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THE FUTURE DATA ECONOMY

COMPETITIVE, FAIR, SAFE

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EXECUTIVE SUMMARY

> Data is not the new oil, as it is often repeated. Data can be used multiple times and in multiple ways, which can bring different levels of value for different people.

Therefore, it is not too daring to state that, with their current ubiquity and scale—which is bound to increase exponentially in the coming decades –, data represents a unique phenomenon in the history of mankind. This represents a big puzzle for economists and other social scientists because, indeed, data is *special*, as Andrea Renda from CEPS (a chief contributor to this project) underlines. Data is "special in the sense of *species*, in Latin, which denotes "a particular sort, kind, or type." In other words, data "behaves neither like ordinary products or services nor like pure public goods." This polyhedric condition of data brings enormous benefits for our societies, but also great challenges. Data can help us understand the world and make it a better place, but they can also fall into the wrong hands and cause considerable harm. This is why there is such a big debate around data.

There is a strong consensus that generating, sharing, and processing data can improve innovation and productivity. The big question is how to do this in the best possible way. This is precisely the main research question that this report seeks to answer. The report is the result of the second work package of ▶"The Digital Revolution and the New Social Contract", a multiannual research project led by the Center of the Governance of Change at IE University. The project is composed of four work packages addressing the impact of technology and digital developments on existing social structures.

While in the first work package we focused on the digital economy (published in November 2022), in this package we have tried to zoom in even further and study the possibilities of creating a data economy that is:

- **FAIR**, in terms of creating a level playing field, which is as accessible to as many players as possible.
- **COMPETITIVE**, under the belief that free competition with the right regulatory safeguards creates best outcomes;
- And **SAFE**, as the new data economy should foster trust and encourage an ever-increasing sharing of data.

To do this, we have had the privilege to gather some of the best minds in the field from three different continents. This report is a summary of their work as well as an analysis inspired by their contributions.

Andrea Renda helped us to better conceptualize data, which is not an easy task. As mentioned before, data can take different forms and have different values. This value will depend on whether the data needs to be public, is best used by certain specialized groups, or should be kept as confidential as possible. Incidentally, **Stefaan Verhulst** of the NYU GovLab argues that if we want to foster competition, data should be shared and re-shared as much as possible. New data and old data, because sometimes we forget that data can be recycled. Data collaboratives and a new profession, data stewards, can help us achieve this goal. However, a data economy cannot just be competitive. It has to be fair. And here the experience of **SITRA, the Finnish Innovation Fund**, is very instructive. Creating a fair data economy is more than just a whole-of-government effort. It needs to be a whole-of-society effort, involving as many stakeholders as possible, and recognizing that the data economy is changing so rapidly that experimentation, flexibility, and adaptability need to permeate the entire policy and decision-making process.

The key to all of this is collaboration between the public and private sectors. And again, there are ways to facilitate that collaboration. **Sharad Sharma and his team at iSPIRT** have shown us that the digital public infrastructure that has been put in place in India over the past few years in the areas of digital identity certificates, money transfers, and government paperwork has made the country a more productive place, despite the challenges that lie ahead. One of those challenges, of course, is privacy and making it safe to share data. But as **Kimberly Houser** of the University of Lisbon and **Susan Aaronson** of George Washington University point out, there are also solutions to introducing and enforcing more accountability from those who manage data, such as data trusts.

FOUR MEGA THEMES

Overall, then, the output of this second work package can be summarized in four mega-themes:

The elusive economics of data means that there is no one-size-fits-all solution.

Policymakers must strike a delicate balance. On the one hand, data must be accessible enough to foster innovation, competition, and economic growth. On the other hand, it must be secured to protect privacy, security and consumer rights. This means that regulation must be smart and flexible. It must be sufficiently adaptable and broad to avoid fragmentation, but also strong enough to overcome algorithmic biases, data asymmetries, and ethical dilemmas.

More (and better) collaboration is needed to unlock the latent potential of data.

This needs to happen at three levels. First, between the private and public sectors. Both have data that can improve the products and services that the former can generate, and that the latter can use to provide valuable public goods. Second, between companies themselves, especially across sectors. This more horizontal collaboration is rare, but has enormous potential. Third, it is important to involve the public as much as possible in this collaborative process in order to build the necessary trust.

But, in turn, this means:

Greater data literacy is needed at all levels of society.

A more nuanced understanding of what data is and is not would enable policymakers, individuals, and businesses to make better decisions, manage risk more effectively, and harness the potential of data responsibly. Policymakers would better understand the potential of data to make better decisions. Businesses would realize the potential productivity gains from a workforce better trained in data generation and management. Finally, average citizens would be better equipped to know when and how to share their data and to navigate the complex world of the data economy with greater confidence.

Regaining social trust is critical to creating a sustainable data governance model.

Currently, too many citizens do not trust the private sector or the public administration to access, manage and process their data. At the same time, due to a lack of literacy and time, they are willing to mechanically hand over their daily data. This creates both frustration and mistrust that can only be overcome by greater transparency and accountability on the part of those who manage this data. Again, governance frameworks are needed.

IMPLICATIONS FOR THE NEW SOCIAL CONTRACT

So what kind of new social contract do we need for this digital age? Perhaps it is too early to give a definitive answer. We plan to develop a third work package focusing on the geopolitics of data, and after that the picture may be clearer, as our societies are influenced and constrained by the geopolitical and geoeconomic context in which they live. Nevertheless, a number of necessary principles can already be outlined.

- The new social contract must **enable greater civic engagement** in shaping the data economy and society.
- The new reality is qualitatively different from the post-World War II Bretton Wood, Keynesian, and post-Wall, neoliberal, eras. Thus, **rights and obligations must be redefined.**
- **The balance of power dynamics needs to be reassessed** and reordered, which means that asymmetries in data management need to be addressed.
- **Trust and accountability** need to be fostered.
- And finally, **human dignity and autonomy must be ensured.**

GENERAL RECOMMENDATIONS

Keeping in mind the previous mega themes and principles, and based on the insights and recommendations of the various authors who contributed to this package, policymakers can consider the following set of recommendations to ensure that the future data economy is fair, competitive, and safe.

FAIR

1/ Build broad coalitions and consider the needs of all participating stakeholders with a shared **'will to act.'**

2/ Identify **strategic priority areas** and set concrete goals with accountable parties and measurable actions.

3/ Address existing imbalances in data markets and create a more **equitable distribution** of data-derived value and risk.

4/ Ensure individuals are not left to fend for themselves against injustices and give them **real choice** in the digital services they use.

5/ Devise these data strategies at the company, community, and state levels and continuously **develop them in a collaborative manner.**

COMPETITIVE

6/ Create an **enabling regulatory framework** by leveling the playing field and increasing legal certainty for organizations participating in the data economy.

7/ Clarify incentives to increase data sharing and consider introducing **compensation mechanisms** for companies leading collaboration efforts.

8/ Promote **standardization** to address the pervasive challenge of interoperability.

9/ Invest in **data stewards** to increase companies' ability to recognize opportunities for collaboration and respond to external data requests.

10/ Create **monitoring tools** to measure how local data economies compare against EU and global standards and identify areas of improvement.

SAFE

11/ Increase **data literacy** to help individuals safeguard against intrusive surveillance and misinformation and exercise greater control of their data.

12/ Make extensive use of Personal Information Management Systems (PIMS) and Privacy-Enhancing Technologies (PETs) to allow individuals to make informed decisions about their data and make potential violations **impossible by design.**

13/ Establish **a social license for data reuse** to help stakeholders trust that all parties will uphold their responsibilities in data protection.

14/ Design **liability frameworks** to properly identify responsibility in cases of data misuse.

15/ Develop **a risk-based approach** to data transfers that envisions data protection measures that are proportionate to the risk at hand.

CONCEPTS, POLICIES, AND TRENDS

CONCEPTS, POLICIES, AND TRENDS

DATA: A NOVEL AND UNIQUE ASSET

In the wake of the digital revolution, the landscape of our economic and social structures has been transformed in many important ways.[1] Central to this shift is the emergence of what many scholars and practitioners refer to as the data economy, an umbrella term covering every aspect of the generation, collection, storage, processing, distribution, analysis, delivery, and exploitation of data through digital technologies.[2] This data economy represents a fundamental reconfiguration of how value is generated, exchanged, and understood in our world today, and it carries profound implications for individuals and organizations participating in this digital environment.[3]

And yet, the data economy remains deeply misunderstood. Many people are unaware of the enormous opportunities associated with data-driven decision-making, and an even larger number ignore the inherent risks and challenges lying ahead. So, as we continue our exploration of the digital revolution and the new social contract, it is imperative to delve into the dynamics of this burgeoning data economy in the hope of contributing to a future where it can be **fair, competitive, and safe.**

At its core, the data economy revolves around the recognition of data as a novel form of capital—a new asset fueling innovation, driving decision-making processes, and shaping the contours of industries and societies.[4] Indeed, data has emerged as a distinct and indispensable resource in the digital age, akin to other inputs traditionally factored as land, labor, or capital in previous industrial revolutions. As such, data has often been referred to as "the oil of the 21st century" and (mis) treated accordingly—something to be simply extracted and amassed for its inherent value.[5] However, in many ways, "the chameleonic features of data clash with the otherwise well-established tenets of market economics."[6]

For example:

- Data is **special** because it behaves differently from other goods and services, with very diverse utility functions depending on the type of data we are talking about. For instance, financial data and information on the weekly menu of a canteen are very different in nature and should not be treated in the same way.
- It exhibits **quantum characteristics**, as it can show a different value, status, and purpose depending on when and how it is observed. Weather data, for example, loses its value over time as the latter lies in its timeliness and accuracy for making immediate decisions, such as planning outdoor activities.
- And crucially, data is highly **malleable and reusable**, meaning it can be decomposed, rebuilt, and repackaged at will, leading to endless possibilities for new and innovative use cases. An example is satellite imagery, which can initially be collected for purposes such as environmental monitoring and then be re-used to plan emergency response operations in the aftermath of a natural disaster.

So, **how can we measure and bestow value on something that escapes so many easy classifications and categorizations?**

Assigning an exact value to data can be extremely difficult, not least because, as we have seen, data comes in a variety of forms and can be used in a range of different ways.[7] In essence, we bestow value on data when we can turn it into useful insights that can be used to make better decisions, wherever they might be. In

other words, the value of data extends beyond the mere business realm. As leading digital economy expert, Diane Coyle, points out, "value arises from data when businesses create jobs or become more productive; when governments deliver more effective public services; when our environment is clean and diverse; and when people live happier and healthier lives".[8] But ultimately, the question of value often boils down to a matter of contingent valuation, whereby each actor considers a set of economic and informational characteristics, such as a dataset's subject matter, excludability, or interoperability, and assigns a value to it based on what they can use it for and how much it is going to cost them. Needless to say, as is often the case, one person's trash is another person's treasure.

Another interesting aspect of data is its distribution, as it is often globally abundant but locally scarce.

Data is generated ubiquitously and continuously, by people, machines, and industrial processes around the world,[9] but as its volume, velocity, and variety have become increasingly overwhelming over the years,[10] the need for specialized technologies to store, process, and analyze it has grown. Think of all the information generated by our social media activity, e-commerce transactions, and electronic health records, as well as sensors, servers, and software necessary to capture and analyze it. This has often resulted in an extreme concentration and asymmetric distribution of data on behalf of those organizations with the means to extract its value most efficiently;[11] those we often refer to as 'Big Tech' companies.[12] Yet, as the cost of data centers, computing infrastructure, and artificial intelligence (AI) systems has decreased (albeit marginally), the rift between the data 'haves' and 'have nots' has somewhat eased.

Although many companies continue to massively hoard data despite having no particular use for it—in fact, more than half of all data collected by companies goes unused[13]—, a democratization process has made the access to data and its insights more widely available to non-technical users.[14] This has also been facilitated by increased instances of data collaboration, whereby participants from different sectors exchange data to solve common problems by bringing together otherwise siloed information and a dispersed range of expertise to match data supply and demand.[15]

Nonetheless, **organizations continue to vary widely in their degree of data intensity, depending on the type of data they gather and store, how often they analyze them, their motivations for doing so, and how important the data is to their business operations.**

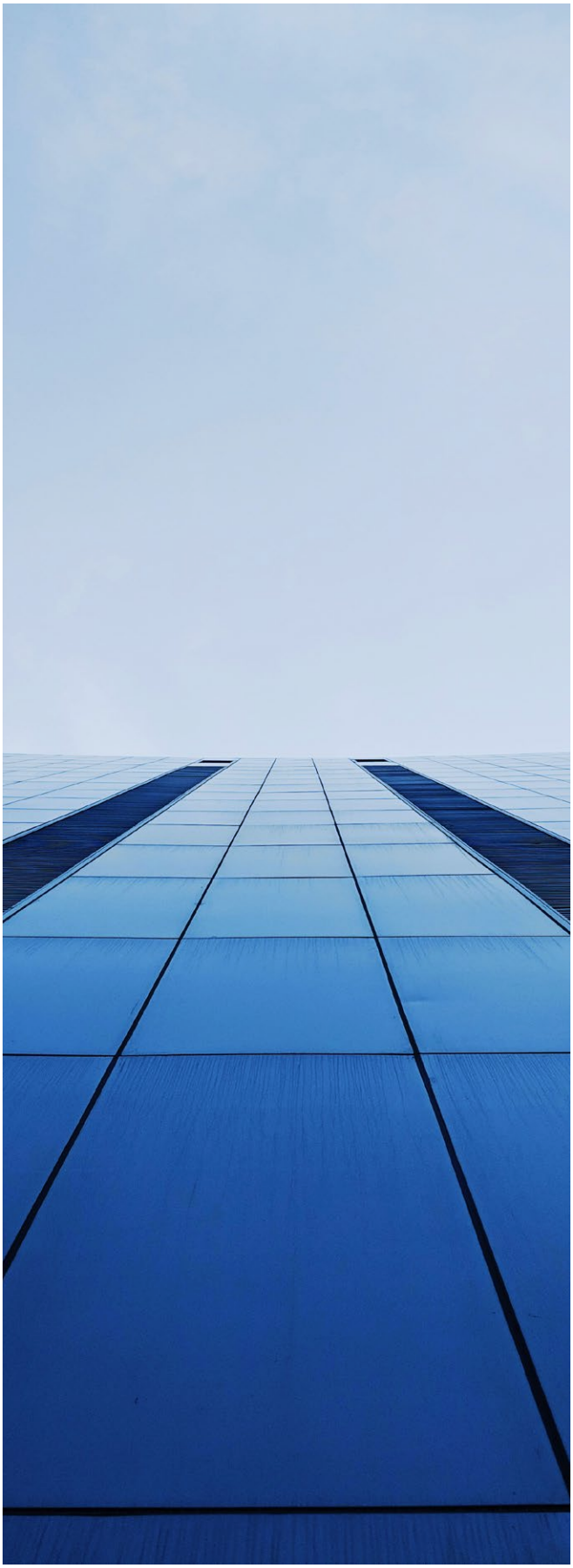
For example, in its "Survey of Business in the Data Economy," the European Commission distinguishes between

(i) non-users,
(ii) passive users,
(iii) regular users-internal optimizers, and
(iv) advanced users-data monetizers.[16]

There are, of course, countless ways to classify organizations according to their data intensity, but what is certain is that nowadays, more and more companies are trying to capitalize on the scale and scope of the opportunities offered by the data economy, increasingly outside the traditional information and communication technology (ICT) sectors. Banks, insurance companies, and other financial institutions rely on data for risk management, fraud detection, and customer relationship management, just as brick-and-mortar retailers use data to manage inventories, optimize pricing strategies, and forecast sales. One last thing worth noting is that the pace of innovation, the increased recognition of the value of data, and the growing data literacy of the population keep changing what it means to be 'data-driven,' and today, only those who embed data into every decision, interaction, and process truly stand out for their ability to capture the highest value from their data-supported capabilities.[17]

In conclusion, the current era of connectivity, advanced analytics, and automation holds significant potential for organizations of all shapes and sizes.

However, it is also crucial to ensure that companies adapt their business model to protect the rights of users and individuals, as alongside the proliferation of data, concerns around privacy, anonymity, and consumer protection have come to the fore. Balancing the imperatives of innovation and data-driven insights with the ethical and legal considerations surrounding individual rights and societal well-being presents a formidable policy challenge—one that lies at the heart of the evolving social contract in the digital age. But guaranteeing the safety of the data economy will require governance mechanisms that extend beyond just personal data. Other types of industrial data,[18] for example, are also subject to liability and security considerations that are central to companies' data strategies and represent a particularly sensitive area for the European Union (EU).



THE EUROPEAN DATA POLICY LANDSCAPE

In the EU, the last decade has seen remarkable focus and investment in promoting the concept of the future data economy. The first efforts can be traced back to 2015, when the Juncker Commission released its **Digital Single Market strategy** and set as one of its key actions "to create a clear and adapted policy and legal framework for the data economy, by removing remaining barriers to the movement of data and addressing legal uncertainties created by new data technologies."[19] At that time, the Commission already recognized that data had become an essential resource for economic growth, job creation, and societal progress, and that in order to unleash Europe's full potential, the EU would need to tackle a number of emerging issues related to data access and transfer; liability; and portability, interoperability, and standards.[20]

In particular, much of the early attention was focused on the idea of free movement of data across Member States in the hope of easing some of the unjustified data localization requirements that were undermining the growth and competitiveness of European companies. However, during this first wave, the Commission also dealt with other issues closer to the individual user, such as consumer trust and data protection. Probably the most notorious example is the **General Data Protection Regulation (GDPR)** of May 2018, one of the most ambitious pieces of European legislation and whose goal of standardizing rules around a single data protection authority has become a model for many countries around the world.[21] Other lesser-known initiatives of this first wave that have been key to fostering the development of the European data economy include the **Regulation on the free flow of non-personal data**, the **Cybersecurity Act,** and the **Open Data Directive**.[22]

A few years later, the new Von der Leyen Commission doubled down on these efforts with the **European Strategy for Data** of February 2020 (see Box 1), a revitalized policy program with the vision to create an attractive regulatory environment that would boost the EU's share and role in the global data economy by 2030.[23] Among other things, the strategy highlighted the rapid growth of global data volumes and the fast pace of technological change—two trends that have raised the importance of data for the economy and society in recent years—, as well as the factors that make Europe a strong candidate for success in the digital age. It also underlined the importance of adopting a "human-centric" approach to data policy and set out a vision to create a new **European data space**: a genuine single market for data where personal and non-personal data are secure and where businesses can freely access high-quality data to create value for the economy and society.

BOX 1: THE EUROPEAN STRATEGY FOR DATA (2020)

"The European data space will give businesses in the EU the possibility to build on the scale of the Single Market. Common European rules and efficient enforcement mechanisms should ensure that:

01. Data can flow within the EU and across sectors;

02. European rules and values, in particular personal data protection, consumer protection legislation, and competition law, are fully respected;

03. The rules for access to and use of data are fair, practical, and clear, and there are trustworthy data governance mechanisms in place; there is an open, but assertive approach to international data flows, based on European values."

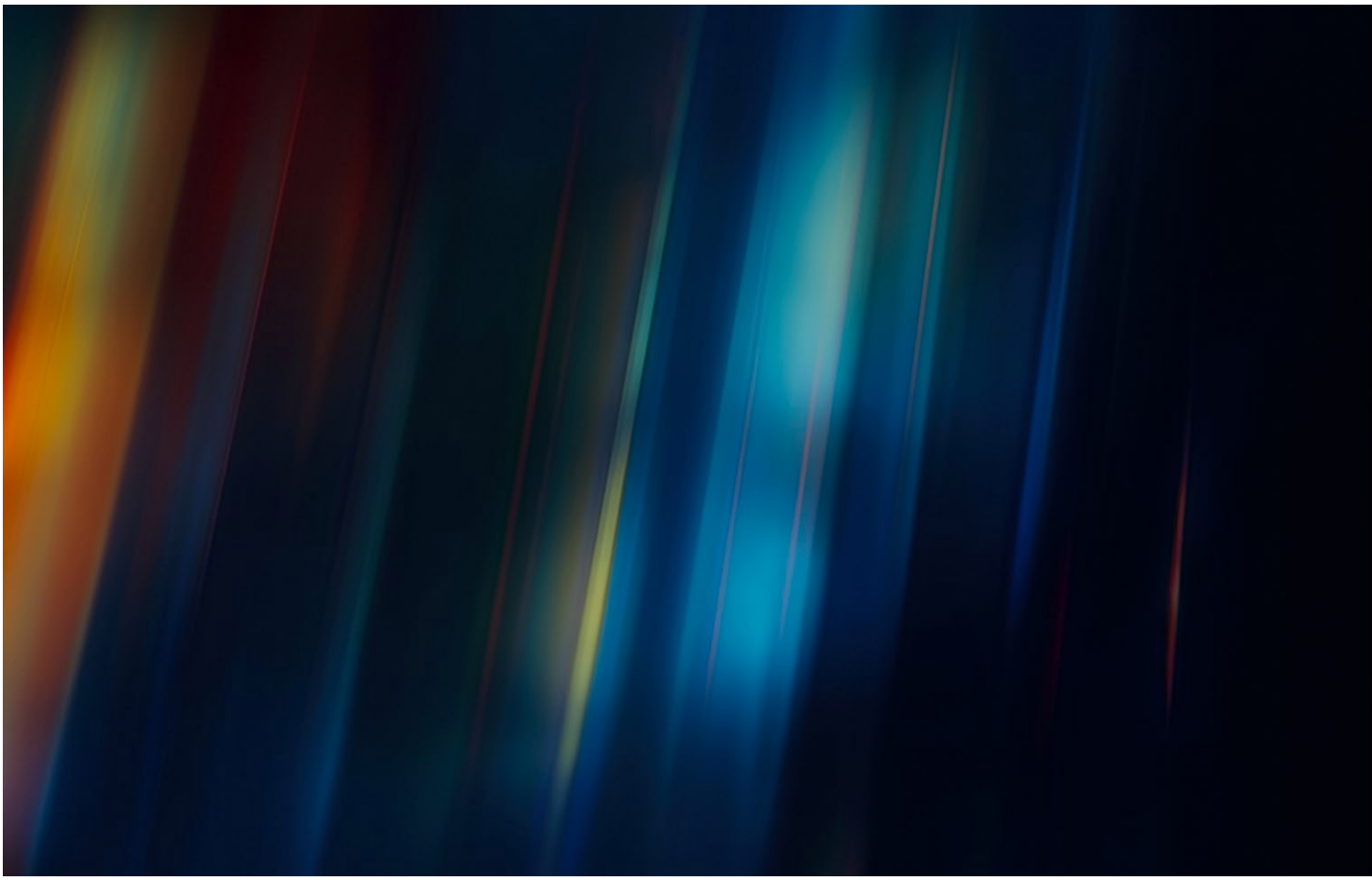
BOX 2: **THE EU'S GROWING DIGITAL ACQUIS**[24]

- **Data Governance Act (DGA):** seeks to foster public sector information reuse, create a supervisory framework for the provision of data sharing services, and establish a framework for voluntary registration of entities that collect and process data made available for altruistic purposes.
- **Data Act (DA):** creates new rules on who can access and use data generated in the EU across all economic sectors to ensure fairness in the allocation of value from data, stimulate a competitive data market, and open opportunities for data-driven innovation by making data more accessible to all.
- **Digital Services Act (DSA):** aims to harmonize conditions for the provision of intermediary services across the EU. Among others, it creates new procedures for faster removal of illegal content, transparency measures, and comprehensive protection for users' fundamental rights online.
- **Digital Markets Act (DMA):** creates new obligations for 'big tech' platforms acting as "gatekeepers" (i.e., providing core platform services) to create a fairer environment for business users that rely on gatekeepers and to ensure consumers have access to better services and can easily switch providers.
- **Network Information Security (NIS2) Directive:** further improves the resilience and incident response capacities of the public and private sectors, and the EU as a whole, through risk management measures and reporting obligations.

To achieve this, the Commission has identified several tools, including a fit-for-purpose regulatory framework to ensure the availability of data, investments in standards, tools, and infrastructure, as well as educational programs to equip citizens with the necessary skills for handling data. Two particularly critical pieces of legislation from this second wave have been the **Data Governance Act** and the **Data Act**, which have been put in place to protect the rights and interests of citizens while simultaneously fostering industrial and technological development. The former intends to regulate the processes and structures that promote voluntary data sharing by companies, individuals, and the public sector, while the latter aims to clarify who can generate value from data and under which conditions. However, the European Strategy for Data also includes a much broader set of measures that have had a more indirect impact on the European data landscape (see Box 2).

> Together, these measures aim to create a single market for data (now envisioned as a collection of "data spaces"[25]) that will ensure Europe's global competitiveness and data sovereignty.

Broadly speaking, they have been well received by the general public, who have particularly welcomed the human-centric approach of the strategy.[26] Yet, some measures, such as the Data Act, have also attracted a fair degree of criticism, particularly from the business sector. Complaints include fuzzy definitions and anti-competitive prerogatives, as well as ambiguities about things like liability and ownership, which could lead to increased legal uncertainty.[27] Nonetheless, the Commission has been able to pass these measures with relatively few substantive changes, although it remains to be seen whether they will be enough to realize the goals originally envisioned in the European Data Strategy. What is certain is that the data policy landscape is being radically transformed and that, in that process, the conflicting interests of the various stakeholders have come to the fore.



OPPORTUNITIES AND CHALLENGES OF THE FUTURE DATA ECONOMY

> As data becomes the lifeblood of modern economies and societies, it is imperative to grasp both the opportunities and challenges it presents to ensure fairness, competitiveness, and safety in the digital age.

The proliferation of data promises to revolutionize industries and revitalize businesses, offering unparalleled opportunities for innovation, personalized services, and efficiency improvements across multiple sectors and geographies.[28] At the same time, collaborative problem-solving and individual empowerment hold the key to immense societal progress and community building in an era of growing social fragmentation.[29]

Amidst these promises, however, lie significant challenges that demand our attention if we are to mitigate risks and foster an equitable data ecosystem. Regulatory complexity poses hurdles for businesses navigating disparate data governance frameworks, especially for small and medium enterprises (SMEs),[30] while data asymmetries threaten market competition by concentrating power in the hands of a few dominant players.[31] Privacy, security, and ethical dilemmas also arise,[32] while the data divide exacerbates inequalities among marginalized populations and puts pressure on our social fabric.[33]

Indeed, in order to realize the full potential of the future data economy, we must address these opportunities and challenges head-on. To design policies, regulations, and governance frameworks that foster fairness, competition, and safety in the future data-driven landscape, we must understand these complexities and reconcile the conflicting interests of stakeholders.

OPPORTUNITIES OF THE FUTURE DATA ECONOMY

ACCELERATE INNOVATION

In the future data economy, vast pools of information will help fuel innovation across entire industries. The increased availability of high-quality, comprehensive datasets will enable businesses of all shapes and sizes to identify emerging trends, develop new solutions, and iterate products more rapidly than ever before. In turn, this accelerated innovation cycle will foster creativity, drive competitive advantage, and deliver new goods and services for consumers in sectors like health, finance, education, and urban mobility.

DEVELOP PERSONALIZED SERVICES

With a virtually unlimited access to real-time information stemming from the growing Internet of Things (IoT) ecosystem, businesses will also be able to tailor products and services to individual needs, preferences, and behaviors with unprecedented precision. From personalized recommendations in e-commerce to customized healthcare treatments and curated entertainment catalogues, the future data economy will empower businesses to deliver experiences that resonate deeply with customers, enhancing satisfaction and loyalty.

IMPROVE EFFICIENCY

Data-driven insights will continue helping streamline processes and optimize resource allocation, leading to significant efficiency gains across the public and private sector. Organizations will be able to leverage advanced data analytics to identify inefficiencies, automate routine tasks, and make data-driven decisions in real-time; faster and cheaper than ever before. In turn, these efficiency gains will translate into cost savings, faster time-to-market, and enhanced operational agility, helping data-driven organizations take the full advantage of the digital age.

SOLVE PUBLIC PROBLEMS

Collaborative data sharing initiatives (also known as Data Collaboratives) between the public and private sectors will also facilitate the discovery of innovative solutions to deep societal challenges. By aggregating the collective intelligence of diverse datasets with the help of data altruists, governments will be able to address issues like urban congestions, healthcare disparities, and environmental sustainability more effectively. Moreover, such collaborations will help promote transparency, foster trust, and promote an increased sense of belonging among the general public.

EMPOWER INDIVIDUALS

In the future data economy, individuals will also have greater control over their personal data thanks to the advent of technology. Innovations in personal information management systems (PIMS) and privacy-enhancing technologies (PETs) will enable people to better manage (and perhaps monetize) their data, fostering a more equitable data ecosystem. Moreover, empowered with insights derived from their own data, individuals will also be able to make more informed decisions, defend from injustices, and advocate for their digital rights.

CHALLENGES OF THE FUTURE DATA ECONOMY

REGULATORY COMPLEXITY

Navigating the intricate web of data regulations poses a significant challenge for businesses operating in today's data economy. Compliance with diverse and evolving regulatory frameworks across regions requires substantial resources and expertise that not everyone can muster. Conflicting regulations, such as those related to data localization and cross-border data flows, can create compliance burdens and hinder companies' global operations. Indeed, harmonizing regulations while ensuring data protection and innovation remains a complex balancing act for policymakers and businesses alike.

DATA ASYMMETRIES

The concentration of data in the hands of a few dominant players presents a formidable challenge for the future data economy. Data asymmetries can stifle competition, limit market entry for new entrants, and impede innovation, as large corporations with access to vast datasets often wield disproportionate influence, leading to anti-competitive behaviors and market distortions. Addressing data asymmetries requires robust competition policies, data governance frameworks, and mechanisms to promote data access and interoperability.

PRIVACY, SECURITY, AND ETHICAL DILEMMAS

Maintaining privacy, security, and ethical standards amidst the proliferation of data poses complex challenges. Data breaches, unauthorized access, and misuse of personal information threaten individual privacy and erode trust in digital platforms, while ethical dilemmas arise around data collection, algorithmic bias, and the responsible use of AI. Balancing innovation with privacy rights and ethical considerations requires proactive measures such as robust data protection laws, encryption technologies, and ethical guidelines for data usage.

DATA DIVIDE

The disparity between the data haves and have-nots exacerbates inequalities that are already present in our social and economic structures. This "data divide" widens between urban and rural areas, developed and developing nations, and socio-economic groups, and it hurts people and companies without access to high-speed internet, data literacy, and affordable digital services, hindering their participation in the future data economy. Bridging this data divide requires investments in infrastructure, digital education programs, and inclusive policies to ensure equitable access to opportunities.

GEOPOLITICS OF DATA

Data has become a strategic asset in global geopolitics, leading to heightened competition and tensions among nations. Control over data flows, data localization requirements, and cybersecurity concerns shape geopolitical dynamics and influence international relations. Conflicting interests regarding data governance, sovereignty, and intellectual property rights can escalate into trade disputes and geopolitical rivalries. Managing the geopolitics of data demands diplomatic efforts, multilateral cooperation, and frameworks for data governance that balance national interests with global connectivity and innovation.

ANALYSIS

ANALYSIS

Against this backdrop, and in the hope of helping public and private sector organizations navigate these complex times, maximize opportunities, and mitigate risks, we set out to reach key data policy experts to reflect on how to make the future data economy fair, competitive, and safe. The result was a series of papers and interviews with practitioners from leading research institutions across six different geographies, covering a range of aspects pertaining to this burgeoning world, from more conceptual issues, such as what makes data special, to more practical ones, such as how to make digital infrastructures more scalable, sustainable, and flexible. The papers, along with their accompanying policy briefs, are available on our website and can be downloaded free of charge by anyone interested in understanding the future data economy.[34]

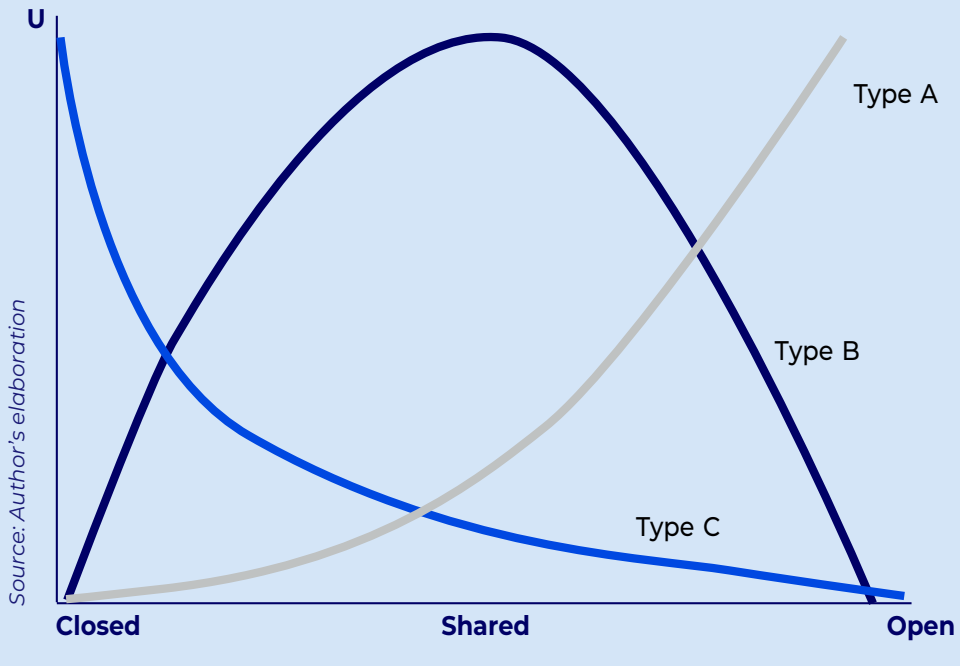
KEY FINDINGS OF THE SECOND WORK PACKAGE

1. Data Policy: A Conceptual Framework, Andrea Renda (CEPS)

In our first paper on the future data economy, Andrea Renda (CEPS) dives into the unique characteristics that make data unlike any other product or service, in order to help policymakers understand their different types, optimize their flow, and ultimately enhance prosperity.

The key lesson of this conceptual paper is that **contrary to common belief, not all data reaches the peak of its value when openly accessed and shared.** Some types of data, such as a bus timetable, do feature public good characteristics and see their value maximized along their diffusion. Other types of data, such as medical research that requires validation and authentication, peak in value when shared within a contained group.

Figure 1.
Types of data, social utility and diffusion



And yet other types of data, including data used in the context of business, such as sales reports, are more valuable when kept private. Renda calls these data Types A, B, and C and plots their utility functions as their access moves from closed, to shared, to open (see Figure 1).

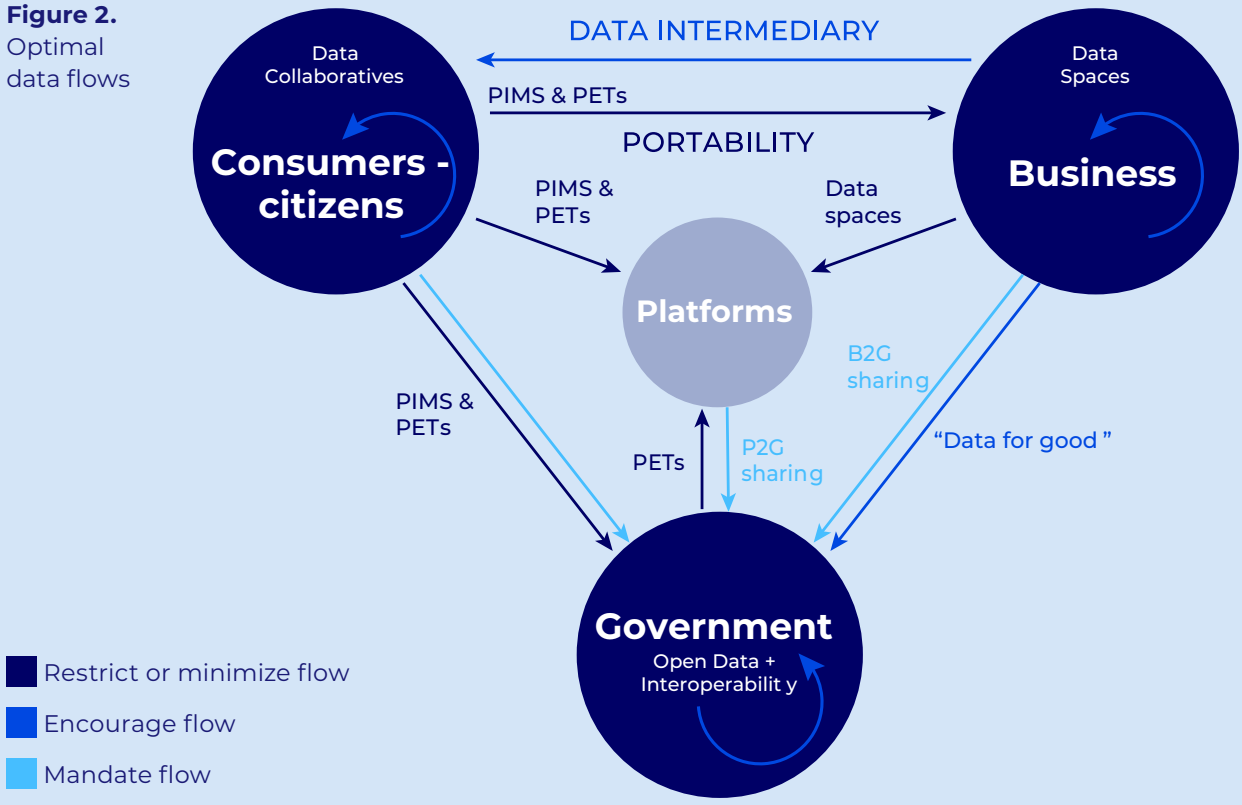
An optimally calibrated data policy should thus ensure that Type A data is shared as much as possible, Type B is shared to the extent that it maximizes its value, and Type C data is kept mostly private. In an ideal world, the best mechanism for optimizing these diffusion levels would be the market, but because the economics of data is fraught with idiosyncrasies that reduce its overall societal value, Renda argues that there is room for improving our data governance strategies and optimizing data flows by removing some of the distortions, asymmetries, and power concentration effects that exist today.

To that end, he presents a decalogue for policymakers to restrict, encourage, and mandate different types of data flows to ensure that they lead to an efficient regime (see these flows, along with some of the technologies and governance arrangements crucial to enabling them, visually represented in Figure 2).

These include **minimizing** the flow of personally identifiable data; **encouraging** businesses to share data (altruism); **enabling** managed data-sharing within data spaces; **avoiding** data hoarding and value capture; **facilitating** switching between cloud and edge services; **incentivizing** businesses and platforms to share data "for good" and in emergencies; **ensuring** fair contractual conditions in data-sharing contracts, **increasing** data sovereignty; **creating** trusted and independent data intermediaries; and **promoting** data stewardship and literacy.

"We must urge policymakers to create the governance arrangements and the policy preconditions that will lead to optimal data flows and enhanced prosperity."—ANDREA RENDA

Figure 2. Optimal data flows



2. Data Collaboratives: Enabling a Healthy Data Economy through Partnerships, Stefaan Verhulst (NYU GovLab, The Data Tank)

In our second paper on the future data economy, Stefaan Verhulst (NYU GovLab, The Data Tank) presents a framework for responsible data sharing that aims to increase collaboration between the public and private sectors, address deeply entrenched data asymmetries, and promote a healthy data economy. His key message is that, **by being smart about incentives and adopting a responsible and sustainable approach to data collaboration, we can unlock data-driven insights to benefit society as a whole.**

According to Verhulst, one of the biggest challenges of our current Zettabyte era[35] is the uncomfortable reality that, while our society is awash in data, not everyone benefits from it equally. Data flows have often been very uneven, concentrating power in the hands of a few and exacerbating existing inequalities to the detriment of society. In turn, this mismatch between data supply and demand has driven a wedge within and between sectors, limiting data's potential to serve the public good.

In response, he draws attention to one model with the potential to increase data sharing and reuse and ensure that data gets applied to the social, economic, cultural, and political problems it could help solve: **data collaboratives**, an emerging partnership scheme in which participants from different sectors exchange data to solve public problems by bringing together otherwise siloed information and dispersed ranges of expertise.

Like any effort at data sharing, however, data collaboratives face several challenges. For example, there is a general lack of awareness about the potential of data collaboration, as well as a pervasive absence of trust among potential sharing partners. The private sector, for its part, also has concerns about the reuse of its data, arguing that increased data sharing could lead to leaks, unfair penalties, and reputational damage that would cost them their competitive advantage.

The role of the policymaker should therefore be to make data collaboratives systematic, sustainable, and responsible by promoting a more participatory approach to identifying **important questions** that can be answered with data; training **data stewards**—individuals or teams within organizations responsible for proactively initiating and coordinating data collaboratives—; **clarifying incentives** for data holders in the private and public sector, as there can indeed be multiple benefits to openly sharing data; **establishing a social license for re-use**, to make the case for data collaboration to all stakeholders in the value chain; and **becoming more data-driven about data**, to gather more information about the types of projects, methods, participants, safeguards, and outcomes that work best.

> "More open data means more access to data or data products. It means that the potential insights contained within data can be better directed in service of those who may most benefit from those insights, as well as those who may be in the best position to unlock the insights."—STEFAAN VERHULST

3. Towards for a Fair Data Economy: Key Lessons from Finland on Building a National Roadmap, Laura Halenius, Taru Rastas, Meeri Toivanen, and Johanna Kippo (Sitra)

In our third paper on the future data economy, we take a closer look at the work conducted by the Finnish Innovation Fund, Sitra, to understand how to address the existing power disparities in data markets with a national roadmap for a fair data economy.

As we have seen, the future data economy holds great potential for our economies and societies. However, **the transition to a more inclusive model, where the rights of individuals are protected, and the needs of all stakeholders are considered, has often been slowed by an inadequate and siloed understanding of data development**, as evidenced by the persistent high barriers to data sharing and the widening skills gap between technophiles and the less technologically savvy. Even Finland, a country that consistently ranks high in international comparisons measuring the development of digitalization, lags behind in data-driven value creation, partly due to the lack of a concrete national data strategy and better coordination channels between stakeholders.

Against this backdrop, Sitra embarked on a mission to create a roadmap that would help Finland succeed in the future data economy on fair terms and through close public-private collaboration. The first step was to decide on the general direction in which the data economy should develop to increase Finland's competitiveness and economic resilience, with strategic priority areas and aspirational goals for each policy area. Having agreed on this shared 'will to act,' the roadmap stakeholders moved on to identifying concrete actions to improve the data economy in practice, and establishing responsible parties to be accountable for their progress, resources, and outcomes. Finally, to make progress in the focus areas more visible and provide up-to-date information to decision-makers, a Data Economy Monitoring Tool was developed using both quantitative and qualitative indicators.

Figure 3. Timeline of Finland's fair data economy roadmap process

Three key lessons may be drawn from the Finnish experience for policymakers looking to replicate its success abroad are to **strengthen collaboration and implementation**, as the transition to a fair data economy requires supportive measures, unified coordination, active stakeholder collaboration, and action-oriented practices; **proceed through experimentation**, to test the functionality and effectiveness of new solutions and deliver higher quality and more innovative policy measures that are known to work; and **use metrics to support decision-making**, since the development of the data economy is still poorly understood and there is a lack of information on its progress and impact to support decision-making.

"Solutions in the data-driven economy are not created by simply replicating the old way of doing things. Rather, it is the multiple collaborations between the public, private, and third sectors that are key."—LAURA HALENIUS ET AL.

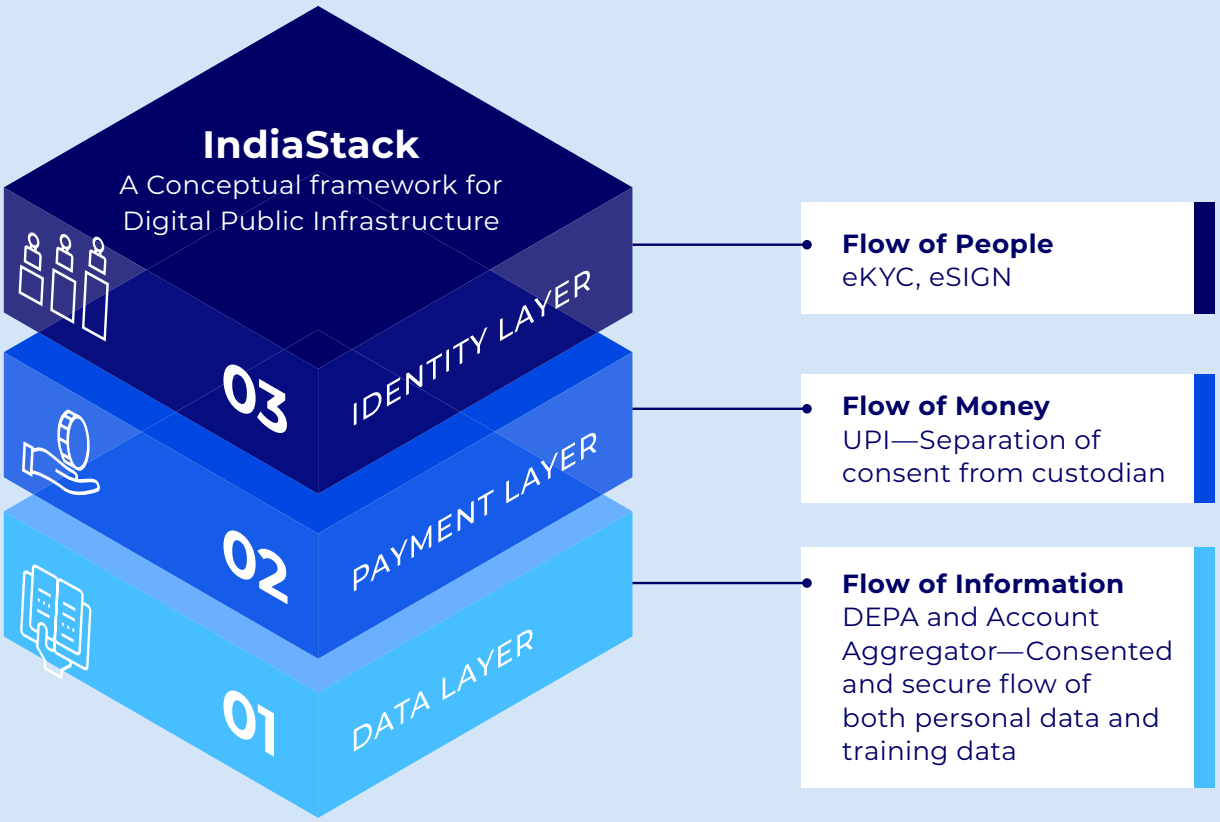
4. Digital Public Infrastructures: Lessons from India for a Thriving Data Economy, Sharad Sharma, Madhumitha Ramanathan, Arun Iyer, and Vivek Abraham (ISPIRT Foundation)

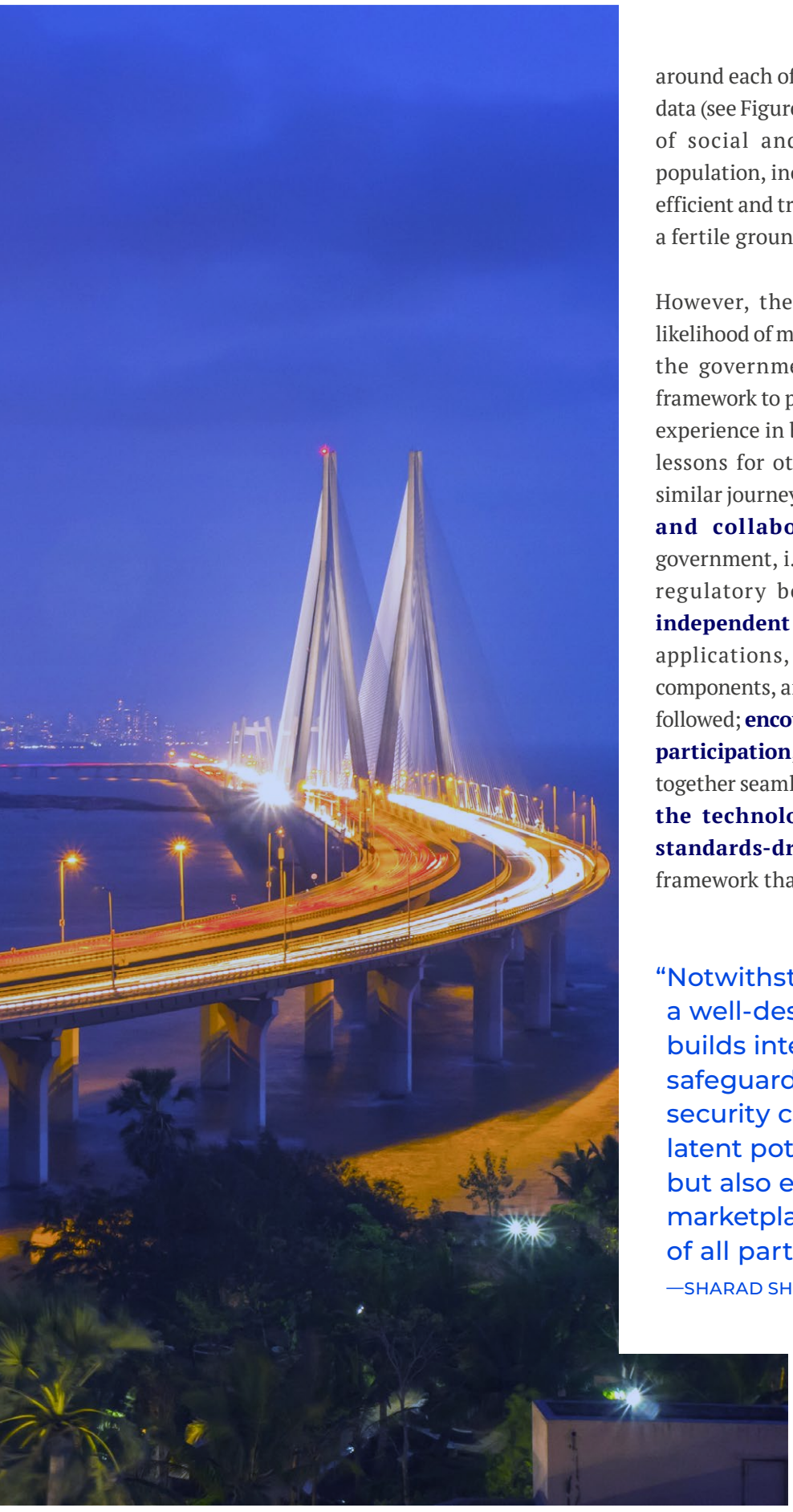
In our fourth policy paper, we examine the lessons from India's digital journey to learn how Digital Public Infrastructures (DPIs) can help unlock the latent potential of the data economy while ensuring the safety of all participants.

According to the authors, **economic dynamics in modern societies are driven by three highly interconnected flow components: the flow of people, the flow of money, and the flow of information, so managing their interplay is crucial to developing the digital infrastructures needed to address the interlocking challenges of tomorrow.** However, the All-Government and Big Tech approaches championed by China and the United States, respectively, have both evidenced their flaws in enabling a truly thriving data economy. To ensure that these digital infrastructures can be sufficiently scalable, sustainable, and flexible, they propose a third alternative, DPIs, which hold the key to encouraging innovation and fostering competition by striking a balance between public and private sector interests.

In their paper, the authors lay out a conceptual framework for DPIs and explore the foundational components of India Stack, the country's revolutionary DPI platform. The solution epitomizes a paradigm shift in how nations leverage digital infrastructure to improve citizens' quality of life, enhance operational efficiencies, and foster innovation. Thanks to its minimalist design, interoperable components, and open networks, the platform has achieved widespread acceptance and encouraged the emergence of innovative use cases

Figure 4. India Stack's three layers





around each of its three layers: identity, payments, and data (see Figure 4). This, in turn, has resulted in a myriad of social and economic benefits for the Indian population, including greater financial inclusion, more efficient and transparent delivery of public services, and a fertile ground for innovation and entrepreneurship.

However, there has also been criticism about the likelihood of monopolization and weaponization, urging the government to introduce a robust regulatory framework to protect users' privacy and security. India's experience in building a DPI ecosystem offers valuable lessons for other countries looking to embark on a similar journey. These include **establishing a cohesive and collaborative relationship** between the government, i.e., the primary sponsor, and the various regulatory bodies; **delegating management to independent bodies** responsible for promoting the applications, maintaining the different platform components, and ensuring the regulatory guidelines are followed; **encouraging a high degree of private-sector participation**, to ensure the various components work together seamlessly and cater users' needs; and **keeping the technology architecture minimalistic and standards-driven** while embedding a techno-legal framework that inherently safeguards data privacy.

"Notwithstanding the inherent risks, a well-designed DPI ecosystem that builds interoperability and adequate safeguards for data governance and security can not only unlock the latent potential of the data economy but also enable fair and competitive marketplaces while ensuring the safety of all participating stakeholders."

—SHARAD SHARMA ET AL.

5. Towards a Safe Data Economy: Insights from Kimberly Houser (University of North Texas) and Susan Aaronson (George Washington University)

Lastly, to think about how to make the future data economy safe, we decided to delve into some of the legal considerations surrounding the current data policy landscape by conducting a couple of interviews with Kimberly Houser and Susan Aaronson, two experts on data governance and data protection.

According to them, transparency, accountability, and trust are three elements that are notoriously lacking in today's data economy. **We need more transparency about when and how data is used in order to increase accountability in cases of data misuse, which in turn will allow individuals and organizations to trust that their rights will be protected at all times.** This will require a much deeper understanding of data's long and complex value chains since, nowadays, we lose track of it almost immediately, making it difficult to attribute responsibility when something goes wrong. In this sense, both experts point to data brokers as the main culprits, since these organizations, which collect personal and industrial data and sell it to third parties for a variety of uses, rarely disclose how this data is treated. Their recommendation to policymakers is to regulate data brokers much more strictly, with special licenses limiting certain activities, and to encourage organizations to systematically conduct data transfer impact assessments and equip data protection authorities with enough resources to fulfill their mandates.

The lack of data literacy among the general public was also a common element in both Houser's and Aaronson's diagnoses, in that our hunger for information at our fingertips has made us more susceptible to privacy breaches and misinformation. Paradoxically, people often say they want to protect their online privacy above all else, yet their behavior rarely reflects this, as virtually no one bothers to read privacy policies when using online platforms. Rather than blaming the data subjects (i.e., citizens) for operating in the data economy without due diligence, however, the experts note that it is organizations that have a responsibility towards the broader society. The data economy should drive innovation and encourage competition, but the price must never be our privacy and security, they say, especially in the EU, where these are fundamental human rights.

How can these recommendations be operationalized? According to the authors, a stewardship model could go a long way in this direction. Houser, in particular, highlights the huge potential of data trusts, independent and neutral entities that act as intermediaries and administrators of users' data in a secure and responsible manner. Their goal is to protect users' rights and privacy through rigorous security controls and the assignment of clear responsibilities to the actors involved in data management, but the current legal regime around data use is not flexible enough to accommodate these solutions. Rather than trying to anticipate how a data trust should work and how it fits within the current law, she proposes a regulatory sandbox scheme to test data trusts and provide information for designing a workable data-sharing framework. This model would be ideal because it would allow to balance the rights of data subjects with the need for data sharing while giving policymakers a better understanding of how regulations should be crafted to support a data economy that is fair, competitive, and safe.

> "European innovation and the growth of the data economy require legal certainty, clear guidance, and a way to test out new data sharing mechanisms without fear of fines and litigation. However, these new mechanisms must protect data subjects and permit the sharing of data with those who can make use of it for public, social, and private good."
>
> — KIMBERLY HOUSER

MEGA-THEMES

Across our various papers and interviews, several horizontal lessons (or "mega-themes") emerged, evidencing the high degree of overlap across the many facets of the future data economy. From the elusive economics of data to the imperative for enhanced collaboration and greater data literacy, these mega-themes serve as a lens through which we can discern the interconnected nature of the opportunities and challenges inherent in this burgeoning world. By recognizing these overarching principles, we can better comprehend the bigger picture of the data policy landscape and lay the groundwork for a more coherent regulatory framework and a more robust social contract.

1. The elusive economics of data means thereis no one-size-fits-all solution.

The first horizontal lesson in our study is that not all data are created equal. As we have seen, data is not a fungible commodity that can be easily bought and sold, like oil or copper. Data can be rival and non-rival, excludable or non-excludable, personal and non-personal, and it can feature different utility functions depending on a range of economic and informational characteristics that vary widely from one actor to the next.

> As such, optimizing data flows defies the sort of one-size-fits-all solutions that policymakers tend to search for in other domains, requiring instead a more nuanced, case-by-case approach that can be difficult to come by in our rapidly changing world.

The challenge lies in striking a delicate balance. On the one hand, data must be accessible enough to foster innovation, competition, and economic growth. On the other, it must be safeguarded to protect privacy, security, and consumer rights. However, the current data policy landscape is not conducive to such equilibrium. Quite the contrary, it is fraught with overlapping and contradicting regulations that hinder participation and leave no one's needs and interests fully satisfied. The fact that these regulatory frameworks vary significantly across industries and jurisdictions exacerbates these problems, as they create a patchwork of compliance requirements that stifle interoperability, inhibit cross-border data flows, and impose prohibitive compliance costs on businesses. Moreover, this fragmentation fails to address other emerging challenges, like algorithmic biases, data asymmetries, and ethical dilemmas.

In striving for a fair, competitive, and safe data economy, we should make strides to classify data accordingly or at least provide exceptions to how some types of data are treated. Policymakers must therefore recognize the inherent complexity and diversity of data and adopt a pragmatic approach that balances the interests of different stakeholders while promoting innovation, protecting fundamental rights, and fostering trust.

2.More (and better) collaboration is needed to unlock the latent potential of data.

The second overarching lesson is that unlocking the latent potential of data requires a paradigm shift towards greater collaboration across all fronts.

> The intricate challenges pervading the data economy underscore the imperative for concerted efforts involving public and private entities, diverse sectors, and the general public.

Yet past efforts to increase data collaboration have been too scattered and uneven, depending on voluntary commitments and altruistic impulses that have hitherto failed to make data sharing more systematic.

The first area requiring attention is public-private cooperation. Public institutions design regulatory frameworks that, in principle, should ensure responsible data practices while incentivizing innovation, but as we have seen, navigating the intricate web of regulations in today's data economy poses a significant challenge for businesses, which are seldom adequately consulted. At the same time, the private sector holds vast amounts of data that public institutions need to tackle societal challenges, so the two have an interest in learning to work together and resolve their differences. For example, data gathered by companies such as Uber or Waze on traffic patterns and commuter behavior could aid urban planners in optimizing public transportation routes and reducing traffic congestion.

Second, there is a dire need for more cross-sectoral data-sharing frameworks, as they could help increase interoperability according to industry standards and generally make data more useful. Most importantly, however, combining data from different sectors has the greatest potential to deliver new services and experiences for people and businesses. For instance, by integrating data from things like healthcare, finance, transportation, and retail, businesses can gain enhanced insights into consumer behavior, preferences, and trends, and even develop entirely new products and business models, like how the integration of healthcare data with wearable technology has led to the emergence of personalized health monitoring solutions. Yet, these partnerships are notoriously lacking across many highly compatible sectors, partly due to the lack of clear incentives in data collaboration initiatives but also because of an inadequate and siloed understanding of data development.

Lastly, engaging the general public in collaborative endeavors is crucial, since it would foster an increased sense of ownership and belonging that would engender greater acceptance of data-sharing initiatives. Building trust through inclusive dialogue and participatory decision-making would also empower individuals to better understand and assert their rights, which is crucial in such a fast-paced environment.

3. Greater data literacy is needed at all levels of society to make better decisions, manage risks, and drive innovation.

The third mega-theme in our study is that we need greater data literacy at all levels of society to navigate the complexities of the digital revolution and build a resilient, inclusive, and innovative data economy.

> A more nuanced understanding of what data is and isn't would allow policymakers, individuals, and companies to make better decisions, manage risks more effectively, and harness the potential of data responsibly.

However, there is a pervasive lack of interest in data, evidenced by the persistently high barriers to greater data sharing, the insufficient awareness of available opportunities, and the inadequate resources, skills, and attitudes for spurring innovation.

For one, **policymakers** require greater data literacy to craft informed regulations that balance fostering innovation with protecting societal interests. Understanding the complexities of data ecosystems would enable them to anticipate emerging challenges, address regulatory gaps, and enact policies that promote responsible data practices while stimulating a competitive environment.

At the individual level, we have also seen the importance of data in helping **citizens** assert their rights, mitigate risks, and capitalize on the opportunities available in the digital age. Equipping people with the knowledge to navigate privacy settings, credibly evaluate information, and discern data-driven insights would give them the ability to understand the implications of their online presence and make more informed decisions in their daily lives.

Lastly, **the private sector** must cultivate data literacy among its workforce to capitalize on the wealth of data available to them. In particular, they need more data stewards who can identify opportunities for productive collaboration, extract actionable insights from seemingly endless data streams, and drive innovation across the board, as well as effectively manage data-related risks, ensure compliance with regulatory requirements, and enhance competitive advantage in an increasingly data-driven economy.

4. (Re)gaining social trust is critical to creating any sustainable data governance model

> The fourth and final horizontal lesson of our study is that regaining social trust is not only a moral imperative but also a prerequisite for the long-term sustainability and viability of data governance models.

Indeed, as much as optimizing data flows depends on incentivizing organizations to share their information and collaborate with other data holders, their success ultimately rests on making the case more broadly to the various stakeholders in society. However, contemporary challenges surrounding data literacy, privacy, and accountability cast a shadow over the promise of the future data economy.

One area of concern is the general lack of understanding of data and its implications among the public (see the previous mega-theme). Past scandals involving data breaches and misuse, such as the notorious Cambridge Analytica episode of 2018, have exacerbated distrust and fostered apprehension towards the entire concept of the data economy. Individuals fear the ramifications of pervasive surveillance, targeted advertisements, and potential manipulation through data-driven algorithms, which will inevitably limit our ability to unlock the full potential of data.

However, the "privacy paradox" adds complexity to this issue, as individuals often express concerns about their privacy but tend to exhibit behaviors that contradict these sentiments.[36] Information disclosure is mainly driven by risk-benefit evaluations, so to regain social trust, organizations should design user-friendly interfaces that explain the extent and purpose of their data collection in a simple and concise manner.[37]

Lastly, there is the issue of accountability. If data flows are to increase, then all stakeholders must be able to trust that all parties will uphold their responsibilities when it comes to how data is collected, stored, and used. In this sense, a robust regulatory framework that helps define legal limits and establish how breaches should be addressed would give the public greater confidence in actors involved in data sharing.

IMPLICATIONS FOR THE NEW SOCIAL CONTRACT

We believe that from these analyses, one can draw five major areas to develop a new social contract fit for the digital age (see Figure 5). They are all equally important and in a constant feedback loop, but perhaps the key is to start and end with a bottom-up approach, and this necessarily means promoting and fostering more civic engagement by all stakeholders: citizens, enterprises, and governments. Without this first step, the others are more difficult to achieve.

This requires **creating the right spaces and channels to enable this civic engagement.** We can start by using clear language with the citizens, both by the public administration and the companies themselves, and facilitating digital tools for citizen and customer participation. But beyond some more concrete policy recommendations that will be developed in the next section, it is crucial to highlight here some fundamental issues. It is important, for example, for countries to develop national data economy strategies. A roadmap on how to develop a fair, competitive, and safe data economy. And this necessarily means better public and private partnerships and a regulatory framework that allows for experimentation and constant flexibility and change. With the ubiquity and complexity of data in this digital age, it is important to constantly **re-imagine rights and responsibilities**. The citizen might now have the right to decide which of their data can be accessed, stored, and transferred. They might also have the right to transfer these data to another service provider under new conditions and safeguards, but these new rights might also come with new responsibilities in terms of sharing these data for the common good. This is valid both for citizens and companies, as well as for governments.

Figure 5.
What needs to be done to prevent social fracture?

The generation, storage, treatment, and usability of data also create asymmetries in power. In the data economy, there is a tendency for winner-takes-all dynamics. Massive concentration of power in a few (public or private) hands is always problematic and a bad symptom that should be addressed. We see this already with the current digital platforms like the GAFAM,[38] and a very similar pattern can evolve in the emerging field of generative AI. Policymakers might need to intervene to **stop these monopolistic tendencies** and force a more widespread sharing of data by those who control them. Sharing data is key to fostering more innovation and productivity, but, at the same time, this requires **fostering trust and accountability**.

Data collaboratives can be a way forward, but again, this might require a new profession: data stewards, which will be in charge of collecting the data that the company or public administration generates, how these are stored and treated, and which can be shared and under which conditions. As a society, we generate enormous amounts of data. The treatment of these data to generate individual and common goods and services brings with it great human and environmental costs. Thus, the more efficient the matching of demand and supply of data is achieved, the better. This is, without doubt, one of the big challenges of our time.

Finally, we have also learned in this work package that a new social contract needs to **protect human dignity and autonomy** in the digital age. This starts by acknowledging that what is illegal and immoral in real life is illegal and immoral also in the cyberspace. There should not be much space for grey zones and a-legal behavior. Privacy, transparency, and accountability should be assured. With the advent of AI, there will be more possibilities for attacking, supplementing, and manipulating the identity of others. With cyber propaganda and deepfakes penetrating our lives, it will also be more difficult to differentiate between the truth and invented, between right and wrong, and to navigate this new, complex hybrid reality, digital literacy and education will be key. Even so, being able to know how to best use our data will be difficult for both citizens and companies and therefore, the possibility of promoting data trusts should be seriously considered.

The aim needs to be to generate individuals and companies that are as autonomous as possible in the digital age. However, fair, competitive, and safe intermediation might be unavoidable, given the complexity of social life in the digital revolution.

RECOMMENDATIONS

RECOMMENDATIONS

Having understood some of the key elements affecting the data space and seen what key data policy experts have to say about them, the final piece of the puzzle is to reflect on the set of recommendations that policymakers might consider in order to ensure that the future data economy fair, competitive, and safe. Our current data landscape is fraught with injustices and inconsistencies, as well as power imbalances, barriers to entry, and risk hazards that have made navigating this complex world a difficult task. And yet, the current environment has also spawned many collaborative efforts, with honest reformers seeking ways to unlock the latent potential of data for individuals and businesses.

As we have seen, solutions in the data-driven economy are not created by simply replicating the old way of doing things but by collaborating with the public, private, and third sectors to seek radical ideas that might solve our intractable problems. If we are to create a fair, competitive, and safe environment, we must embrace these radical ideas for positive change and be willing to reconstruct what we see and act otherwise.

FAIR DATA ECONOMY

1. Build broad coalitions and consider the needs of all participating stakeholders with a shared 'will to act.'

A fair data economy is one in which the rights of individuals are protected, and the needs of all stakeholders are considered.

> Our first recommendation for policymakers looking to steer inclusive data development is to engage relevant stakeholders, build broad coalitions, and find common ground, in the hope of creating a shared 'will to act' that will help public and private sector organizations orient action and assess progress.

This 'will to act' simply describes the direction in which participants believe the data economy should develop in order to reach their desired objectives, and it can be as modest as a mission statement which lays a shared vision of what the future should look like. Based on their analysis of the current state of the data economy in Finland, for example, the participating organizations in Sitra's National Roadmap for a Fair Data Economy project compromised on one simple statement that helped kickstart a collaborative process in which everyone felt represented. Their 'will to act,' which focused on renewing business, strengthening productivity and prosperity, and achieving positive environmental impact, could serve as a blueprint for other jurisdictions looking to replicate their success.

2. Identify strategic priority areas and set concrete goals with accountable parties and measurable actions.

Having established a common 'will to act' to provide a general sense of direction, the next step in building a fair data economy would be to **identify strategic priority areas with a high degree of economic and social impact and set concrete goals with accountable parties and measurable actions to enhance situational awareness.** This would allow for a much more inclusive exercise, as it would ask the participating stakeholders to select the areas where they believe change is most urgently needed and to set aspirational goals according to their own understanding of the key enablers and challenges, thus promoting a greater sense of ownership and belonging.

For example, one such priority area could be "transforming businesses," with the desired goal of ensuring they are equipped with the skills to leverage data to improve their operations, establish new partnerships, and create shared value. Another could be to "develop human-centered services," in order to support people's lives and digital rights and deliver positive social change. Responsible parties would then be chosen among the participants to propose concrete actions to advance development in this area and be entrusted with the task of identifying key performance indicators, mobilizing resources, and measuring outcomes.

3. Address existing imbalances in data markets and create a more equitable distribution of data-derived value and risk.

A fair data economy should also welcome companies of all shapes and sizes and provide them with equal opportunities to succeed. Many local data economies still face unfair competition practices from large enterprises, particularly Big Tech companies, which dominate startups and SMEs and hoard massive amounts of data to the detriment of the public good. However, as explained below, large companies also face unfair conditions in the current data economy, as regulators can sometimes place burdensome requirements on them under the assumption that, because of their size, they can deal with the increased costs and complexities associated with regulations such as the Data Act. Instead, data markets should strive for a more equitable distribution of both data-derived value and risk, with rules that are proportionate to the size, complexity, and administrative capacity of the different players.

> Policymakers should, therefore, address existing imbalances and keep fairness in mind when designing tomorrow's regulatory frameworks.

This means ensuring that larger players do not abuse their dominant position (as enshrined in the DMA)[39], opening opportunities for smaller players by getting large companies to release some of their data (as enshrined in the DA)[40], and redefining rights and responsibilities to get these smaller players to share some of the risks.

4. Ensure individuals are not left to fend for themselves against injustices and give them real choice in the digital services they use.

At an individual and community level, data hoarding practices harm privacy and can sometimes lead to violations of data protection rights, but due to the limited options for alternative digital services, people often struggle to enforce their digital sovereignty. For example, ChatGPT stores copious amounts of users' data without explaining how it is used and who gets to see it nor giving people the option to consult, rectify, or eliminate it; a practice that is worryingly common in the industry.[41] In a fair data economy, individuals should not be left to fend for themselves against law-breaking companies, and they should have real choice in the technologies and digital services they use. In part, these issues could be solved by the market, for example, by promoting competition and allowing new players to cater to the needs of dissatisfied individuals (see below). That would increase innovation and diversity among digital service providers and give people a wider range of options to choose from. However, the underlying problem is that today's data economy strictly serves people as customers instead of citizens.

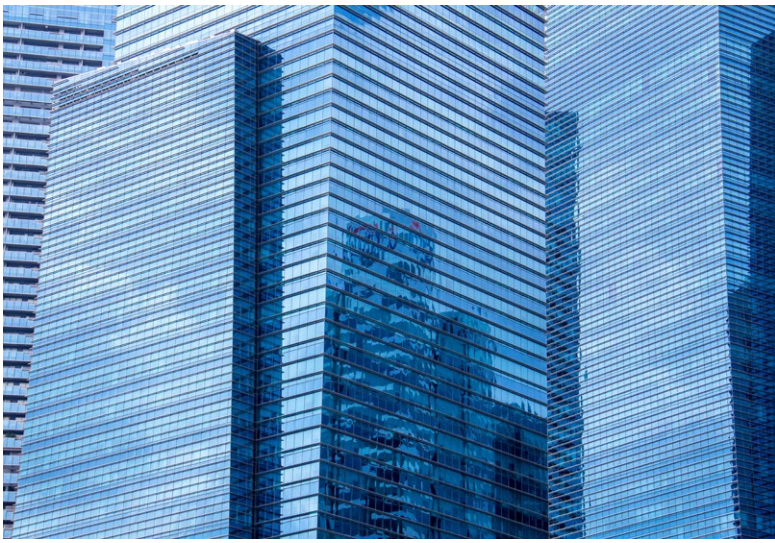
> Policymakers should, therefore, enshrine people's digital rights with robust regulatory measures that protect citizens from injustices and give them meaningful control over their digital experience.

These regulations should guarantee individuals' right to privacy, security, and autonomy and include measures to enhance transparency and accountability in data practices.

5. Devise these data strategies at the company, community, and state levels and continuously develop them in a collaborative manner.

Finally, these recommendations should take shape in the form of official data strategies at the company, community, and state levels to systematize the lessons from effective collaboration and guide future endeavors to support inclusive development. The tools and processes conducive to a fair data economy are harder to ignore when they are enshrined in a formal data strategy that everyone is supposed to follow, and they can provide a basis for subsequent reforms as technology develops and certain policies need to be revisited. Indeed, much like the European strategy for data has set in stone the principles guiding the development of the EU data economy, others could benefit from having a roadmap to go back to as they move forward. Moreover, if these strategies are treated as an ongoing process and are updated in a collaborative manner, they will continue fostering a sense of ownership among the various stakeholders involved, which will increase overall satisfaction.

> Policymakers should thus acknowledge ambitious collaborative efforts and nurture them to sustainability, in the hope that these formal data strategies will become part of the future data economy's long-term development.



COMPETITIVE DATA ECONOMY

6. Create an enabling regulatory framework by leveling the playing field and increasing legal certainty for organizations participating in the data economy.

A competitive data economy is also one that is open to businesses of all shapes and sizes and provides equal opportunities for success.

> Policymakers looking to increase competition and drive innovation should start by creating an enabling regulatory framework that fosters a level playing field and provides organizations with a high degree of legal certainty.

Such a framework would probably include measures to address monopolistic behaviors, promote market access for new entrants, and encourage entrepreneurship, but it would also need to ensure these measures are clear and predictable enough to provide decision-makers with the confidence to invest knowing that they will continue operating within the established legal boundaries. This requires a delicate balancing exercise, as policies would need to be flexible enough to adapt to technological advancements and evolving market dynamics but coherent enough to avoid creating duplications, contradictions, or inconsistencies. In this regard, India's techno-legal approach, which combines technical frameworks along with regulations, provides an interesting case study, as it has purportedly created a data empowerment and protection architecture that has given companies a fertile ground for innovation while giving users greater control.[42]

7. Clarify incentives to increase data sharing and consider introducing compensation mechanisms for companies leading collaboration efforts.

As we have seen, the lack of clarity around incentives is one of the major impediments to greater data collaboration. Data holders incur costs in collecting, processing, and maintaining data, and while they may recognize the value of sharing that data for the greater good or to foster innovation, they also expect fair compensation to (at least) cover the expenses associated with making that data available. Without adequate compensation mechanisms, there is little incentive for them to willingly share their data or even to collect it in the first place, potentially hindering future data-driven innovation.

> Policymakers should, therefore, consider introducing market-driven compensation mechanisms to recognize the value of data and incentivize collaboration efforts, and include provisions for reinvestments and innovation to ensure that organizations sharing data enhance their capabilities over time.

While monetary incentives are one approach, policymakers should also consider non-monetary incentives such as the 9Rs framework, which emphasizes the benefits of reciprocity (gaining access to complimentary datasets), reputation (enhancing the image of a socially conscious organization), and rectification (improving data quality by allowing others to look at your data) for companies making their datasets available for societal purposes.[43]

8. Promote standardization to address the pervasive challenge of interoperability.

Another barrier in today's data economy is the pervasive lack of interoperability for data reuse. The ability of different organizations to seamlessly exchange and use data is critical for unlocking the full value of data, especially across different sectors, but the absence of standardized formats, protocols, and interfaces casts a shadow over the promise of a competitive data economy. Market-driven approaches could leverage the expertise of industry participants to identify and prioritize standardization needs based on market demand and technological trends, but they would require a high degree of collaboration that is somewhat lacking in today's data markets. An alternative option could be the DPI approach championed by India, which has provided a minimalistic and standard-driven technology architecture to make it easy for all players to communicate using the same protocols. Regardless of the sponsor, however, **these standardization efforts would need to lower barriers to entry, foster competition, and drive innovation by enabling organizations to focus on product differentiation rather than market access.** By doing so, policymakers could create a level playing field where companies of all shapes and sizes could compete based on the value they provide rather than their ability to generate data.

9. Invest in data stewards to increase companies' ability to recognize opportunities for collaboration and respond to external data requests.

One of the most important factors in effective data collaboration, and thus a more innovative and competitive data economy, is having individuals or teams specifically empowered to initiate, facilitate, and coordinate data collaboratives, otherwise known as data stewards. These data stewards have the requisite expertise and authority to identify opportunities for productive collaboration and respond to external data requests, but they have been largely ignored by companies with an inadequate and siloed understanding of data development, which have instead limited all data-related activities to a Chief Data Officer (CDO). However, these roles are not mutually exclusive. Data stewards help systematize the process of partnering and community engagement, monitor and assess the value, potential, and risk of data held within organizations, and nurture data collaboratives to fruition, bringing huge economic and social benefits for companies leveraging their potential, so they should be seen as complementary to CDOs.

> Policymakers should, therefore, support data stewardship and invest in their formal training and development with executive education programs, as well as incorporating data stewards into the public sector for their own data collaboration efforts, thus setting the example for others.

10. Create monitoring tools to measure how local data economies compare against EU and global standards and identify areas of improvement.

A final lesson for policymakers is that if we want to create an innovative and competitive data economy, we must become more data-driven about data. Both public and private sector stakeholders need a more accurate and predictive view of data economy trends to better plan and develop their activities and capacities, but they often lack the resources to gather huge amounts of data and create internal models themselves. Against this backdrop, **policymakers should encourage the creation of adequate monitoring tools to provide up-to-date information, measure how local data economies compare against EU and global standards, and identify areas of improvement.** This would support decision-making by businesses, developers, and governments, as more people would have access to relevant information, and act as a collaborative platform to build the knowledge base and update measurements and indicators according to stakeholders' different needs. Indeed, as the example from Finland shows (see Sitra's paper), such tools could be built in an open-source format to help further develop them in a collaborative manner, taking into account links with national development programs, strategies, and policy objectives.

SAFE DATA ECONOMY

11. Increase data literacy to help individuals safeguard against intrusive surveillance and misinformation and exercise greater control of their data.

Finally, a safe data economy should protect industrial data from unauthorized access, breaches, and cyberattacks and ensure that personal data is handled in accordance with privacy regulations and ethical principles. A primary recommendation for policymakers would be to empower individuals with a deeper understanding of their data and its implications to safeguard against intrusive surveillance, misinformation, and other risks. Although robust regulatory measures are necessary to limit what companies can do with people's personal data, increasing data literacy is still essential, as it allows individuals to actively protect their privacy and security in the digital age.

> By educating citizens on how their personal information is collected, used, and shared, they would be able to make more informed decisions about the digital services they engage with.

Moreover, this would allow individuals to better recognize and mitigate potential risk hazards associated with data sharing and online interactions, like phishing, identity theft, and attempts at spreading misinformation. Policymakers could promote data literacy initiatives through educational programs and public awareness campaigns to help individuals navigate the complexity of the current data landscape more effectively.

12. Make extensive use of Personal Information Management Systems (PIMS) and Privacy-Enhancing Technologies (PETs) to allow individuals to make informed decisions about their data and make potential violations impossible by design.

Beyond the promotion of data literacy, another way to empower individuals to exercise greater control over their data and protect themselves from intrusive surveillance is to promote the widespread adoption of PIMS and PETs. The former allow individuals to decide how their data is collected, stored, and shared, by providing them with tools and mechanisms, such as data encryption, access controls, and consent management functionalities, to manage and protect their information more effectively. The latter, in turn, enable organizations to leverage data for analysis and decision-making while preserving individuals' anonymity using techniques like differential privacy, homomorphic encryption, and anonymization algorithms.

> The widespread use of such technologies would allow policymakers to create a safer data ecosystem where potential violations are impossible "by design," and if Europe can gain a competitive advantage in their development, they could become a potential source of jobs and economic growth that would bring great benefits to the EU large.

13. Establish a social license for data reuse to help stakeholders trust that all parties will uphold their responsibilities in data protection.

As we have seen, the element of trust is essential to enable a healthy data economy.

> However, as much as optimizing data flows depends on getting data holders to share their datasets with others, their success ultimately depends on establishing a clear set of standard practices and procedures for the subsequent use of data that was collected for one purpose for an alternative one with positive social and economic impact; otherwise known as a "social license" for data reuse.[44]

Many people and businesses do not want to share their data because of a pervasive lack of trust in the system, which is rooted in fears that we have hitherto failed to mitigate. These concerns are legitimate, but in the future, we are going to need more data to drive innovation, generate growth, and solve public problems. Transparency, open dialogue, and a new social contract are good places to start, as are explainability and data literacy. However, policymakers also need to consider more tangible measures, such as stricter regulatory requirements on data brokers, compulsory data transfer impact assessments, and well-endowed data protection authorities. Enabling data trusts under a stewardship model would also be ideal, as it would allow organizations to use data without fear of fines and litigation while providing people with a certain level of trust that their data will be protected.

14. Design liability frameworks to properly identify responsibility in cases of data misuse.

Closely linked to the element of trust is the equally crucial issue of accountability. To be able to trust that all parties will uphold their responsibilities when it comes to how data is collected, stored, and used, we need to be able to trust that if something goes wrong, the responsible party will be held accountable. However, identifying liability in case of data misuse can be exceptionally hard, not least because data value chains are long and complex, especially when they involve different jurisdictions.

> In response, policymakers should design adequate liability mechanisms to track how data is transformed across its life cycle and identify the party at fault, as well as establish market-driven dispute settlement mechanisms to quickly find remedy.

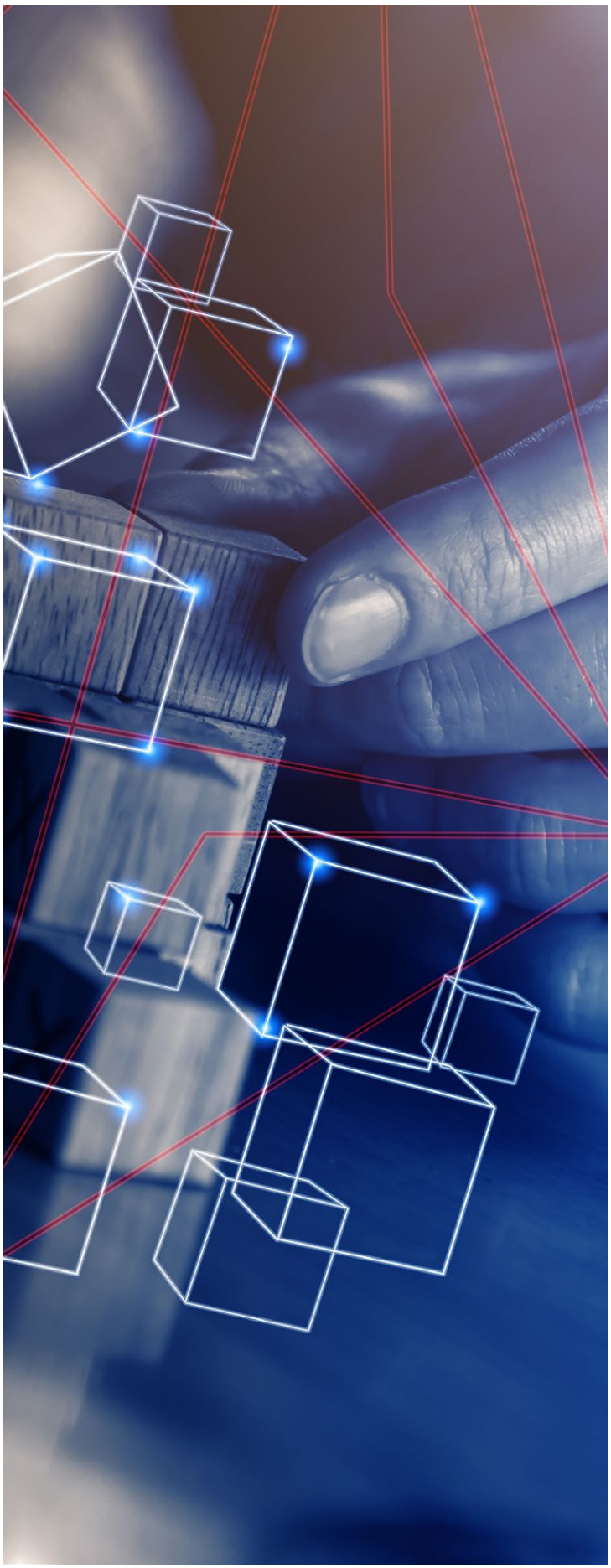
This is particularly relevant in the face of new European regulations that mandate certain enterprises to make their data available to third parties in case of emergencies or simply to increase competition. Naturally, if those third parties handle that data irresponsibly, we should not punish the organization that made the data available, at least if they were mandated to share that data in the first place. But that punishment should be strong and swift enough to prevent future wrongdoings.

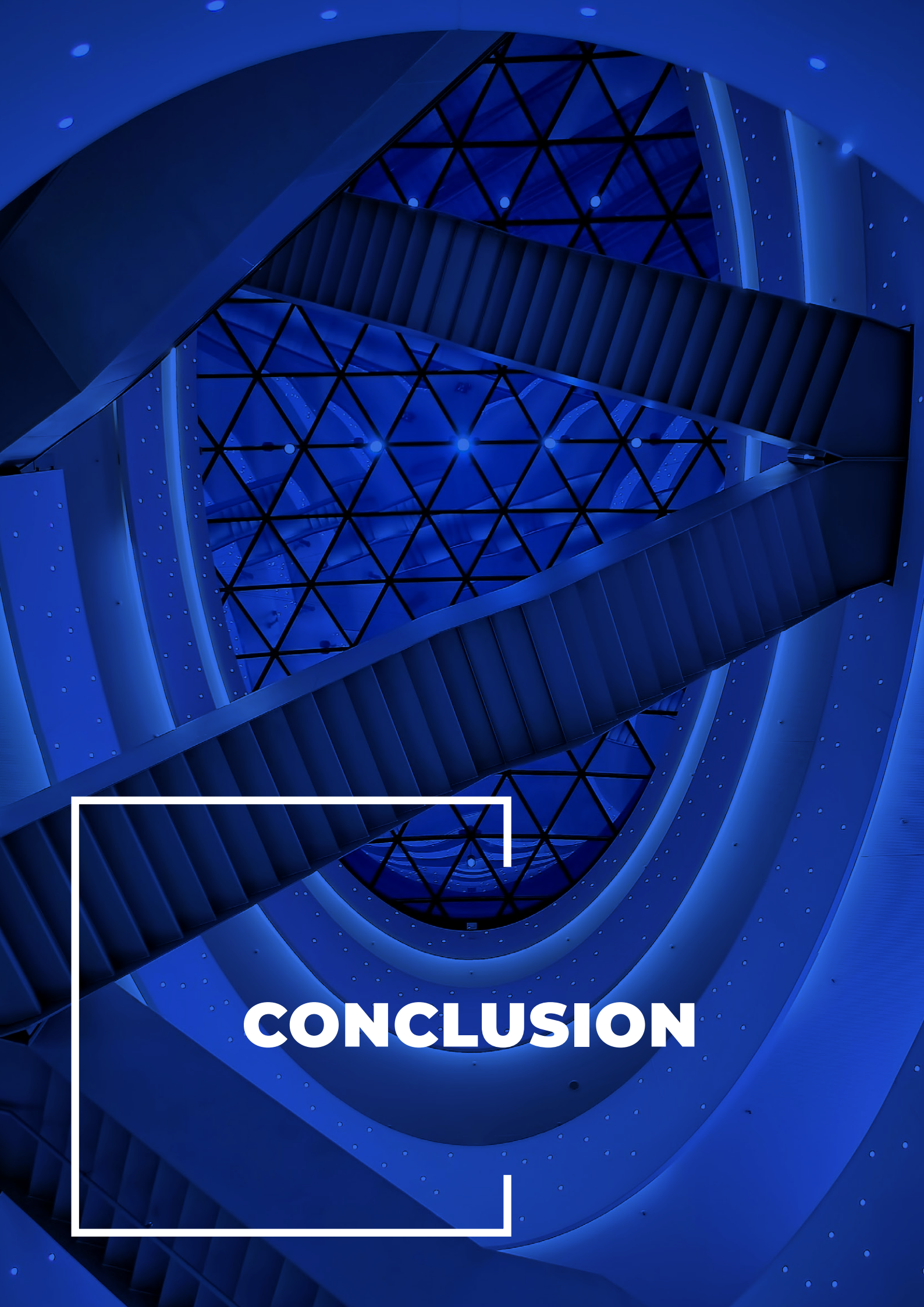
15. Develop a risk-based approach to data transfers that envisions data protection measures that are proportionate to the risk at hand.

Cross-border data flows are a particularly sensitive area for policymakers because of the regulatory differences between jurisdictions, which can sometimes become a potential source of risk. The EU, for example, has a strict data protection framework that many other countries do not, so when companies move data outside the Single Market, they are often required to apply stringent security safeguards to protect that data from being manipulated or otherwise misappropriated abroad. However, in recent years, the EU has mostly dictated a 'zero-risk' approach, which can sometimes be both extremely costly and restrictive for organizations operating across jurisdictions. Indeed, not all cross-border data flows need to be treated as strategic or sensitive, as it could hinder the potential for innovation and put certain companies at a competitive disadvantage.

> Instead, policymakers should move towards a risk-based approach that envisions proportionate data protection measures depending on both the scale and probability of the risk at hand.

This more flexible and pragmatic approach would provide much-needed relief for data controllers and processors and still guarantee the safety of European data.[45]





CONCLUSION

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While the first work package in our multiannual research project on the "Digital Revolution and the New Social Contract" focused on the wider understanding and analysis of the digital economy—with eight research papers that covered broader questions around regulation and foresight, AI, national digital strategies and crypto, and the digitalization of SMEs, skills and the digital gap between the rural and urban areas—in this second work package we have tried to be more targeted and dissect the data economy only with five papers. We believe that this allowed us to analyze the key question of how to create a fair, competitive, and safe data economy in more depth. We also think that we achieved our objective by first having a conceptual understanding of data, then exploring the possibility of deploying data collaboratives for a more competitive data economy, understanding how a fair data economy can be generated by the participation of all relevant stakeholders in our society, analyzing how public digital infrastructure might be needed to achieve this aim, and, finally, finding out how a safe data economy could be constructed.

This has been an extraordinary journey, and we have learned a lot, starting with the realization that the current economy based on data (as they are generated, stored, treated, and used to date) might be a quantitative and qualitative watershed in the evolution of mankind. This is why we have called our research project "the digital revolution" from the start because it is, indeed, a revolution. After analyzing the possibilities for a fair, competitive, and safe data economy, we have discovered **four mega-themes**, which can be summarized in the following statements.

01/ The elusive economics of data means there is no one-size-fits-all solution. Customization and adaptability are key.

02/ More (and better) collaboration is needed to unlock the latent potential of data. This needs to be done between and within the private sector (including cross-sectoral collaboration) and between the private and the public sectors.

03/ Greater data literacy is needed at all levels of society to make better decisions, manage risks, and drive innovation. This is key to achieving autonomy of individuals, companies, and governments in the digital age, but perhaps professional intermediation is also necessary.

04/ (Re)gaining social trust is critical for creating any sustainable data governance model. This should be achieved by better and smarter regulation and civic behavior on the basis of more accountability.

All of this has implications for the formation of a new social contract for the digital age, which we think should be based on **five key goals** that need to be understood and envisioned in a feedback loop.

#1 Enable civic engagement;
#2 Re-imagine rights and responsibilities for this new era;
#3 Balance power dynamics in the digital domain;
#4 Forster trust and accountability; and
#5 Protect human dignity and autonomy in the digital revolution that we are experiencing.

This is not easy to achieve, but on the basis of our analysis, we propose 15 recommendations, five for each realm, to achieve a fair, competitive, and safe data economy.

Still, there are some open questions that we have not been able to answer. The first, and perhaps most important, is: who owns the data? There is no clear answer to this question because, as we repeated throughout this report, data come in many different forms, and individual data can be ours, but they are worthless on their own. It is the sum and scale of data and its treatment and application that give them value. This brings us to the next big question; Whether we have put in place the best regulation and incentives to promote the sharing of data on a mass scale and across sectors, which is where the biggest potential for productivity growth lies. We propose data collaboratives, data stewards, data trusts, and smart regulation with sandboxes to achieve this. But is it enough? And, finally, there is an even bigger question. How does geopolitics affect all of this? Can the EU afford to be more ethical and stricter than the US, China, and India in the regulation of the data economy without undermining its competitiveness? Is the Brussels effect still having the influence of the past? Can the EU be a big player without having big player companies in the digital age? Are there asymmetries in the generation, storage, treatment, and deployment of data worldwide that undermine the strategic autonomy of the EU? These and other questions related to the geopolitics in the digital age will be the focus of our next and third work package.

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