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datum  
future



**Opportunities and Challenges**  
Navigating the new world of data

The history of humankind is the history of the transformative powers of technology. In devising new ways to do familiar things, we sometimes trigger deeper change. Private cars not only shortened journey times; they also reshaped cities, work patterns and family structures, altering both our relationship to the environment and the environment itself. The impact of digitisation has been at least as profound, a dizzying and ever-accelerating process of disruption and innovation.



The digital revolution is still in its infancy, yet already it has upended many of the precepts of the analogue world, forging products and services not by moulding plastic or riveting metal, but out of the raw material of human existence—personal data. The expanding capabilities of data-driven technology are already delivering opportunities unimaginable even a few decades ago. Change this far-reaching rarely arrives without unexpected consequences, good, bad or, not infrequently, a befuddling combination of the two. As we grapple with the immediacy of digital transformation and datafication, we rarely take the time to scan further horizons or even know where to look. Technological change has dramatically increased flows of information while helping to undermine faith in the systems and institutions that told us the information was legitimate. Data in all its forms is multiplying, but trust in institutions that collect, handle and analyse data—and that's most institutions—is diminishing, not least because of institutional missteps, malfunctions and, in the most damaging cases, malfeasance. In 2017 the Edelman Trust Barometer of 28 countries for the first time found a decline in trust across the board, in government, media, business and non-governmental organisations.

This reality simultaneously makes the debate around the impacts of data-driven technologies more urgent and more difficult. The global companies that last year approached me to lead a new initiative to examine the evolving opportunities and challenges created by data-driven technologies understood the business imperative of taking ownership of those challenges. If businesses move in this space without due care, they create risks not only for others but for themselves. They acknowledged another imperative too. In a world of patchwork regulation and political turbulences, building an ethical, sustainable data environment relies on businesses doing more to ensure this outcome than is required of them by law.

This means not only identifying and adopting best practice, but also constantly updating their structures and cultures to reflect and anticipate changing realities. This means future-facing impact assessments and critical thinking around assumptions and received wisdoms, such as the notion that the gains in security offered by technology must come at the expense of privacy, which is not necessarily the case. This means sharing insights and opening up dialogues around sensitive issues. These are not things that always come easy to business. And so **Datum Future** was born, a new non-profit think tank, supported and deeply informed by its business members, and structured so that decision-making on the content and direction of initiatives and projects is independent of them, individually and collectively.

**Datum Future** was founded out of the conviction that the only way to ensure a better future is to engage in building it. And that the only way to realise the opportunities of the digital era – of big data, machine learning and artificial

intelligence, automation, connected devices and cities, cloud systems, distributed ledger technologies and many more emerging trends and capabilities – is also to understand and communicate such trade-offs as exist and to find ways to mitigate or, better yet, resolve them.

Many research-based organisations are already doing great work in these fields, and **Datum Future** will strive to highlight their reports and recommendations and to seek out joint projects and partnerships. What **Datum Future** offers in addition, whether in collaboration or in its own research and initiatives, is the ability to tap into the experience of its members and to foster vital discussions within and between them and other entities. The range of sectors represented by the eight founding members, Accenture, BNP Paribas, Experian, Facebook, Mastercard, Microsoft, Novartis and Publicis Groupe, reflects another fundamental shift. All global businesses these days are, in a sense, tech companies, with data ever more central to their activity.

This report, our foundational piece of research, maps the fast-evolving digital terrain. The research identifies five areas of maximum opportunity, Powerful Me, Healthier World, Protected Lives, Smart Cities and Brighter Economies, and associated challenges that could diminish or distort their impacts. The report also illuminates a roadblock that **Datum Future** will strive to dismantle: the fractured nature of the debate around data. There is confusion over what is meant by data and how it is created, collected and deployed. A more damaging disconnection arises in the nature of the discussion itself. Businesses, governments and regulators, scientists and technologists and individuals (who are sometimes, but by no means always, consumers) too often talk past each other. Joining up these conversations and breaking down the silos between and within these constituencies will enable the informed debate and decision-making essential to successfully navigating the path to a better future.

The interests of these constituencies sometimes converge and overlap, at other times appear in conflict. **Datum Future** starts from the principle that it is not only possible to balance the interests of businesses and individuals but essential for the future wellbeing of business, individuals and wider society that we do so.

I hope you enjoy the report.

Yours sincerely,  
**Catherine Mayer**  
Executive Director  
**Datum Future**

# Executive Summary

## Context

Personal data<sup>1</sup> is revolutionising how people live, work, relax and interact. The opportunities created by this transformation are multitudinous and profound: more vibrant economies, vastly improved health care, greater safety and security, enhanced individual agency and better ways to organise homes and cities.



The momentum of change is building. There is a surge in investment in data-related technologies such as artificial intelligence (AI), the internet of things (IoT), cloud systems and new distributed ledger technologies (DLT) including blockchain.

Data is already the lifeblood of the ever-increasing online sphere and is becoming ever more abundant as individuals generate personal data from an increasing number of connected devices.

Most private sector businesses and providers of public services are already digital. Others are making that transformation as fast as their ability to attract the necessary skills allows. As both public and private sector bodies embrace these changes, the wider social impacts are immense.

Such fundamental changes do not come without potential trade-offs. As data becomes central to so much human activity, the potential damage that can be wreaked by its misuse—wilful or unintended—is magnified, for individuals and at scale. Fake news and propaganda are used to try to game systems. The dangers of digital exclusion and algorithmic bias increase. Data sets used to train AI solutions may reflect and therefore risk entrenching existing inequalities because they are reflections of a world that excludes or marginalises certain groups. Human bias or lack of understanding of structural inequalities may then compound the problem if algorithms are built to take into account factors that disadvantage those groups.

Access to data technology varies across different economic and age groups, with some poorer and older populations shut out from growing areas of activity and opportunity. Behavioural differences also need to be better understood. Research suggests that younger generations are more relaxed about data sharing, for example, but it is not clear whether this is a cultural evolution or simply that younger people have less to lose from data falling into the wrong hands or feel that risk less acutely.

Understanding these issues and meeting the evolving challenges is essential to fully realising the substantial opportunities identified in this report. This requires taking a long-sighted view—one that extends beyond the typical planning horizon of companies and the electoral cycle of governments.

There is also an urgent need to recognise and address the fractures that diminish multi-stakeholder debate and undermine decision-making around data. It is not possible to have a meaningful discussion about the opportunities and challenges of a data-driven future without asking “opportunities for whom?” and “challenges to whom?” As the report reveals, the answers can look quite different for the different constituencies with most skin in the game: business, governments and regulators, science

and technologists and individuals impacted by the digital revolution—and that is pretty much everyone. Lack of a shared understanding of the benefits and risks that data is creating for each group will keep perspectives narrow and limit meaningful dialogue and progress.

Concerns also differ between countries, cultures and political systems. The concept of data rights cannot be divorced from human rights or the wide variations in the legal frameworks and institutions concerned with those rights. The regulatory environments in which global businesses operate also vary dramatically, from lighter-touch, risk-based data regulation (such as in the US) to areas where there is comprehensive horizontal data regulation such as the EU (encompassing cultures such as Germany that are particularly suspicious of data collection) and to countries that effectively nationalise personal data, such as China. This report focuses on Europe, North America and market economies in Asia.

The European Union’s General Data Protection Regulation (GDPR) has been a game changer. The subject of data governance has become a boardroom issue, businesses have spent heavily to meet their regulatory requirements and it has also helped to raise individuals’ awareness of their personal data and how it is used. These are welcome developments. It is too early to know how many businesses are compliant, how regulators will choose to enforce the new regulations and – most importantly – whether the new framework and the investments that businesses have made in response will deliver substantially better outcomes for individuals.

1. Personal data encompasses data which is volunteered by individuals, observed from their behaviour and inferred about them. See Personal Data: The Emergence of a New Asset Class, An Initiative of the World Economic Forum, January 2011

## Methodology and approach

This study set out to map the complex terrain of the data-driven world and to provide a framework for further research. Digital economy expert Ctrl-Shift conducted desk research and in-depth interviews with representatives of business, governments and regulators, the science and technology community and organisations representing the interests of private individuals. This work was tested by and against insights from Weborama's BigFish, a high-precision and high-scale semantic analysis tool, with iterative searches used to capture the divergent debates and concerns around data that happen online. Weborama is a strategic partner that works with Publicis Groupe, a Datum Future founding member. Datum Future founding members also gave interviews to Ctrl Shift and provided case studies.

The first stage of the research revealed significant consensus around core areas of opportunity for significant social benefit in five areas: health, security, individual agency, economic vibrancy and smart cities. These are the areas Datum Future focused on in further stages of this research and that will set the priorities for future projects.

But this process also confirmed deep disconnections in the ways these opportunities are viewed and discussed by the different key constituencies.

Later stages of the research drilled down into those opportunity sets and identified some of the potential trade-offs associated with each.

The relationship between the five major opportunity sets – Powerful Me, Healthier World, Protected Lives, Smart Cities and Brighter Economies – is depicted in the Opportunity Sets graphic generated by BigFish. As the image shows, these are not mutually exclusive—topics such as AI and the IoT transcend them all—but they are clearly distinct.

Powerful Me covers the expanding ways data enables individuals to find information, learn, make better decisions, participate, organise, automate tasks and customise services.

Healthier World is potentially the most transformative of the opportunity sets given its impact on life spans and quality of life. Already data technologies are leading to advances in public health, with better disease prevention, diagnosis and treatment and cheaper, more efficient and targeted provision. At the farther horizon is the possibility to extend healthy life spans.

Protected Lives identifies the potential for deploying data technologies to mitigate or prevent disparate large-scale challenges, from crime and terrorism to natural and man-made disasters, such as those created by climate change.

Smart Cities will be the testbeds for many of the opportunities included in other sets, aiming to deliver greater safety to residents, transform transport systems and options, improve environmental sustainability and boost civic participation.

Brighter Economies encompasses the economic potential of all of these other areas of data-driven innovation to spark further innovation, improve efficiencies, lower costs, create whole new industries and promote growth.

If the opportunities are clear, the challenges are also stark: to ensure that the prosperity created by data benefits wider economies and populations, not least by investing in the education needed to expand data literacy and expertise and to cushion those whose jobs are lost to automation; to resolve tensions between security and privacy and always to guard against unintended consequences such as digital exclusion, algorithmic bias and the potential manipulation of systems, thought and behaviours. The report identifies five key areas in which business can spearhead the push for the best possible outcomes.

## Recommendations

Unlocking the opportunities created by data in such a way that all parties share in the benefits requires co-operative responsibility—collaboration among different constituencies including businesses, governments, regulators and civic society institutions such as universities and organisations that represent the rights of individuals. This is a major challenge given they currently do not have a shared vision of the future opportunity or a common understanding of the potential trade-offs.

Creating such an understanding is clearly the provenance of government, but businesses should also take a lead role in forging a closer alignment across these constituencies. That starts at home. Global companies are alert to the challenges of internal communications, but need to work especially hard to ensure a joined-up approach to data across different job functions and departments.

They must also demonstrate commitment to working with governments and regulators, civic society and the science and technology communities.

Creating effective governance in the management and use of data is a collaborative process. Regulation helps to create a level playing field and make it harder for bad actors to prosper. But organisations also need to forge internal data governance frameworks that go beyond compliance and help to earn the trust of those whose data is being governed. This is particularly important when regulation struggles to keep up with technological developments, as is often the case. It is in the interest of business and governments to work together to ensure that good regulation is enacted and good data governance practices are embedded in organisations, so that together they achieve the goals of protecting individuals and enabling innovation.

Many of the opportunities identified in this report can be delivered by businesses going about their business. However, it is vitally important at the research and design stage to anticipate possible trade-offs, designing products and services to minimise and mitigate any negative impacts, for example by using privacy by design methodologies.<sup>2</sup> There are also some potential opportunities, such as privacy-preserving technologies, that currently appear too expensive to attract large-scale private investment and will get to market only through close collaboration with the academics and technologists working in the field. Many of the challenges around access to data for research are common to both businesses and academic institutions—solving the problem for one will help solve the problem for the other.

Engagement with consumer and citizen groups should also be given priority. Such groups are often proxies for the voice of the individual in this collaboration, trying to ensure that their needs are not forgotten or misrepresented. They also play a role in educating individuals about how they can use their personal data for their own or public benefit and guard against potential risks.

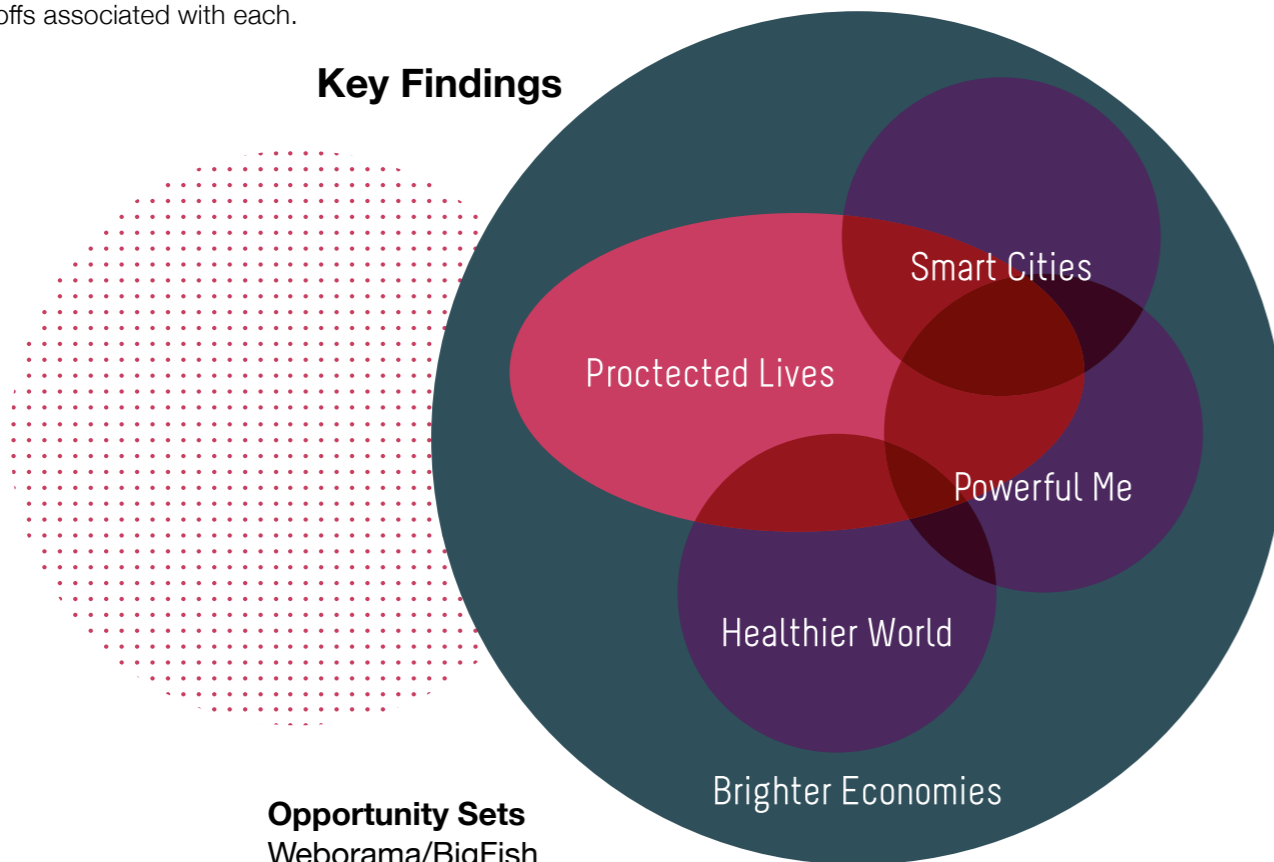
The risks look different for individuals and organisations. For individuals, concerns around personal data focus on the potential loss of security, privacy violations, discrimination, decisions based on inaccurate data and manipulation of thought and behaviour. These are mitigated when individuals are able to exercise control and perceive they are being treated with fairness.

Safeguarding user agency requires transparency, accountability and fairness on the part of the organisations with which individuals share their data. Organisations—businesses, research establishments, government departments—that fail properly to address these risks in the services they provide will suffer reputational damage and may be subject to regulatory sanctions.

But there are additional challenges for business. A continuing skills shortage in the field of data science, analytics and data management threatens to trim ambitions and increases the likelihood of missteps. Deepening public disquiet raises the prospect of regulation drawn so tightly that it restricts access to the data required for training algorithms, performing research and enabling innovation.

The core of all data services is data. This data may be as seemingly inconsequential as the character count in a text sent by a mobile phone, yet in combination with other data creates the picture of a person, their drives and desires, hopes and fears, behaviours and movements. This makes data a new unique, and uniquely sensitive, raw material.

## Key Findings



Opportunity Sets  
Weborama/BigFish

<sup>2</sup> For more information on privacy by design, Ryerson University has created a Privacy by Design Centre of Excellence

Any effective production process respects the characteristics of the raw material it is using, yet online products and services have not always reflected the sensitivities inherent to personal data. Greater balance is required between creating customer benefits in the form of frictionless user experiences or greater personalisation and mitigating potential vulnerabilities.

Unlike other raw materials, data can be used by multiple parties simultaneously and never be consumed—it is “non-rivalrous”. And unlike most materials, the use of data creates more data in the form of predictions, classifications and metadata—who used it, when and how. It is also non-fungible —one piece of data is not the same as another.

Yet corporate tradition has tended to see data as a potential differentiator—an information advantage yielding valuable competitive positioning in the information economy. This has led to market imbalances and data accumulating in silos, limiting the network value it can generate. For the full value of data to be unlocked, new business models are needed, based on sharing not stockpiling, and with greater transparency and interoperability, so data can flow to where it is most valuable.

Data sharing is not without additional challenges—data in motion provides further points of attack for bad actors. Data services need to both be safe and seen to be safe. Governments and regulators play a part in this, but there is also a role for business to implement governance that goes beyond the regulatory requirements. There is already some evidence of this with an increasing number of organisations focusing on data ethics and implementing principles, policies and standards that translate these ethics into everyday behaviours that beneficially impact customer or citizen experiences.

By defining, articulating and sharing good practice, opening up about the complexities they face and working closely with regulators, businesses can not only help create an environment conducive to their own work but also one that is supportive to the research community and civic society.

