based participatory economy and regenerative value creation models. This publication gives direction and initiatives to enable that goal. Our focus has been on envisioning the implications that greater recognition of the anti-rival nature of digital goods could have for societies, and how its realisation through DLT could be supported.

To move forward, the recommendations and roadmap for a regenerative digital economy need to be translated into action and tailored to the unique policy context of each community. This requires collective action and collaboration on different levels in our society. Desired changes will be achieved only if the whole of society is equipped to envision and work together towards a better digital future.

Read more

ATARCA - Accounting Technologies for Anti-Rival Coordination and Allocation

Digitalization transforms data, information, and knowledge as key success factors in the economy. Digital goods – based fundamentally on digitally storable, replicable, and transmittable information – require redefining business models, altering operational structures, and adopting strategic change. In ATARCA, we focus on anti-rivalry³⁶ to promote an efficient economy of digital goods.

The publication builds on four policy observatories, each engaging with around 30 participants with expertise in European economic policies, data economy and distributed ledger technologies (DLT) such as blockchain. Furthermore, ATARCA's policy advisory board, internal policy impact and communication task force, and five external dialogue events have also contributed to the publication. Findings from the three anti-rival pilot use cases and scientific papers written during the project have also been instrumental for understanding the theoretical and practical questions of the anti-rival economy. For more information on the process and ATARCA, see website atarca.eu.

³⁶ Nikander, P., Eloranta, V., Karhu, K. and Hiekkanen, K. (2020). Digitalisation, anti-rival compensation and governance: Need for experiments. In Proceedings of Nordic Workshop on Digital Foundations of Business, Operations, and Strategy, Espoo, Finland.



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