



DATA MOBILITY:

The personal data
portability growth
opportunity for the
UK economy



/ Table of Contents

Introduction	3
Executive Summary	4
Report Overview	8
Approach	20
1 Setting the scene for data portability and mobility	23
2 Opportunities in personal data mobility	36
3 Core issues and challenges	49
4 Aligning the stakeholder engagement	60
5 Enablers - emergent solutions and relevant market activities	67
6 Demonstration of a framework for data-driven innovation	88
7 Conclusions	94
8 Recommendations	103
Appendices	107
Appendix 1: GDPR Article 20	107
Appendix 2: Data mobility: the digital charter and the industrial strategy	110
Appendix 3: Examples of potential data mobility enabled innovation	117
Appendix 4: Data mobility economic considerations	121
Appendix 5: Contributors and participants	145
Appendix 6: Data-driven innovation framework	148
Appendix 7: Design-led framework approach	154
Appendix 8: Desk research - reports reviewed	189
Appendix 9: Enabler's landscape	195
Appendix 10: Glossary	208

/ Introduction

This document is the final report on Data Mobility: the data portability growth opportunity for the UK economy, carried out for the Department for Digital, Culture, Media and Sport (DCMS) by Ctrl-Shift.

The aim of this study was to gain a better understanding of the potential of personal data portability to stimulate innovation and competition, and to develop a tool to demonstrate practical approaches to personal data portability.

The study has examined the opportunity presented by mobility in personal data; evaluated the key challenges in achieving this potential, and investigated the leverage to be gained from emergent solutions and relevant initiatives that could materially enable progress.

/ Authors

Ctrl-Shift

Ctrl-Shift is an innovation consultancy specialising in the strategic value of personal data in the digital economy.

We help organisations realise the transformational growth opportunity in trusted personal data by creating strategic, sustainable and practical solutions that enable them to deliver new value in people's lives.

For a decade Ctrl-Shift has been a pioneer, innovator and authority in the personal data economy. We have amassed a unique body of knowledge and insight which is at the heart of the services and solutions we provide to prominent organisations globally.

Ctrl-Shift has previously published reports on a wide range of topics relating to personal data. These include: Open Banking; Information Logistics; Next Generation Intermediaries; Personal Information Management Systems.

/ In the delivery of this study Ctrl-Shift partnered with two leading organisations in their spheres:

Normally

Normally is a data product and service design studio. They solve complex design problems for some of the world's largest organisations. In this study, Normally worked with Ctrl-Shift to apply a design framework approach to investigate how design-led techniques could support the efficient exploration and development of data mobility solutions.

London Economics

London Economics is a leading specialist policy and economics consultancy. London Economics worked with Ctrl-Shift to carry out economic research and modelling of the personal data mobility market.

/ Executive summary

DCMS commissioned innovation consultancy Ctrl-Shift to carry out this study to develop understanding of the potential that personal data portability holds for the UK economy.

Personal data lies at the heart of many of the most promising opportunities for business growth, consumer benefit, and public good in a fast-evolving digital economy. The GDPR has established data portability rights of the individual over their personal data, creating a firm legal basis for initiatives to promote economic and societal use of personal data. However, the GDPR does not address the requirements of either safe and secure data sharing or value generation from data portability that will be needed to realise the huge potential of personal data.

Therefore, the vision of personal data mobility described in this report goes beyond data portability as specified by the GDPR. Data mobility refers to a world where personal data flows safely and efficiently; where it can create maximum value with personal, societal and economic benefits distributed fairly.

A wide range of initiatives have been progressed which relate, in various ways, to different aspects of data portability and mobility. This study has assimilated relevant knowledge and insight from a broad spectrum of these activities to build a comprehensive picture of the current state of play.

This report lays out the current state of personal data portability and mobility in the digital economy and the potential of data mobility to unshackle personal data, and so stimulate new levels of innovation, productivity and competition.

This report concludes that action on personal data mobility can be a vital stimulus for the next major stage of growth in the digital economy.

Personal data mobility can drive fresh growth by creating an environment where empowered individuals can safely make valuable use of their personal data, and consent to its use by others in new data-driven services and technologies. In short, delivering benefit to individuals and organisations alike, with significant economic and societal gains.

There are however material challenges to be overcome in realising this potential.

A high proportion of personal data is locked in organisational 'silos' - limiting the scope of what the data can be used for, and by whom. Also, there are important systemic issues and market failures at the core of the digital economy (including data breaches, loss of consumer trust of how personal data is captured and used, and uneven sharing of benefits), to which any development of the personal data market must respond.

The GDPR legislation has been an important step in enshrining the data portability rights of the individual over their personal data. But it does not create the structures to support value generation from personal data. And importantly, there are new risks. In the absence of a safe and secure environment for the sharing of personal data, the new data rights that individuals have introduced new risks for both them and the organisations with which they interact.

The economic analysis estimates the impact from productivity and competition benefits enabled by personal data mobility at £27.8bn increase in UK GDP.

The contribution to GDP that digital innovation enabled by personal data mobility, is likely to be significantly greater.

Building on the extensive qualitative research, this study has, for the first time, codified the Core Issues that lie at the heart of the complex web of challenges to personal data mobility.

The Core Issues can be summarised as follows:

Core Issue 1: Infrastructure & Standards:	The need for common technologies, standards and services, reflecting a number of Key Challenges that repeat across the stakeholder groups. Progress on these will reduce the cost barriers and risks preventing businesses taking action on personal data mobility. And, by reducing risk for citizens will contribute to the success of the government's Digital Strategy.
Core Issue 2: Individuals' Know How:	Consumers have a lack of know how and understanding of the digital market, and limited knowledge about their data, how it is used, and how they could use it. This makes the individuals vulnerable to abuse and lacking in the skills to access the opportunity.
Core Issue 3: Adaptive Regulation:	Well-functioning markets require strong regulation and legislation. To match the pace of change in a fast-moving developing market such as personal data mobility, regulators and government need new levels of knowledge, skills and adaptiveness to ensure successful market development at pace.
Core Issue 4: Services & Applications:	There is a lack of services and applications that enable Individuals to use personal data to create value for themselves and others. These fall into two categories: Personal Data Management Services, and Personal Information Management Services comprising Decision Support Services and Life Management Services.
Core Issue 5: Incumbent Business Case:	There is not a clear, or compelling enough case for business to embrace personal data mobility with measurable costs and risks created largely by Core Issue 1 & 2. There is a lack of proof points for the innovation opportunity.

The Core Issues analysis delivers two key outcomes. First, it clarifies understanding of the multiple connected risks and consequences of personal data mobility challenges. Secondly, it forms the basis of a co-ordinated and practical development agenda for the successful realisation of the benefits of personal data mobility.

Stakeholder engagement will play a critical and central role in the development of personal data mobility, which will require strong coordination.

The multi-faceted and interrelated nature of the challenges to personal data mobility emphasise the need for active continuous participation from stakeholders.

There are inevitably barriers to achieving this, with conflicts in the motivations of the potential stakeholders including learnt behaviour, existing competitive positions and existing revenue streams.

To achieve the engagement necessary, it is essential to understand the differing motivations of the key stakeholder groups. This study has informed this by examining stakeholder motivations specifically around the impact of the key challenges to personal data mobility – providing valuable input to the development of an effective stakeholder engagement plan.

In the market there are multiple emergent solutions and relevant initiatives that can enable and inform the development of personal data mobility, but none of them approach complete, scalable solutions - there are no quick fixes.

The UK is currently seen as a global leader in data-sharing and usage initiatives, such as Open Data and Open Banking, and in the development of Personal Data Management Services (PDMS), each of which have emergent solutions that contribute to the development of personal data mobility. The UK is therefore well-placed to consolidate and extend this lead, leveraging advanced insights, technologies and capabilities.

However, activity in the market is far from coherent and investment is patchy - varying in depth and pace. If this approach were to continue, and personal data mobility is not deliberately and coherently addressed, it could result in only sporadic development of a high potential market restricting the growth opportunities and potentially creating new challenges.

A Directed Innovation Framework demonstrator was developed to show how the challenges to personal data mobility could be approached using a data-driven approach, focused on creating value for individuals.

The study included the development of a new framework for demonstrating how a 'Directed Innovation' approach can be effective in creating solutions to Core Issues and challenges in personal data mobility.

The Directed Innovation Framework achieves this by blending a rigorous consumer-value-focused analytical approach, together with agile thinking, enabled by design-based techniques.

The key outcomes were:

- Demonstration of new consumer value opportunities and personal data mobility.
- The effectiveness of a Design Jam approach in bringing together multi-disciplinary teams to explore challenges.
- Analysis of the Design Jam output as guiding principles for the design of data mobility enabled services.
- Demonstration of the use of a design Intervention Stack, to determine intervention for the design of the data mobility market.

The Directed Innovation Framework has been validated to a level which demonstrates the merit of its further development to become an effective tool in the delivery of personal data mobility.

The outcomes from this study provide the foundation for a practical personal data mobility market development agenda.

In determining the Core Issues structure, and understanding the leverage to be gained from relevant market initiatives and emerging solutions, the outcomes from this study provide the foundation for meaningful progress on the development of the personal data mobility market.

The main elements of this are:

1. **Establishment of a personal data mobility Coordinating Entity (CE)** – a body which will facilitate and coordinate the delivery of the personal data mobility market. Fully empowered and with the authority and capacity to drive effective collaboration across a diverse stakeholder group. To achieve this, government would have involvement, either in a leading role, or providing active strategic support.
2. **CE-led personal data mobility development agenda** – focused on Core Issues 1 (Infrastructure & Standards), 2 (Individuals' Know how) and 3 (Adaptive Regulation), which cannot be resolved by individual organisations, and which will focus on making the market safe, and easy to operate within.
3. **Business-led personal data mobility development agenda** – focused on the Core Issues can only be led by business: Core Issue 4 (Services & Applications) and Core Issue 5 (Incumbent Business Case), which deliver value to individuals, organisations and the economy.

The development agendas can enable purposeful progress towards the realisation of the significant opportunity offered by personal data mobility - creating better outcomes for individuals and organisations alike, and becoming a major contributor to the growth of UK economy in the 21st century.

This report makes three major recommendations which directly support the progression of the personal data mobility development agenda

- **Recommendation 1:** Create the personal data mobility Coordinating Entity (CE). The Coordinating Entity requires the following characteristics to be successful:
 - Empowered – have teeth or have the resources to teeth the enforcement of action.
 - Commercially independent.
 - Impartial – be known to be unbiased.
 - Have capacity and funds to support engagement.
 - Be able to coordinate across sectors.
 - Have market authority – strong skills and knowledge and with the capacity to drive the coordination required.
- **Recommendation 2:** Progress priority items from the CE-led development agenda across the Core Issues of Infrastructure and Standards, Individuals' Know How and Adaptive Regulation:
 - Early intervention in three critical Infrastructure and Standards Key Challenges, Safe Data Sharing, Liability, Interoperability.
 - Raise individuals' know how through prominence in related government and regulatory communication activities, work with organisations such as Which?, Consumers International and Doteveryone to design know how development.
 - Create a structure for the development of Adaptive Regulation. Work with innovators and regulators during policy development.
- **Recommendation 3:** Progress priority requirements from the business-led development agenda around the Core Issues of Services and Applications and Incumbent Business Case:
 - Design with industry, how government can best support market development.
 - Support the development of applications and services.
 - Promote the use of the Directed Innovation Framework for use by business.
 - Enable use of government data to support the development of personal data mobility and recombinant innovation.

/ Report overview

1. This Study

Personal data mobility is a complex, multi-faceted and fast-evolving subject that offers great benefits for the economy by enabling innovation and growth. Data mobility goes far beyond data portability as envisaged by GDPR, enabling empowered individuals to safely and easily permit and control the free flow of personal data, to deliver material and on-going value.

This study has assimilated knowledge and insight from business and government leaders, subject-matter experts, and from a broad spectrum of market initiatives that relate to data portability and mobility. From this we have developed a comprehensive picture of the current state of data portability and mobility. Building on this research, the objectives of the study have been to:

- Understand the consumer, business, economic and social opportunities presented by mobility in personal data;
- Evaluate the core issues and underlying key challenges in achieving this potential; and
- Investigate the leverage to be gained from relevant initiatives and tools that could materially enable progress.

All with the aim of determining purposeful recommendations that can form the basis of coordinated action towards the successful realisation of the benefits of personal data mobility.

Research and insight development. In Part 1 of the study we applied Ctrl-Shift's Personal Information Economy research methodology which included:

- Activating our global expert network through a series of structured interviews with senior representatives, covering all key stakeholder groups
- Extensive desk research, applying our broad knowledge-base of relevant data mobility initiatives and the Personal Information Economy to capture key insights
- Economic review: London Economics carried out an economic assessment of the impacts of data mobility on innovation, productivity and competition; including an illustrative quantification of the potential value of data mobility to the UK economy

2. The Current Landscape: Personal Data, Portability and Mobility

Personal data lies at the heart of many of the most promising opportunities for consumer benefit, economic growth and public good in a fast-evolving digital economy. Its importance to the UK economy cannot be overstated.

2.1 Personal Data

The digital economy continues to grow at an extraordinary rate, with exponential expansion in the range and volume of personal data being created due to the proliferation of personal digital devices.

The recombinant and non-rivalrous characteristics of data (the ability to limitlessly re-combine it and never 'use it up' even when used by many actors) can enable a step-change in innovation and value creation. Personal data is also crucial to the success of two of the most exciting technologies - the Internet of Things

(IoT) will become an increasing generator of personal data and Artificial Intelligence (AI) an increasing consumer of it.

There are, however, material barriers to realising the great potential of personal data.

As the data market grew, organisations learned to see exclusive access to the personal data which they collect as a key strategic asset and source of competitive advantage. As a result, a high proportion of personal data is locked in organisational silos where only one organisation can access it - limiting the scope of what the data can be used for, and by whom.

Furthermore, as demonstrated by the recent Cambridge Analytica issue, there are important systemic issues at the heart of the digital data economy. These include: widespread data breaches; decreased customer trust of how personal data is captured and used; uneven sharing of benefits, and new concentrations of data and market power. These issues will be exacerbated by growing data volumes and the emergence of new technologies. Developments in personal data mobility must address these challenges.

The presence of these systemic issues and associated risks depresses business investment in personal data initiatives, and introduces new uncertainties in the minds of individuals – deterring them from engaging more actively with the personal data market.

The economic analysis carried out in this study identified four key market failures, which provide strong cases for government intervention:

- Barriers to entry: impeding businesses' entry into market.
- Asymmetric information: where some market participants are disadvantaged by having less access to data and related tools.
- Coordination failures: market participants failure to coordinate on issues such as standards and new collaborative business models.
- Externalities: that prevent optimal investment of effort and resources in data mobility.

2.2 Personal Data Portability

At its simplest level, personal data portability is the ability for individuals to access their personal data and potentially for it to be used in multiple applications.

In some business-to-business contexts personal data portability is already a well-established practice. For example, organisations routinely share customers' personal data with other companies for the purposes of administration, analytics, marketing and advertising. However, these business to business transactions have rarely involved the individuals who are the subjects of the data.

A number of important initiatives have paved the way towards establishing the rights of individuals over the use of their personal data. These include midata in the UK, PDMS and PIMS globally, Mesinfos in France, PSD2 in the EU, and Blue Button and Green Button in the USA.

Several of these contributed to the development of the GDPR EU and UK legislation which in 2018 enshrined the data portability rights of the individual over their personal data. This legislation has created a firm legal basis for initiatives to promote economic and societal use of personal data, and for organisational change and policy reform.

GDPR only creates a right to data portability, it does not enable it or create the structures to support value generation from personal data portability. Furthermore, there are new risks. In the absence of a safe and secure environment for the sharing of personal data, the new rights that individuals have over their data introduce new potential hazards for both them and the organisations with which they interact.

2.3 Personal Data Mobility

This vision for personal data mobility goes far beyond data portability as specified by the GDPR. In this vision the range of use of personal data is hugely expanded, empowering individuals to access and use data about them for their own purposes and make it available to others - stimulating far-reaching innovation, and enriching and streamlining existing products and services.

Personal data mobility can enable the true potential of personal data by allowing its safe and efficient use where it can create maximum value. In this way it can stimulate new data-enabled innovation and efficiency in the market, creating better outcomes for individuals and organisations alike. In so doing it can be a major contributor to the UK economy and society in the 21st century.

We are at an inflexion point. Enhancing the mobility of personal data offers the potential for rapid growth in innovation, efficiency and productivity. To achieve this, data mobility developments must also respond to the systemic issues in the digital data market. In doing so, data mobility can contribute to unleashing the full personal, social and economic potential of personal data.

3. Opportunities in Data Mobility

The combined evidence and perspectives from the diverse sources researched in this study strongly support the view that personal data mobility has the power to grow value for all stakeholders – individuals; business (incumbent and new-entrant), and society – and enable the next major advance of the digital economy.

The opportunities presented by personal data mobility for the economy fall into three main categories:

- 1 **Recombinant Innovation:** Combining data traditionally held by different parties in new ways will generate significant innovation across the digital economy, including: product and service design and delivery, business model, platform, ecosystem, technology and infrastructure innovation.
- 2 **Productivity and efficiency improvements:** enabled by economies of scale and scope in the use of personal data; with a multiplier effect due to positive externalities – where increased sharing by individuals of their data can be used for the benefit of all consumers, not just for the benefit of those doing the sharing.

The economic analysis commissioned by this study estimates the impact from personal data mobility enabled productivity and efficiency benefits of approximately £27.8bn increase in GDP. This is only one part of the value opportunity. The contribution to the economy that digital innovation driven by incumbents, new entrants, peer-to-peer markets and individuals themselves is likely to be significantly greater.

- 3 **Competition and market dynamics:** personal data mobility can support healthy and fair markets, with reduced friction that can stimulate competitive innovation, and greater consumer choice.

By enabling personal data to flow safely and efficiently to where it can create maximum value personal data mobility will have multiple benefits for all parties involved in the digital economy.

- **Individuals, groups and communities:** decisions regarding the mobility of personal data will be in the hands of the individual.

This empowerment will enable people to gain a greater share of value in tomorrow's digital economy; both in their engagement with providers and in direct leverage; of their own personal data.

- **New Entrants:** personal data mobility will open the door to new service providers who are leveraging recombinant innovation, especially where integration of data from previously separate providers is required. Barriers to market entry and risks can be reduced through better insight into consumer behaviours and needs, enabling better targeting of innovative new products and services.

The positive competitive effects of data mobility on markets will enable consumers to more easily switch to new products - reducing friction and accelerating adoption.

- **Organisations:** can build new trust-based relationships with empowered consumers Incumbent organisations (private and public-sector businesses, and government departments in their role as managers of data) can gain new insights to innovate and improve services and products, and to enhance the effectiveness of marketing and operations. Economies of scale and scope of data inputs, and positive externalities can reduce production costs and deliver better tailored products and services. Personal data mobility can also enable closer collaboration between organisations, particularly in building a response to dominant competitors.
- **Governors and regulators:** personal data mobility will be a significant contributor to all of the objectives of government's Digital Charter. Indeed, without it, opportunities to innovate and create new value from personal data will remain restricted. Personal data mobility will also make a significant contribution to the Industrial Strategy – addressing aspects of each of the Grand Challenges, and being directly relevant to the Foundations of Productivity.
- **UK economy:** the development of supporting technologies, infrastructure, skills and capabilities will deliver supply side benefits, enabling the economy to be more productive, and boosting growth. If the UK takes a lead in developing these new capabilities, it will also have increased export opportunity through their deployment overseas.
- **Societal benefit:** Personal data mobility will also bring societal benefit with more personalised, consolidated social services, delivered at lower cost. Tackling poverty and addressing health, human rights, education and environmental issues often relies on access to personal data from a variety of sources. With personal data mobility, data will no longer be restricted to the organisation that originally collected it, enabling the flow of data to the services that require it.

4. Core Issues

Our analysis identified five Core Issues that combined, prevent the successful development of personal data mobility. These were developed by prioritising and amalgamating the more granular Key Challenges to the realisation of personal data mobility which emerged from the study.

The Core Issues analysis provides a clear view of the complex multi-dimensional nature of the challenge space, and can form the basis of a structured approach for tackling personal data mobility - with stakeholder motivations aligned.

Focusing on the Core Issues is valuable because it addresses the interrelated nature of the Key Challenges. The interconnectedness of the market system needed to develop personal data mobility

creates multiple connected risks and consequences. Progressing one challenge independently of others is likely to create unintended consequences and new risks or new challenges in the other parts of the market, or for other stakeholders.

The Core Issues are:

<p>Core Issue 1: Infrastructure & Standards:</p>	<p>The need for common technologies, standards and services, reflecting a number of Key Challenges that repeat across the stakeholder groups.</p> <p>Progress on these will reduce the cost barriers and risks preventing businesses taking action on personal data mobility. And, by reducing risk for citizens will contribute to the success of the government's Digital Strategy.</p>
<p>Core Issue 2: Individuals' Know How:</p>	<p>Consumers have a lack of know how and understanding of the digital market, and limited knowledge about their data, how it is used, and how they could use it.</p> <p>This makes the individuals vulnerable to abuse and lacking in the skills to access the opportunity.</p>
<p>Core Issue 3: Adaptive Regulation:</p>	<p>Well-functioning markets require strong regulation and legislation.</p> <p>To match the pace of change in a fast-moving developing market such as personal data mobility, regulators and government need new levels of knowledge, skills and adaptiveness to ensure successful market development at pace.</p>
<p>Core Issue 4: Services & Applications:</p>	<p>There is a lack of services and applications that enable Individuals to use personal data to create value for themselves and others.</p> <p>These fall into two categories: Personal Data Management Services, and Personal Information Management Services comprising Decision Support Services and Life Management Services.</p>
<p>Core Issue 5: Incumbent Business Case:</p>	<p>There is not a clear, or compelling enough case for business to embrace personal data mobility with measurable costs and risks created largely by Core Issue 1 & 2.</p> <p>There is a lack of proof points for the innovation opportunity.</p>

5. Aligning Stakeholder Engagement

Stakeholder engagement will play a critical and central role in the development of personal data mobility.

The successful development of the personal data mobility market requires strong, coordinated and simultaneous stakeholder engagement. The multi-faceted and interrelated nature of personal data mobility challenges emphasise the need for active continuous participation by stakeholders.

There are inevitably barriers to achieving this, with significant conflict in the motivations of many of the essential stakeholders. Many existing players benefit strongly from the status quo. Often competitive positions based on data assets rely on exclusive access to data. Movement from this position is frequently constrained by risks being more readily quantifiable than the strategic opportunities.

To achieve the engagement necessary, it is essential to have a well-developed understanding of the differing motivations of the key stakeholder groups. This study has provided the basis for this by examining stakeholder motivations specifically around the impact on each group of the key challenges to personal data mobility, as determined from the research. This analysis provides a key component for the development of an effective stakeholder engagement plan.

6. Enablers: Emergent Solutions and Relevant Market Activities

In our research we identified relevant emerging solutions and market activities that could accelerate the development of the personal data mobility market.

In the market there are multiple Enablers that can help progress addressing the personal data mobility Core Issues. However, there are no easy answers or quick fixes - none of the Enablers offer complete scalable solutions.

There are emergent solutions which can be built upon, and market activities that provide invaluable learnings from relevant initiatives and research, but development is largely uncoordinated with investment spread across multiple aspects of the market, services and infrastructure.

The support that can be provided by Enablers varies across the Core Issues:

<p>Core Issue 1: Infrastructure & Standards:</p>	<p>A good set of Enablers with relevant emergent solutions in the Open Banking implementation, digital identity initiatives, and development of interoperability standards. A strong research base evidencing the market need, and the potential for PDMS and recent market initiatives to support development.</p>
<p>Core Issue 2: Individuals' Know How:</p>	<p>Supported by sound understanding of the 'points of tension', identified by research and analysis done by a number of organisations. Multiple standards in development which can reduce risks and improve ease for the individual. As PIMS and PDMS evolve, they can provide tools for increasing individuals' understanding and value.</p>
<p>Core Issue 3: Adaptive Regulation:</p>	<p>Discussed in initiatives such as midata, however, it is early days for this development. The UK Government Regulators Network, the Joint Government Regulator Consumer Forum and the Centre for Data Ethics and Innovation provide market activities with which to work and build. The Open Banking Governance Process begins to create a systematised to managing changing governance requirements.</p>

<p>Core Issue 4: Services & Applications:</p>	<p>Good basis of market and consumer research on the types of data tools that individuals may need to make the market safer or easier. Multiple PIMS and PDMS already in market can provide a foundation to build value and utility for the individual. Market initiatives such as Blue Button provide learnings for the value and utility needed and used by individuals.</p>
<p>Core Issue 5: Incumbent Business Case:</p>	<p>Need for the illustration/demonstration of value from recombinant innovation - not easily apparent from the perspective of a siloed sector business. Some demonstration of this value in market initiatives such as the midataLab and MesInfos. PIMS also provide examples of value proposition for individuals. The Directed Innovation workshops in this study also illustrate the opportunities.</p>

Several Enablers provide building blocks that support multiple Core Issues. Notable amongst these are:

- Open Banking tools which are considered to be 12-18 months ahead of similar initiatives globally.
- Personal Data Management Services (PDMS) and Personal Information Management Services (PIMS), such as Decision Support and Life Management services, where the UK is a market leader.
- Standards development activity, especially for interoperability.

Market initiatives have generated important learnings which can accelerate the development of personal data mobility, such as strategic motivation, effective programme structures, international collaboration, and the environments built for Internet of Things (IoT) and Smart Cities programmes.

However, there are significant gaps where there is little support from Enablers, indeed some of the Key Challenges that make up the Core Issues have no material enablers – in particular Safe Data Sharing.

7. Demonstration of a Framework for Data-Driven Innovation

Design-led approaches have been applied increasingly over recent years to conceptualise new solutions. Whilst these have been helpful in generating new ideas, often it has been proved difficult to translate concept into reality. The Directed Innovation Framework demonstrated in Part 2 of this study has shown how rigorous business analysis frameworks can be combined with design-based techniques to both stimulate innovation and produce focused practical solutions.

The study included the development of a new framework for demonstrating how a ‘Directed Innovation’ approach can be effective in creating solutions to Core Issues and challenges in personal data mobility. The Directed Innovation Framework has been validated to a level which demonstrates the merit of its further development to become an effective tool in the delivery of personal data mobility, and for wider use in the development of other policy explorations.

Design thinking is most valuable when it is rooted in sound analysis and a clear focus on creating value for individuals – avoiding ‘activity without productivity’. The Directed Innovation Framework achieves this by blending a rigorous consumer-value-focused analytical approach, together with agile thinking, enabled by design-based techniques. The application of each stage of the Directed Innovation Framework to Key Challenges for personal data mobility demonstrated the value and relevance of the approach.

The key outcomes were:

- Demonstration of how new consumer value opportunities and personal data mobility challenges can be brought to life most vividly in the context of people's daily lives and everyday needs - enabling the exploration of a rich set of consumer wants across a wide range of data types and market sectors.
- The effectiveness of the Design Jam approach in bringing together multi-disciplinary teams to explore, design, and prototype new digital service concepts to expose the effects of personal data mobility challenges.
- Demonstration of how the Design Jam output could be analysed to determine key themes that can be used as guiding principles around which data mobility enabled services can be designed.
- Demonstration of the effectiveness of the Intervention Stack, which ensured that all relevant types of intervention were considered, in prototyping the service concepts emerging from the Design Jam to bring to life tangible risks related to personal data mobility challenges.

8. Personal Data Mobility Market Development

Drawing together the learnings from this study, specifically in the areas of: core issues at the heart of data mobility; stakeholder engagement and motivation; enabling initiatives in the market, and the value of Directed Innovation techniques, the study has identified the key steps to successful development of the personal data mobility market.

8.1 Establishment of a personal data mobility Coordinating Entity (CE)

Because of the complex coordination and facilitation requirements, and because there are and will be pockets of data mobility development within sectors, there is a need for an entity which can facilitate and coordinate the delivery of the personal data mobility market. To be successful this entity needs the following characteristics:

- Empowered – have the teeth or the recourse to teeth to enforce action.
- Commercially independent.
- Impartial – be known to be unbiased.
- Have capacity and funds to support engagement.
- Be able to coordinate across sectors.
- Have market authority – strong skills and knowledge and with the capacity to drive the coordination required.

To achieve the above, government would need to have significant involvement in the Coordinating Entity, either in a leading role, or providing active strategic support to it.

Action on the development of the personal data mobility market can be effectively structured around the resolution of the five Core Issues identified in this study. These Core Issues group logically into two distinct but closely related Development Agendas for both the CE and for business.

8.2 CE-led Personal Data Mobility Development Agenda

Core Issues 1 (Infrastructure & Standards), 2 (Individuals' Know how) and 3 (Adaptive Regulation) cannot be resolved by a single organisation and when considered together with the market failures described in Section 1.4.3, present a strong case for government intervention and facilitation. Together they form the CE-led Personal Data Mobility Development Agenda.

Action on the three of the Core Issues which cannot be resolved by individual organisations forms the CE-led Personal Data Mobility Development Agenda. Resolution of these Core Issues will make the market safe and easy to operate within, and will enable value to be effectively and sustainably developed.

- **Core Issue 1: Infrastructure and standards:**

The key challenges within this Core issue are: safe data sharing; liability models; inadequate consent mechanisms; digital identity; interoperability; lack of data access standardisation. Without coordinated action to collectively and collaboratively develop the Infrastructure and Standards, access to value from personal data mobility will be slow and will potentially cause increased market risks for all stakeholders. The lack of infrastructure has and will continue to hamper investment in innovation and therefore market growth. Action on this Core Issue can address many of the cost and risk barriers that currently impede active engagement by businesses.

- **Core Issue 2: Individuals' Know How:**

Action on this Core Issue will enable and empower individuals to gain access to new value created by personal data mobility in a safe and secure way. Individuals' know how needs to be built in coordination with the other market developments to achieve maximum stimulation of engagement and demand.

- **Core Issue 3: Adaptive Regulation:**

Adaptive Regulation, in parallel with infrastructure development, ensures that the legislative and regulatory environment reflects the pace and direction of the personal data mobility market and its underpinning technology - dynamically ensuring a balance between growth and safety. Using a collaborative approach, adaptive regulation also develops the business confidence to support innovation and, for individuals, that misuse will be addressed.

8.3 Business-led Personal Data Mobility Development Agenda

Two of the Core Issues can only be led and ultimately addressed by business - together they form the Business-led Personal Data Mobility Development Agenda and their resolution will make the market valuable.

Core Issue 4 (Services & Applications) and Core Issue 5 (Incumbent Business Case) deliver the value to individuals, organisations and the economy, which is the purview of business (private and public sector and new entrants) with involvement from, and coordination oversight between the two Development Agendas also being provided by the CE.

- **Core Issue 4: Services and Applications**

New access to personal data will enable the development of new services and applications for individuals that help them be more effective in using their data to make decisions, and manage their lives more efficiently. This will also unlock new value for businesses.

The development of consumer-facing personal data services and applications will help to inform the development of Infrastructure and Standards, Individuals' Know How, and Adaptive Regulation.

- **Core Issue 5: Incumbent Business Case**

Reduction of the costs and risks caused by Core Issues 1, 2 and 3 will foster the development of business cases for incumbents to invest in this market. This will lead to greater participation in the market, be that making data available, accessing the productivity and efficiency, or delivering new innovation, which creates new revenues.

The two Development Agendas should optimally run in parallel. This is because:

- They very valuably inform each other, and independently they don't and won't deliver the value of personal data mobility.
- If run independently they will trigger other risks and challenges. For example, data access without resolving safe data sharing stalls value creation.
- Due to their interconnectedness all stakeholders can make a valuable contribution to both Development Agendas.

9. Recommendations

This report makes three major recommendations which directly support the progression of the personal data mobility market, as described in Section 8 above.

Recommendation 1: Create the Coordinating Entity.

Recommendation 2: Progress the priority activities in the CE-led Personal Data Mobility Development Agenda, specifically progressing interoperability, safe data sharing and liability model while also designing the approach to the resolution of the Core Issues of Individuals' Know How and Adaptive Regulation.

Recommendation 3: Progress priority activities in the business-led development agenda, specifically to engage stakeholders and map a route to long term participation.

9.1 Recommendation 1: Create a personal data mobility Coordinating Entity.

Initiate a personal data mobility industry working group with immediate responsibilities to:

- Design the coordinating entity, with essential characteristics outlined earlier.
- Codify and promote reusable solutions.
- Enable ways of sharing knowledge.
- Use the Directed Innovation Framework to explore solutions, inform the business case, identify government intervention requirements.

9.2 Recommendation 2: Progress priority items in the CE-led Personal Data Mobility Development Agenda across the Core Issues of Infrastructure and Standards, Individuals' Know How, and Adaptive Regulation

9.2.1 Infrastructure and Standards

Progress the resolution of three of the infrastructure and standards Key Challenges which require priority action:

- Support the development of interoperability – identify and promote reusable solutions and actively support the development of standards.
- Government and industry to collaborate to identify ways to mitigate the potential harms from data portability as an individuals' legal right. Safe data sharing should be an early focus of this approach, to tackle the threat of misuse of data increased by data portability.
- Work with OBIE to establish a liability model for Open Banking that would be transferable to other sectors and applications.

9.2.2 Individuals' Know How

Consumer demand for data mobility will be vital in developing the case for business investment.

- Work with DCMS, NCSC, the ICO and other regulators to ensure that the right to data portability is prominent in communications. Data sharing skills should also be included in digital skills programmes.
- Work with consumer groups such as Which?, Doteveryone, and Consumers International to support the development of individuals' know how.

9.2.3 Adaptive Regulation

- Create a structure to enable the development of iterative and adaptive regulation that utilises the Directed Innovation Framework.
- Close collaboration between government, innovators and regulators using the Directed Innovation Framework to highlight areas of regulation required.

9.3 Recommendation 3: Progress priority requirements from the Business-Led Personal Data Mobility Development Agenda

It is for businesses and industry to lead on building the products and services that populate the data mobility ecosystem, however, government also has a role to play in the facilitation of the development of the business case.

- We recommend that an industry working group, as described in Recommendation 1, is convened to agree how support from government would be best focussed.
- Support developers of applications and services:
 - Create a Sandbox, similar to the FCA Sandbox using the Directed Innovation Framework at its heart.
 - PDMS/PIMS businesses and organisations such as TechUK and InnovateUK, actively participate in designing the Sandbox.
- Promote the use of the Directed Innovation Framework outlined in this report by making it available for use by businesses seeking to create new services encouraging its further iteration and development.

Work with government departments and with initiatives such as Smart Data Review and the National Data Strategy to release government data and encourage the private sector to follow suit. Establish a set of standards and solutions that will lower the development burden for incumbents and innovators. This section of the report describes the approach, concepts and structures used in this study to undertake the research and analysis of the personal data market in relation to portability and mobility, and the demonstration of a 'Directed Innovation' Framework to explore solutions.

/ Approach

This section of the report describes the approach, concepts and structures used in this study to undertake the research and analysis of the personal data market in relation to portability and mobility, and the demonstration of a 'Directed Innovation' Framework to explore solutions.

/ Research and insight

In Part 1 of the study we applied our Personal Information Economy research methodology to build a comprehensive picture of the current state of personal data portability and mobility, together with the opportunities and challenges personal data mobility presents.

This included the following:

- Activating our global expert network through a series of structured interviews with senior representatives from all key stakeholder groups. A complete list of people who were interviewed appears in Appendix 5.
- Extensive desk research, applying our broad knowledge-base of relevant personal data portability/mobility initiatives and services across the Personal Information Economy, to capture key lessons learned and insights from each initiative.
- Economic analysis: London Economics carried out an assessment of the impacts of personal data mobility on the UK economy.

/ Analysis

Part 2 of the study focused on the analysis of the output from the research. The main steps in the analysis were as follows:

- **Opportunity Analysis**

The analysis of opportunity represented by personal data mobility was built on the output from: expert views emerging from the structured interviews in Part 1; findings from the desk research; the economic analysis, and the Ctrl-Shift Personal Information Economy knowledge base.

The key themes in the analysis of opportunities were as follows:

- Innovation: based significantly on recombinant data stimulating the development of better products, services and production methods.
- Productivity and efficiency: increasing productivity of organisations, individuals and the economy.
- Competition and market dynamics: supporting healthy and fair markets, with reduced friction to deliver greater value.

An illustrative quantification of the potential value of data mobility to the UK economy, in respect of improved productivity and efficiency was also produced.

- **Core Issues and Challenges Analysis**

The analysis of challenges presented by personal data mobility was built on the output from: expert views emerging from the structured interviews, and findings from the desk research carried out in Part 1.

The challenges were evaluated and prioritised by their potential impact on the 3 main pillars of a strong market: Safe, Easy and Valuable. This resulted in a list of 18 Key Challenges.

To determine the Core Issues at the heart of personal data mobility we examined how the Key Challenges interrelated, and analysed how challenges related to the different stakeholder groups.

The Core Issues analysis provides a clearer view of the complex multi-dimensional challenge space, and can form the basis of a structured approach for tackling personal data mobility

- **Enablers (Emergent Solutions & Market Activities) Analysis**

The analysis of the potential Enablers of data mobility was built on the output from: expert views emerging from the structured interviews in Part 1; findings from the desk research, and the Ctrl-Shift Personal Information Economy knowledge base. Enablers are emergent solutions and market activities that could materially support the development of personal data mobility by helping address the Core Issues (and their underlying Key Challenges).

An Enabler landscape was developed by researching a total of 96 initiatives and 109 reports, papers, surveys and articles (as listed in Appendix 8). The Enablers were consolidated to 51 (listed in Appendix 9), based on a qualitative assessment of their potential impact on the personal data mobility Core Issues.

/ Demonstrator for a 'Directed Innovation' framework approach

Also in Part 2 of the study a new tool was demonstrated for the exploration of solutions to Core Issues and challenges in personal data mobility. This entailed the development of a 'Directed Innovation' Framework. The framework was tailored for the data mobility challenge and, in Design Jam workshops, was used to explore, design, and prototype new digital service concepts, to expose the effects of personal data mobility challenges on them.

The output of the Design Jam was analysed to determine specific needs of users when engaging with data mobility enabled services. Hypothetical services were developed to a level where tangible risks related to the two Key Challenges could be surfaced.

/ Conclusions and recommendations

The findings and outputs from the research carried out in Part 1 of the study, and from the analysis and demonstrator activity performed in Part 2 were drawn together in a set of clear conclusions.

These conclusions formed the basis of purposeful recommendations that can form the basis of informed and coordinated action towards the successful realisation of personal data mobility.



1.SETTING THE SCENE FOR DATA PORTABILITY AND MOBILITY

1.1 Conclusions from this section

- Personal data lies at the heart of many of the most promising applications for consumer benefit, economic growth and public good in a fast-evolving digital economy.
- The recombinant and non-rivalrous characteristics of data (ability to limitlessly re-combine and never deplete even when used by many actors) are at the core of the unprecedented growth potential in innovation and value from personal data.
- New technologies such as Artificial Intelligence (AI) and the Internet of Things (IoT) are driving huge new growth in the digital economy. Data portability can fuel these technologies by helping build the data infrastructure needed for a flourishing digital economy.
- A high proportion of personal data has been concentrated in organisational silos where only one organisation controls it. This limits the scope of what the data can be used for, and by whom.
- There are systemic issues in the digital data economy, including: data breaches; consumer mistrust; uneven sharing of benefits, and deepening concentrations of data and market power. These issues may well be exacerbated by growing data volumes and the impact of new technologies.
- The economic analysis has identified key failures in the current market. These could provide strong cases for government intervention:
 - Barriers to entry: impeding businesses' entry into market.
 - Asymmetric information: where some market participants' are disadvantaged by having less access to data and related tools.
 - Coordination failures: market participants failure to coordinate on issues such as standards and new collaborative business models
 - Externalities: that prevent optimal investment of effort and resources in data mobility.
- Interventions aimed at addressing market failures are likely to bring greater benefit to the individual and society than to businesses.
- Personal data portability is well established in a business-to-business context, but business transactions rarely involve the individuals who are the subjects of the data. Important initiatives have paved the way towards establishing the rights of individuals over the use of their personal data. These include midata, PDMS and PIMS, Mesinfos, PSD2, Blue Button and Green Button.
- The GDPR has enshrined the data portability rights of the individual over their personal data, creating a firm legal basis for initiatives to promote economic and societal use of personal data, and for organisational change and policy reform.
- However, GDPR data portability does not provide the structures to support value generation from personal data and, in the absence of a safe and secure environment for the transaction of personal data, the new rights individuals have over their data introduces new potential risks for both themselves and the organisations with which they interact.
- This vision of personal data mobility goes beyond data portability as specified by the GDPR. It looks to a world where personal data flows safely and efficiently to where it can create maximum value with personal, social and economic benefits distributed fairly.
- Personal data mobility can enable new data-enabled innovation and efficiency in the market, creating better outcomes for individuals and organisations alike. In doing so it can be a major contributor to the UK economy in the 21st century.

- We are at an inflexion point. Enhancing the mobility of personal data offers the potential for explosive growth in innovation, efficiency and productivity. To achieve this, the development of data mobility must also respond to the systemic issues in the digital data market. In doing so, data mobility can contribute to unleashing the full personal, social and economic potential of personal data.

1.2 How did we get here?

To understand why the greater accessibility and usability of personal data is potentially strategically important for the UK economy, we need to understand the history of the digital economy, and how it developed. The commentary that follows focuses on aspects of the digital economy related to personal data.

1.2.1 The first phase

Today's digital economy began with the first applications of computing to information intensive business processes such as payroll and billing. Computerisation of these previously-manual tasks unleashed significant savings and efficiencies: this was the focus - using computerisation to achieve internal efficiencies.

More sophisticated techniques such as segmenting customers for product development and marketing were subsequently introduced. This resulted in the creation of multiple systems focused on specific applications inside companies with separate databases that didn't link to each other. This was the origin of data being organised in silos, serving single business applications.

New approaches such as CRM (Customer Relationship Management) emerged as a means of combining multiple different tasks (such as billing, segmentation, marketing) into integrated enterprise-wide systems that began to create a consolidated picture of customers based on multiple dimensions of an organisation's customer interactions.

As the potential power and benefits of data and data analytics became apparent, a new conventional wisdom began to take hold amongst business: that data about your customers is a key strategic asset and source of competitive edge. This led to the building of loyalty schemes like Tesco Clubcard and Nectar. In loyalty schemes, consumers are encouraged to share data about their shopping experiences, preferences etc. in return for loyalty points that can be traded for benefits such as price discounts. As the schemes expanded the volumes of consumer personal data enabled retailers to apply sophisticated data analytics to generate valuable new insights into consumer behaviours and needs. This in turn enabled them to deliver significant improvements in customer service and in business performance – particularly in the optimisation of their supply-chains.

Some early forms of data portability were established and proven. For example, credit reference agencies which used customer data from multiple different sources in a variety of organisations providing a fuller view of individuals to help reduce loan risks and fraud for organisations.

1.2.2 The second phase

The digital economy's second phase was when computer systems began to interact with to each other via the World Wide Web. The Internet transformed how traditional businesses like retailers, utility companies

and banks connected with their customers - increasingly via web sites and applications. It also triggered the growth of new digital information services such as search, social media and peer-to-peer platforms, changed competitive dynamics by, for example, removing the overheads of having a physical shop. It also massively expanded the amount of data that could be collected about consumers e.g. via cookies and online activity tracking.

Over the periods of both the first and second phases of the digital economy the costs of collecting, storing and transmitting data have fallen over a million-fold.

This rapid fall in the costs of a critical economic resource means that the frontiers of what is possible, technically, functionally and commercially have expanded immensely and are expanding – and at an increasing rate. It is hard to comprehend the scale and scope of this transformation but it is much greater proportionately than the fall in the costs of energy that triggered the industrial revolution.

1.3 The economic logic of information

These trends illustrate and highlight the unique characteristics of information as a commodity, which are in many ways the opposite of those of physical commodities. Physical commodities ('atoms') are rivalrous (when they are used, they get used up), exclusive (only one party can hold or use it), costly to copy and therefore in finite supply. They are also difficult and expensive to move and combine.

Information ('bits') is non-rivalrous (unlike physical goods, when it is used it is not depleted). It can be copied at close to zero marginal cost. It is non-exclusive (unlike physical goods it is infinitely copyable: multiple parties can hold and use the same piece of information). It is infinitely expandable (we can always add more information (assuming we have the computer systems capacity to do so); even using information creates meta-information about what information is being used, how, when, by whom). It is infinitely recombinant (with a virtually infinite number of ways of combining and recombining different bits of information). And the costs of storing and moving information continues to fall exponentially. When considered in the context of increased data portability, these characteristics lie at the heart of the unprecedented growth opportunity in innovation and value from personal data.

Organisations and governments throughout the world are wrestling with the challenge of redesigning and re-forming industrial structures, supply chains, business models, markets and indeed complete economies from structures and ways of working designed to maximise and optimise the potential of 'atoms' to one that is designed to maximise and optimise the potential of 'bits'. The first two phases of the digital economy (as described in Section 1.2.1) focused on uses of data, including personal data, that took place with the operational frameworks and mental constructs of an industrial age organised around the manipulation of atoms. Data was collected by a single organisation - the data controller - and treated as a rivalrous, exclusive, and a finite resource.

These first two phases delivered considerable benefits for both organisations and individuals. But they have created many problems too, including data breaches, a decrease in customer trust about how data is captured and used¹, claims that the benefits have been unevenly shared, resulting in new concentrations of data and greater market power of a few big organisations e.g. Google, Facebook and Amazon. Regulators and policy makers have struggled to keep pace with the rapid development of digital technologies and the new types of business they have spawned.

1.4 Current state of play: personal data in an expanding digital economy

The digital economy continues to grow at an extraordinary rate, and its contribution to the UK economy is

1. [Rose J, Lawrence A, Baltassis E \(2018\) Bridging the Trust Gap in Personal Data Boston Consulting Group & Boston Consulting Group Henderson Institute](#)

very significant. The latest 'DCMS Sectors Economic Estimates'² published in 2016 reported that in 2016, the Digital Sector exported £39.1 billion worth of services to the rest of the world, an increase of 21.8% from 2015; and that the Digital Sector contributed 15.9% of the total value of services exported by the UK in 2016.

Notwithstanding this growth, the structure of today's digital economy and the handling of personal data has remained largely as established by the developments discussed in Section 1.2.

1.4.1 Silos and data concentration

The main entities collecting and using individuals' data are typically large organisations. These organisations maintain very large databases, holding details about vast numbers of customers. As the data market has grown, organisations have learned to see exclusive access to and control of personal data as a key strategic asset and source of competitive edge - even though many are becoming increasingly aware of the associated risks and on-costs. These include risks of data breaches, costs of compliance with data protection regulations.

The scope and nature of the data collected by organisations tends, however, to be limited by the nature of each organisation's service and relationship with its customers.

So, for example, records of an individual's financial transactions would be held by a bank like Barclays or HSBC; of their health by the NHS; and of friends and family by Facebook, etc. At the same time, competing companies have built separate, rival databases. Thus, even as organisations have been collecting ever more data, it has tended to be data about one sort of thing (customer transactions and interactions with that organisation). This siloed, 'organisation-centric' structure meant that companies still lacked information about customers' dealings with competitors or the context of their behaviours. This led to the need to augment the data that they held on customers by accessing data from other sources such as market researchers or credit reference agencies.

1.4.2 Implications of artificial intelligence, machine learning, internet of things & personal assistants

With the rapid development in AI (expected to contribute £630bn to the economy by 2035³), the Internet of Things (over 200 billion connected devices in the next two years⁴), and digital personal assistants like Alexa and Siri, the amount of data that is being collected is accelerating even further.⁵

Each of these technologies is an exciting driver of innovation in its own right. Enabling data portability and, more significantly, data mobility (see Section 1.5), can fuel these parallel developments, thus helping build the data infrastructure needed for a flourishing digital economy.

At the same time however, by massively expanding the range and volume of data being created, they may exacerbate existing issues and concerns and compound existing risks in two ways:

- the exponentially increasing volumes of data that are being collected could increase the risk of the creation of new concentrations of data power and unfair distribution of rewards.

2. See statistics above from: [Department for Digital, Culture, Media and Sport \(2018\) DCMS Sectors Economic Estimates 2016: Trade. Department of Digital, Culture, Media and Sport](#)

3. [Hall, Professor Dame Wendy, Pesenti J \(2018\) Growing the Artificial Intelligence Industry in the UK. Department of Digital, Culture, Media and Sport & Department for Business, Energy & Industrial Strategy](#)

4. [Intel \(2013\) A Guide to the Internet of Things, How Billions of Online Objects are Making the Web Wiser. Intel](#)

5. [Wavestone \(2017\) The Rise of Intelligent Voice Assistants: New Gadget for your Living Room or Window of Opportunity to Reshuffle the Cards in the Web Economy. Wavestone](#)

- the extension of data collection to new, unfamiliar arenas could increase the risk that unintended negative consequences occur or that unscrupulous players take advantage of consumer (and regulator) lack of awareness to introduce policies and practices which have harmful and negative effects. For example, connected cars not only collect data about the mechanical operation of the car, they also collect data about drivers: where they drove, when, how fast they went, etc⁶. Digital personal assistants can 'listen in' to private and intimate conversations⁷. Internet of Things devices can (and do) share the data they collect with potentially hundreds of unknown third parties.

1.4.3 Market failures

The economic analysis carried out in this study identified a number of key failures in the current market. These failures impede participants in the market from unlocking the true potential of data and could provide strong cases for government intervention

The failures identified are:

- Barriers to entry: anything stopping new businesses from entering a market or incumbent businesses entering a new market.
- Asymmetric information: some market participants being advantaged by knowing more about the market than others, and this advantage enabling them to gain more data and develop more sophisticated analytics tools.
- Coordination failures: market participants fail to coordinate on issues, such as standards, where coordination would be mutually beneficial.
- Externalities: actions of one individual impact others without this being reflected in a single price.

1.4.3.1 Barriers to entry

Barriers to entry created when firms looking to enter a market lack access to consumer data. This lack of access prevents entrants from effectively competing in markets where consumer data is a significant factor. If entrants cannot effectively compete, they are deterred from entering a market, thus limiting competition. This is exacerbated by business models that accumulate data and prevent others from doing the same.

1.4.3.2 Asymmetric information

Asymmetric information is a problem in two ways:

- asymmetry between businesses: data-driven businesses understand the value of data better than 'analogue' businesses, (including traditional industries and most SMEs), which enables them to prevent other businesses from accessing greater value from the market opportunity.
- asymmetry between businesses and consumers: businesses have more data and data tools to understand and derive the value from data than the consumers who generate it.

In both cases, there are market participants that understand the value of data better than others. This can lead to undesirable outcomes for the market participants with poorer knowledge. For instance, individuals who do not understand the value of their data might be willing to give it up too easily and in so doing disadvantage themselves.

6. [McQuinn A, Castro D \(2018\) A Policymaker's Guide to Connected Cars. The Information Technology & Innovation Foundation.](#)

7. [Wolfson S \(2018\) Amazon's Alexa recorded private conversation and sent it to random contact. The Guardian](#)

1.4.3.3 Coordination failure

Coordination failure is where market participants fail to align on issues, such as standards, where coordination would be mutually beneficial. Additionally, data mobility enables new collaborative business models, which often go against the grain of existing businesses. Business are used to treating data as an asset to be protected, not to be shared. Efforts to enable the release of data to support more collaborative business models, and their associated benefits, may be impeded by self-interest – creating coordination failure.

1.4.3.4 Externalities

Market failure created by externalities, both positive and negative, that prevent optimal investment of effort and resources in data mobility. Externalities also impact the amount of data sharing in society. As noted in Section 2.2.2.4, positive externalities can mean that the amount of data sharing is less than optimal for society at large. The mirror image is that negative externalities might lead to oversharing of data. Government interventions could bring society closer to its best outcome.

1.4.3.5 Distributional Considerations

The economic analysis also concluded that Government intervention in relation to these market failures is likely to benefit people most. Most of the market failures tend to benefit businesses at the expense of the welfare of people. This is particularly evident in the case of barriers to entry and asymmetric information. Barriers to entry benefit incumbent businesses, and disadvantage consumers by restricting the benefits from competition. Asymmetric information can limit the effective use of data in solving consumer problems, because the individual does not understand the value of their data.

As a consequence of this, interventions aimed at alleviating these market failures are likely to benefit people, rather than the provider.

1.5 The evolution of personal data portability

At its simplest level, data portability is the ability to reuse data, including personal data, in multiple applications, wherever those applications are located. This is enabled by the applications being able to exchange and process the data, through the use of standard interoperability protocols.

1.5.1 Experience of data portability so far

In some business-to-business contexts personal data portability is already a well-established practice. For example, organisations routinely share customers' personal data with other companies for the purposes of administration, analytics, marketing and advertising. Entire industries - such as credit referencing - are enabled by organisations sharing data about their customers. Banks have recently cooperated in sharing data about accounts for the purposes of tracking money to identify accounts involved in money laundering.

There are useful lessons to learn from these well-established existing practices, for example about data standards and format, metadata and interoperability. However, none of these examples of data portability happen on the request of the individual whose data it is.

1.5.2 Initiatives that have formed thinking on personal data portability

Over recent years there have been a number of important initiatives that have been influential in shaping personal data portability. (Several of these continue to have relevance to the shaping of Data Mobility, as discussed in Section 4.)

- midata:** The UK's original midata programme which put the idea of data portability on the map. The midata programme⁸ initiated in 2011 and run by the Department for Business, Innovation and Skills (now BEIS), was an initiative to help consumers access and use data collected about them by service providers. midata was intended to act as a platform for innovation at the same time as empowering the individual to act with their data inside the digital data economy. The programme was designed to ensure the individual know how was increased and that consumer representative groups, acting on behalf of the individual, would have greater sight of data and be able to more rapidly identify market wrong doings. This was designed to act as a self-correcting mechanism ensuring that legislative intervention was only required at a macro level not at a micro level within each sector. The programme sought voluntary engagement from businesses to make the data available to the individual. The programme triggered primary UK legislation designed to enforce the data release, this awaited the conclusions of the then early stage GDPR development to enact this at a regulatory level. To progress the business case challenge for businesses the midata innovation Lab (miL) which worked with over 25 UK brands and a team of multi-disciplinary people together to explore the innovation opportunities in an open, safe environment. The learnings from the miL contributed to the progression of data portability. The midata programme also initiated the development of a data standard for the energy industry, which enabled the roll out of a QR code⁹ for individuals' energy bills, enabling them to access the data about their energy usage. This initiative required intervention by the regulator and facilitation by BIS midata team members. Key learnings from the midata programme centred on the multiple barriers to engagement for incumbent business around data portability.

These manifested as follows:

- It is essential to focus on the opportunity and make it measurable and / or highly compelling. For incumbent businesses, the costs of making the data available (especially before organisations had been required by GDPR to reorganise their customer data), and the lack of a clear business value or measurable opportunity, made the business case for midata untenable
- Developing the market opportunity out of innovation and corporate social responsibility opened stronger relationships and faster progress
- If progress was to be made without a compelling opportunity, the main lever to pull is legislation and, in the case of Energy data the regulator
- The right level of sponsorship within government attracts the right level of involvement and commitment. When meetings were held in the offices of Number 10 and chaired by the minister senior business senior stakeholders got involved.

8. <https://www.gov.uk/government/news/the-midata-vision-of-consumer-empowerment>

9. <https://www.gov.uk/government/publications/qr-code-use-in-energy-sector-midata-programme-study>

- **Personal Data Management Services (PDMS) and Personal Information Management Services (PIMS).** The UK is a market leader in these services and applications, many of which have built on the progress made in the midata programme. They have become the focus of a large number of start-ups around the world and involved multiple international activities.

The services and applications fall into three broad categories:

- **Personal Data Management Services (PDMS):** services or applications that enable the individual to gather, manage and share their personal data from multiple places and to use that data e.g. easy form filling, fast online checkout.
 - **Decision Support Services:** services or applications which help individuals make decisions using their data to inform that decision or automate it, such as where to go to the gym while travelling. Currently, the information to enable these services is embedded within existing proprietary services or applications such as those provided by Amazon or Google. This makes it harder to gain the value of combining data from multiple services or applications and contributes to increased market concentration within those services.
 - **Life Management Services:** services or applications which bring together a complex set of decisions to help individuals manage their life better such as organising children's education
- **Mesinfos:** A French consortium of large French companies, organised by Fing¹⁰, a digital think tank. The aim was to explore the collection, use and sharing of personal data by and for individuals, under their complete control and designed to fulfil their own needs and aspirations (SelfData). A pilot¹¹ was launched in 2016. To ensure MesInfos could proceed with its SelfData agenda, a second initiative – now named DataAccess¹² - was launched which focuses exclusively on data portability and how data portability as laid out in GDPR can be enacted by individuals and organisations. Various models for data portability were explored and a number of design patterns published through Creative Commons. The initiative is now in the hands of organisations to take the concepts forward.

Key learnings from Mesinfos:

- Getting from use cases to service prototypes is a challenge due to the difficulty of attracting established businesses or start-ups to an emerging market.
- Presenting data in a form and way that consumers found intelligible also proved a challenge for the platform (Cozy Cloud).
- Finally, the pilot was carried out in parallel to GDPR implementation and lack of clarity as to the regulatory situation, particularly around data portability, proved a stumbling block for agreement between consortium members.
- Without a stable or engaged legislative and regulatory environment, businesses will stall on key decisions and go into wait-and-see mode.
- Design patterns can provide building blocks for data portability, the full value of this is yet to be proven.

10. <http://fing.org/?About-Fing&lang=fr>

11. http://doc.openfing.org/MesInfos/SyntheseMesInfos_V3_EN-WEB.pdf

12. <https://medium.com/mydata/dataaccess-for-consistent-and-positive-portability-gdpr-befd8164967f>

- **PSD2:** A European directive¹³, the main objectives of which are to make payments safe, increase consumer protection and foster innovation and competition while ensuring a level playing field for all players, including new ones. The directive, importantly for informing data portability, enables third party access to consumer account information. Combined with providing a framework for new payment and account initiation services (AISPs and PISPs) the Directive illustrates how data portability, when combined with other market shaping initiatives, could offer a model for market development. Following on from Article 20 in GDPR on data portability, PSD2 provides additional data protection requirements by stating that Third Party Providers (TPPs) are only permitted to access information for the specific purpose(s) “explicitly requested by the customer” relating to the provisions of the account information (AISPs) or payment initiation services (PISPs), and not for any other reason. PSD2 also built the basis for the Open Banking initiative in the UK. The initiative provides a great opportunity for enabling data mobility and is discussed in Section 4: Enablers – Emergent solutions and Relevant Market Activities.

Key learnings from PSD2:

- A development approach was used that is sector-wide and incorporates not only data portability but also other levers for sector change. When combined together these could create even more far reaching changes for consumers and industry.
 - The time frames from development to enacting in the market of a legislative-led approach needed to be extended.
 - The individual country and business initiatives provided essential learnings on how to enact data portability.
 - The implementations of PSD2 helped provide clarity on many of the challenges that needed to be overcome to enable data portability.
- **Blue Button¹⁴ Initiative.** In 2010 the U.S. Department of Veteran Affairs (VA) launched the Blue Button initiative to give veterans the ability to access and download their medical records from their ‘MyHealthVet’ online portal. The initiative was launched by President Obama. In 2013 the Blue Button service was expanded to include a standardised, machine-readable data format. With the Blue Button, a patient is provided with a highly visible, clickable button to download his or her medical records or other health information in digital form from a secure website offered by their doctors, insurers, pharmacies or other health-related service. The initiative has gone on to support the development of many services and applications and support millions of Americans.

Key learnings from Blue Button:

- Creating and maintaining momentum is crucial. This initiative was undertaken without legislative pressure; however, it was initiated by one of the most senior political sponsors, had significant focus from power brokers and the associated budget.
- Importantly its stated purpose from the outset was societal benefit and motivated participation, enabling a more emotive business case for participation and potentially drawing on social responsibility budgets and motivations in business to gain momentum.
- Standards for data access and interoperability were developed and, beyond the standards, further engagement in the market has created consumer and business value.
- It is yet to be seen if the initiative has developed enough momentum to be carried through from a politically-driven initiative a market-driven one.

13. https://ec.europa.eu/info/law/payment-services-psd-2-directive-eu-2015-2366_en

14. <https://obamawhitehouse.archives.gov/blog/2016/03/15/my-data-empowering-all-americans-personal-data-access>

- **The USA Green Button¹⁵ initiative.** Launched in 2012, this initiative gave Americans online access to their detailed electricity usage, facilitating virtual energy audits to identify inefficiencies and money opportunities for both residential and commercial customers. Consumers are able to securely download detailed energy usage data with a simple click of a literal “Green Button” on electricity utilities’ websites. Additionally, consumers could grant third party developers and service providers direct access to their Green Button data, e.g. to compare their usage with local government open data on energy usage patterns.

Key learnings from Green Button:

- The Green Button initiative was based on a common technical standard, the ESPI (Energy Services Provider Interface), and was developed in collaboration with the Smart Grid Interoperability Panel and the PAP10 working group.
- The ESPI standard described how to represent energy usage information in an XML format and how to enable the exchange of that information between utilities and third parties on behalf of consumers. Together these defined a flexible file format for Green Button based on ratified standards from NAEBS (North American Energy Standards Board).
- By July 2015, more than 150 utilities and service providers had committed to providing over 60 million U.S. households with access to their own Green Button energy data in a consumer and computer-friendly format. It is worth noting that the USA energy market is extremely large running to thousands of suppliers.

1.6 The Data Protection Act 2018

The passing of the UK Data Protection Act 2018 is the UK’s implementation of the European General Data Protection Regulation (GDPR). It creates a new consumer right to ‘data portability’ (Article 20), in addition to the long standing right of ‘Subject Data Access’ (Article 15). This provides “the right to receive the personal data concerning him or her, which he or she has provided to a controller, in a structured, commonly used and machine-readable format and have the right to transmit those data to another controller without hindrance from the controller to which the personal data have been provided.”

1.6.1 Different approaches to data portability

GDPR mentions two different approaches to data portability: individuals’ right to send their data to another organisation and the right to receive their data from an organisation.

In the first approach, the individual requests that the data is sent from Company A to Company B, typically for the purpose of providing a specific service using that data. In the second approach, the individual requests that the data is sent to themselves “for further personal use on a private device, without transmitting it to another data controller”.

This is a key structural change where individuals become active participants in the data economy rather than being treated as passive data subjects.

The Article 29 Working Party further comments, in its Guidelines on the Right to Data Portability¹⁶, that “this could be implemented by making an API available. Data subjects may also wish to use a personal data store or a trusted third party, to hold and store the personal data and grant permission to data controllers to access and process the personal data as required, so data can be transferred easily from one controller to another.”

15. <https://www.energy.gov/data/green-button>

16. http://ec.europa.eu/information_society/newsroom/image/document/2016-51/wp242_en_40852.pdf

1.6.2 Issues in the wake of the GDPR

By enshrining the rights of the individual over their personal data, this new legislation creates a firm legal basis for initiatives designed to promote the wider economic and societal use of personal data - under the control of the individuals who own it, and a strong foundation for organisational change and policy reform. However, it opens a number of new issues.

Two key questions that emerge in the wake of this new right are:

- How can the personal data portability rights introduced by the legislation be translated into value?
- How can this be achieved in a safe and fair way to all participants?

Appendix 1 reviews some of the more detailed legal questions raised by this new right. Clarifying these legal questions is important for widespread adoption of standardised, easy-to-understand and easy-to-do data portability processes that become familiar to all parties.

1.6.2.1 Creating value from personal data: beyond GDPR

The GDPR legislation does not extend to the structures that will be necessary to enable and support the transaction of personal data for value generation.

Standards for data interoperability lie at the heart of this. GDPR includes no provisions for data standards, APIs or interoperability protocols will be required to build an effective and efficient transactional environment for personal data.

There is growing concern that more needs to be done to ensure that value from the personal data can be realised by consumers and businesses. Currently only a limited range of data is specified and no innovation-friendly conditions, such as the data needing to be available as a real-time feed, are mandated. Comparing this to the lessons-learned from previous initiatives, these limitations of the right of data portability could hamper the benefits that could be generated through this new right.

1.6.2.2 The risks in data portability

These new rights provided by the GDPR for individuals to transfer their personal data to new data controllers opens entirely new risks for the participants. Important questions are raised such as, how will data be shared safely and securely; and, , which parties are liable if things go wrong?

In the absence of a safe and secure environment there is new risk not only to organisations, whose risk models and procedures will need to adapt to a new data-sharing structure, but significantly to individuals – who have little or no understanding, experience or capabilities to deal with this risk.

1.7 Vision for Personal Data Mobility

The vision for personal data mobility builds on, but goes beyond, the legal provisions for data portability specified by the recent European and UK data protection legislation. The concept of personal data mobility encompasses the potential personal, societal and economic benefits of enabling the safe, efficient sharing of personal data, beyond the narrower technical and legal interpretations and implications of any one piece of legislation.

The vision for data mobility is for a world where data flows safely and efficiently to where it can create maximum possible value, with personal, business, social and economic benefits distributed fairly and appropriately. This vision extends to Big Data and Open Data but this report focuses on a specific aspect of data mobility: that of personal data, which brings with it unique considerations. These relate to: privacy and data protection (raising specific questions about governance and liability); rights to use and economic benefit (often confused with ownership), as well as the technical and policy-related issues in ensuring that any data that is moved from one place to another does so safely and efficiently.

Specifically, personal data mobility rests on the simple idea that the use of personal data to create value should not be exclusively restricted to the party that was responsible for the original collection and storage of the information (the 'data controller' in terms of UK law). Instead, individuals should have a right to move their data elsewhere, to be stored and used by themselves for their own purposes, or to other service providers.

In this way, this data can be used for different purposes by different parties. These uses and users potentially expand significantly as data from different sources, previously held in separate data silos, are combined and recombined to open up new usage opportunities.

Key aspects of the personal data mobility vision are:

- by enabling personal data to flow safely and efficiently, under the control or consent of the individual, to where it can deliver maximum benefit, data mobility can transform the value from personal data for all market participants
- the right to data portability created under the 2018 Data Protection Act creates an opportunity to open the way to the creation of these new and additional forms of value
- in the process, new, never-before-seen data assets can be built by combining data previously held by many different data controllers into richer, more complete data sets
- these new, richer, more complete data sets will further accelerate, enrich and enhance the services that could be built on top of them.
- just as the capabilities necessary for the collection, management and use of data that have been developed help existing data controllers make the most of the data they collect, enabling other parties (including other service providers and/or individuals) to access and use this data will trigger the development of new, additional skills, technologies and other capabilities.
- personal data mobility can be a major contributor to the prosperity of the UK economy in the 21st century through the creation of innovative new services based on the ability to access previously inaccessible and unavailable data assets aided by the development of new data sharing infrastructure, skills and capabilities.

1.8 Today's inflexion point: choices and opportunities to shape the future

As the UK Government has recognised¹⁷: "The digital era has led to a transformation in the way that consumers interact with business. This is a revolution of choice, convenience and affordability... [and] just the beginning – these new technologies have the potential to transform every facet of our lives."

¹⁷ [Department for Business, Energy and Industrial Strategy \(2018\) Modernising Consumer Markets. Department for Business, Energy & Industrial Strategy](#)

Whilst digital technologies and mobility in personal information offer huge potential, as demonstrated by the recent Cambridge Analytica and Facebook scandal, there are some systemic issues at the heart of the digital data economy. These issues include: widespread data breaches; decreased customer trust of how data is captured and used; claims that the benefits have been unevenly shared, and new concentrations of data and market power.

These issues may well be exacerbated by growing data volumes combined with the impact of new technologies. We are at an inflexion point. Enhancing the mobility of personal data offers the potential for explosive growth in innovation, efficiency and productivity. To achieve this, the development of data mobility needs also to respond to systemic issues and current market failures in the digital economy. With this approach, data mobility can contribute to sustainably unleashing the full personal, social and economic potential of personal data by freeing personal data from its current confines within organisational data silos and empowering people with their personal data.

2. OPPORTUNITIES IN PERSONAL DATA MOBILITY

2.1 Conclusions from this section

- The opportunities identified in the research and analysis carried out in this study strongly support the view that personal data mobility can transform the value of personal data for all market participants thereby enabling the next major advance of both the digital and overall economy.
- The opportunities presented by personal data mobility fall into three main categories:
 - Personal data mobility can spur innovation in many different areas of the digital economy, including: product and service design and delivery, business models, platforms, ecosystems, technology, and infrastructure.
 - Combining data traditionally held by different parties in new ways, enabled by personal data mobility (recombinant innovation), can be a major driver of innovation in both product and service development and in production methods. Personal data mobility can support productivity and efficiency improvement by enabling: economies of scale and scope in the use of personal data; and multiplier effect (positive externalities), where increased sharing by individuals of their data with businesses can be used by businesses to improve products and services to the benefit of all consumers.
 - Competition and market dynamics: personal data mobility can support healthy and fair markets, with reduced friction that can stimulate competitive innovation, and greater and simpler consumer choice.
- The economic analysis estimates the impact from personal data mobility enabled productivity and efficiency benefits of approximately £27.8bn increase in UK GDP. The contribution to the economy that digital innovation driven by incumbents, new entrants, peer-to-peer markets and individuals themselves represents is likely to be significantly greater.
- Personal data mobility can offer benefits to all participants in the digital economy
 - Individuals, groups and communities: decisions regarding the mobility of personal data will significantly be in the hands of the individual. This empowerment will have material value, enabling people to gain a greater share of value in tomorrow's digital economy, both in their engagement with providers and in direct leverage of their own personal data.
 - Incumbent organisations (private and public-sector businesses, and government departments in their role as managers of data): personal data mobility can help build new trust-based relationships with empowered consumers, gaining new insights to: incrementally improve services and products; innovate new ones, and improve the effectiveness of marketing and operations. Economies of scale and scope of data inputs, and positive externalities can reduce production costs and deliver better tailored products and services. Personal data mobility can also enable closer collaboration between organisations.
 - New Entrants: personal data mobility can open the door to new arenas of recombinant innovation, especially where integration of data from previously separate providers is required. Better insight of consumer behaviour and needs will enable new entrants to better shape and target innovative new products and services - reducing barriers to market entry and risks. The positive competitive effects of data mobility on markets will enable consumers to more readily switch to new products, reducing friction and accelerating adoption.

- **Governors and regulators:** personal data mobility can be a significant contributor to all of the objectives of the Digital Charter. Indeed, without it, opportunities to innovate and create new value from personal data will remain restricted. Personal data mobility can also make a significant contribution to the Industrial Strategy – addressing aspects of each of the Grand Challenges, and being directly relevant to the Foundations of Productivity.
- The potential benefits of personal data mobility are not restricted to the new services that they make possible. The development of the supporting technologies, infrastructure, skills and capabilities delivers supply-side benefits, enabling the economy to be more productive leading to a boost in growth.
- If the UK takes a lead in data portability firms developing these new technologies, skills and capabilities for the UK market will be in a good position to sell them to other countries wishing to adopt similar strategies, delivering an additional export boost.
- Examples of these new technologies and infrastructure include information logistics and interoperability tools e.g. providing data translation services, data governance, consent management and transparency services, and data security.
- Personal data mobility can enable public, social and charitable sectors to provide better, more personalised, relevant and ‘joined up’ services at lower cost. Tackling poverty and addressing health, human rights, education and environmental issues often relies on access to personal data. Because data mobility means that access to data would no longer be restricted to the organisation that originally collected it, it will enable the flow of data to initiatives seeking to use data in this way

2.2 Opportunities Presented by Personal Data Mobility

This section of the report brings together the opportunities identified in the multiple research and analysis stages of this study.

The combined evidence and perspectives from these diverse sources strongly support the view that personal data mobility has the power to transform the value of personal data for all: individuals; business (incumbent and new-entrant), and society – enabling the next major advance of the digital economy.

“ *We are definitely leading the world at the moment and it would be great to develop standards that could become Global.* ”

Matt Hammerstein Managing Director, Head of Barclaycard UK and Retail Lending (and Co-chair of Open Banking Working Group)

The opportunities presented by personal data mobility fall into three main categories:

- **Innovation:** stimulating the development of better products and services by bringing together data from diverse sources held in previously inaccessible separate ‘silos’.

“ *New insights will be enabled, leading to new value propositions ranging from ‘data concierge’ services offering convenience, to smart cities able to achieve step changes in resource utilisation efficiency.* ”

Miles Cheetham, Head of Propositions, Open Banking Miles Cheetham, Head of Propositions, Open Bank Working Group)

- **Productivity:** the ability to materially increase the productivity of businesses, individuals and the economy through: increased cost-effective access to data; increased efficiency of product development, the effectiveness of marketing through an increased scope of data inputs; and the multiplier effect of sharing data that can bring value to wide communities of people thereby benefiting society as whole.
- **Competition and Market Dynamics:** supporting healthy and fair markets with reduced friction, stimulating (subject to market characteristics) increased competition, more effective collaboration and efficient consumer switching resulting in greater value being delivered to individuals.

“ *Why is Data Mobility important? Without it the structure creates friction which creates inefficiency, reinforcing and promoting ‘rent seeking*”

Anthony Jenkins, CEO, 10X Banking

The economic analysis illustrates the impact from personal data mobility enabled productivity and efficiency benefits of approximately £27.8bn increase in GDP.

This estimate does not include the contribution to GDP that digital innovation from incumbents, new entrants, peer-to-peer markets or individuals themselves will make. This, whilst difficult to quantify, is likely to be significantly greater.

The economic analysis illustrates the impact from personal data mobility enabled productivity and efficiency benefits of approximately £27.8bn increase in GDP.

This estimate does not include the contribution to GDP that digital innovation from incumbents, new entrants, peer-to-peer markets or individuals themselves will make. This, whilst difficult to quantify, is likely to be significantly greater.

2.2.1 Personal Data Mobility Innovation Opportunity

The scale of the opportunity presented by innovation that is enabled by personal data mobility will be significant.

Personal data mobility can spur innovation in many different areas:

- **Product/service design and delivery:** new products and services more tailored to peoples’ specific life needs.
- **Business models:** some organisations will use ported data to create new services that can be directly charged for (new revenue streams), others to cut costs and improve quality and competitiveness; others will charge for the provision of enabling services (such as personal data management services).
- **Platform:** personal data mobility could stimulate the creation of new data platforms. For example, Modalgo aims to create a data platform for the travel industry to build a complete picture of travellers’ journeys door-to-door using multiple modes of transport e.g. walking, car, taxi/Uber, train, plane, boat. Another company we spoke to is developing a data platform for the high-street retail industry.

- **Ecosystem:** ultimately, a data ecosystem organised around personal data mobility looks, feels and works very differently to an ecosystem organised around data silos. We expect to see the emergence of nested data ecosystems specialising in different types of data such as health, media and money, with specialist services creating connections between them.
- **Technology:** the technologies needed to ensure safe, efficient data porting, information logistics, and interoperability.
- **Infrastructure:** personal data mobility will require innovation in infrastructure to enable new forms of data management, for example: data release, capture, cleanse, re-structure, processing and analysis. Further, core services will be required that enable the value to be realised from data mobility, such as consent management, digital identity and data security. (See Enablers in Section 4). This demand will provide opportunities for new revenues streams in the UK and in export markets.

“ *It would be advisable to take the infrastructure created for open banking and build on it; create a roadmap of incremental data that is complying with the standards.* ”

Matt Hammerstein, Managing Director, Head of Barclaycard UK and Retail Lending (and Co-chair of Open Banking Working Group)

Appendix 3 illustrates the vast array of different forms that personal data mobility enabled innovation and growth could take.

“ *The cross-sector use cases will be compelling. You need to identify the number of people it would be valuable for, the size of the benefit and make it happen.* ”

Matt Hammerstein, Managing Director, Head of Barclaycard UK and Retail Lending (and Co-chair of Open Banking Working Group)

From an economic viewpoint, the effect of personal data mobility in enabling diverse data sources to be more readily accessed will stimulate recombinant (data combining) initiatives, fuelling innovation.

2.2.1.1 Recombinant Innovation

Combining data traditionally held by different parties in novel ways can drive innovation in both product and service development and in production methods.

Because different data sources can be combined in innumerable ways it is difficult to predict the way innovation will go. It is difficult therefore to reliably model the economic effects of recombinant innovation. However, the vast potential for combining data sources makes it undoubtedly an important driver for future growth.

“ *For someone like Barclays, the business case is enormous. Firstly, it could help connect internal silos. But Barclays could also offer its customers a PIMS service seeded with Barclays data that customers could extend. Barclays could then monetise that service, for example from the credit reference bureau whose score would be included. Barclays could sell the due diligence / KYC carried out on the customer via a PIMS.* ”

Ben Helps CEO, Factern

Potential examples include:

- **Money Management:** Data ported from multiple financial service providers can create a complete picture of an individual's financial position as the basis for the provision of financial advice.
- **Health Management:** Combining data from various fitness and well-being services can increase the ability to maintain a healthy weight. This could include combining exercise tracking data (such as Fitbit or Nike), food consumption data (from digital receipts), stress levels (from services such as Empatica Embrace) and sleep patterns (from Withings Pulse or Nokia Sleep) alongside weight data (from Nokia Body+ or Weight Watchers Precision).

“ *Data portability can assist with the health co-operatives created by people, with long term conditions who are pooling their data for it to be shared with medical research bodies or pharma companies under the terms that the co-operative stipulates.*

Tom Symons, Principal Researcher, Government Innovation, Nesta

Whilst these examples provide opportunities for new revenue streams, in the weight management case for Nokia, in the case of Money Management for financial institutes, it is important to note that opportunities and the data relating to them are not constrained within individual sectors.

People will increasingly expect products and services more attuned to their lives – helping them make complex decisions and simplifying time-consuming tasks. Servicing this need will demand new solutions built on data sources across multiple sectors and creating business opportunity for new market players, such as ‘Next Generation Intermediaries’.¹⁸

2.2.2 Personal Data Mobility Productivity Opportunity

Personal data mobility will reduce the cost of accessing data, enabling businesses to acquire more data cost-effectively, which will stimulate increased output and improved efficiency (economies of scale). Also, increased sharing by individuals of their data with businesses can have a multiplier effect (Positive Externalities), where the data is used by businesses to improve products and services to the benefit of all individuals.

The economic analysis illustrates the impact from personal data mobility enabled productivity and efficiency benefits of approximately £27.8bn increase in GDP.

“ *Data portability means more data in the economy therefore net positive.*

John Gibson Director of Data Science Consulting, ASI Data

2.2.2.1 Productivity Benefits from Increased Use of Data

Personal data mobility could deliver economies of scale in the use of data by businesses. For businesses over a certain output range, any production process in which data is a material factor in production will benefit from more data being used.

More ready access to wider data sets increases the ability of business to use the right data – type and quantity – to achieve optimal productive efficiency. The use of more data leads to higher productivity without corresponding increase in data usage costs.

18. [Ctrl-Shift \(2014\) Next Generation Intermediaries. The maturing market for decision support services. Ctrl-Shift](#)

2.2.2.2 Productivity Opportunities from Increased Scope of Data Inputs

Easier access to a greater variety of data will lead to reduced production costs and better tailored and better targeted products and services.

For example, more ready access to different types of data provides better insight of consumer behaviour and is an important driver of consumer-data analytics. This insight can increase the efficiency of service and product development, and enhance the effectiveness of marketing. The net effect being both greater

“ *Increasingly rich data will become available as a result of data mobility (as is happening with the implementation of Open Banking), with new data sources being made available by HM Government, social media companies, utility companies, etc.*

Miles Cheetham Head of Propositions, Open Banking

value for individuals and reduced cost for business.

Better insights from more varied data sources also allows businesses to tailor prices to buyers - price discrimination. Price discrimination is typically not beneficial for individual consumers but can be beneficial for the economy as a whole. It is based on gaining an understanding of the price tolerance levels of consumers, and adjusting pricing accordingly, so each customer pays the maximum price they are prepared to pay. Price discrimination increases overall economic efficiency if it leads to more sales.

However, for consumers as a group, price discrimination has a negative impact if each consumer pays the maximum price they can tolerate – consumer surplus is eroded. This negative impact is investigated in the 2018 Green paper on ‘Modernising Consumer Markets’¹⁹.

This also found that consumers surveyed perceive personalisation to be unfair: 78% of UK internet users who were surveyed think that online platforms should be regulated to limit the extent that search results are personalised using consumer data.

2.2.2.3 The Wider Value Opportunity from Increased Data Sharing

Increased data availability and an increased number of users of data and data services can create broader benefit. Value can be produced by sharing data that benefits more parties than those directly involved in the sharing of their data (positive externalities). When an individual shares data with an organisation in exchange for a product or service, the data provided can be used by the organisation to improve its products or develop new ones.

This benefits not only the individual who originally shared the data, but potentially a wide cross-section of individuals. The aggregation of such data sharing across a large number of individuals has the potential to multiply benefit to all. For instance, in health applications, if more health data were to be made available, through the use of analytics, a better understanding of health issues and better health outcomes will be achieved. Also, in this way, predictive health services will be improved to enable better health outcomes to individuals.

“ *Data Mobility can help with resource wastage when you don’t have the data in the right place, e.g. in Health there is lots of wasted time.*

Anthony Jenkins CEO 10X Banking

19. [Department for Business, Energy and Industrial Strategy \(2018\) Modernising Consumer Markets. Department for Business, Energy & Industrial Strategy](#)

2.2.2.4 Network Externalities

Additionally, as with any network such as a telephone service, the more people that contribute to it the more value each contributor can receive (network externalities). With data this is seen in examples such as social media, the more people that contribute their information, the more the service is able to help bring people with common interests together.

Through these external effects, increased data availability and an increased number of users can also create positive outcomes for society as a whole. The health example will lead to substantially improved health outcomes across society. In financial services applications, these effects will help to reduce poverty through better financial management and the enablement of better risk assessment.

“ *Social equality has the greatest potential benefit [with data mobility].*

Dr Victoria Nash Deputy Director, Policy and Research Fellow, Oxford Internet Institute

An important factor in this situation where society as a whole benefits more from data sharing than any individual is that people do not share enough data. When deciding how much data to share, the individual does not typically take society into account. Therefore, the individual will generally share less than would be fully beneficial to society. This consequence provides a rationale for government intervention, as discussed in Section 2.4.4 below.

2.2.3 Competition and Market Dynamics

The effect of personal data mobility on the market will likely be a reduction in frictions in transactions involving personal data. Reduced friction impacts the competitive environment and resource allocation within markets which, in turn, influences innovation and drives consumer choice.

“ *There is huge value for individuals from reducing friction in the economy [via Open Banking]*

Matt Hammerstein, Managing Director, Head of Barclaycard UK and Retail Lending (and Co-chair of Open Banking Working Group)

2.2.3.1 Competition, Innovation and Collaboration

Personal data mobility can stimulate innovation in competitive markets. Greater access to personal data means that new entrants can more readily understand consumer needs and the competitive landscape. This reduces barriers to entry, enabling products and services to be better optimised to meet market needs, and to be promoted more effectively. The impact of these reduced barriers to entry will depend on market characteristics. The potential for highest impact by new entrants lies predominantly in markets where there is a high concentration of dominant suppliers and the market is not highly competitive.

In these market conditions, the potential profits to new entrants in escaping the competition by offering new products and services is increased, as the existing players will not have been forced into being efficient by competitive pressure. But the risks of failure are higher, as the scale of existing players gives them the resources to crush new entrants.

Conversely, the profits that successful new entrants can anticipate in a more balanced competitive market landscape are generally likely to be lower because profit margins are lower in competitive markets and competitive dynamics mean innovations are more quickly replicated.

Personal data mobility can also enable new levels of collaboration between market incumbents. A number of examples are already emerging of well-established businesses entering into new data collaboration initiatives, particularly in the face of competition from a very dominant market player. Market examples include an initiative where 24 retailers share data to improve personalisation of marketing to consumers.

2.2.3.2 Competition and Consumer Choice

Personal data mobility can support the growth of healthy markets, stimulating competition and consumer choice. The nature of the impact will again depend on the characteristics of the market.

With greater mobility of data, individuals will be able to more easily react to price signals and switch to the supplier that offers the best deal. Rather than re-entering information or waiting for data to accumulate, an individual can simply ask for their data to be transferred. Particularly in situations where the data involved is large and/or complex, the friction reduction is considerable, resulting in significantly reduced switching costs.

In markets with lower concentrations of suppliers this reduction in barriers to switching can stimulate increased competition. With lower switching costs it is easier for new market entrants to attract consumers away from existing suppliers thereby strengthening their business case for market entry. Existing suppliers will need to react to the risks of higher consumer churn in these new market conditions.

However, the net benefits from government encouraging mobility as a means of supplier switching (following the model of the current account switch service) were assessed in this economic analysis as low. Such an intervention would be unlikely to address the fundamental behavioural issues underlying a lack of switching; cognitive limitations prevent consumers from recognising the value of switching.

It should also be noted that in markets where there are dominant suppliers because of network effects, the result of reduced friction might be that consumers gravitate towards the incumbents, thereby increasing market concentration. If it is the case that the bigger the network, the more value an individual consumer gains, moving data to the largest network generates the most consumer value. A risk in greater market concentration is that the positive effects of competition could be reduced.

Markets relying heavily on data, such as financial services, e-commerce and entertainment, are often characterised by having network externalities. These arise because, the greater the usage of the product or service, the more data the provider has available to refine and tailor its product to consumer needs, and deliver greater value. Such markets might be particularly susceptible to increasing concentration as a result of reduced friction delivered by personal data mobility.

2.3 The Benefits of Personal Data Mobility to Participants in the Digital Economy

As introduced in Section 1, which set the scene for personal data mobility, a new model where data is able to flow safely and efficiently to where it can create maximum value will have multiple benefits and implications for all parties involved in the digital economy.

To structure the analysis of these benefits and implications, the study has classified the participants and entities in the digital economy as follows:

- Stakeholders - those parties directly engaged in the exchange and management of their own or third-party data. These comprise:
 - Individuals: empowered people acting on their own behalf and in groups or communities
 - Organisations: service or product providers including:
 - Incumbents including private and public-sector businesses, and government departments in their role as managers of data
 - New-entrants: including both entrepreneurs building new businesses around product and service innovation, and existing organisations entering into new markets.
- Governors and regulators – those parties engaged in establishing and maintaining the rules that govern the functioning of the market, comprising:
 - Government in the role of law-makers
 - Regulators and authorities, ensuring compliance and operation of a fair market
- UK economy and society

The subsections below summarise the benefits of personal data mobility for each of these entities. (The analyses of Core Issues and Challenges, and Enablers in the following sections of this report consider their implications for the Stakeholder groups.)

2.3.1 Stakeholders

2.3.1.1 Individuals, groups and communities

Decisions regarding the mobility of personal data will significantly be in the hands of the individual. This empowerment will have material value. Individuals will determine whether data is opened up to firms, and to which organisations. This could allow them to extract more of the innovation and productivity benefits gained by organisations. An individual can withhold data from firms providing bad offers and give it to firms providing good offers. Personal data mobility increases the probability that individuals will be able to access a wider range of better services and products from existing providers and benefit from innovative services from new entrants operating in more open and competitive markets. Individuals will have greater opportunity to build up their own personal data assets – either under their direct control or managed by independent third parties on their behalf.

These personal data management services will enable personal data assets to appreciate in richness and value over their lifetime; becoming a valuable resource for themselves and the organisations they choose to deal with.

Health-related applications that provide different Lifestyle-monitoring data are an obvious example. Combining, for example, heart rate monitoring data with sleep cycle data could provide a better overview of health (personal analytics – sometimes known as quantified self). Also, vulnerable people in society could be beneficiaries. The 2018 BEIS green paper on ‘Modernising Consumer Markets²⁰’ describes how, by understanding bills better, vulnerable people can make better decisions and become less reliant on particular service providers.

“ *There is utility from data portability for the customer so they can manage their off and online behaviour.* ”

Sara McVittie, Co-Founder, Dressipi

20. [Department for Business, Energy and Industrial Strategy \(2018\) Modernising Consumer Markets. Department for Business, Energy & Industrial Strategy](#)

The empowerment offered by personal data mobility makes new peer-to-peer community-based services possible. The ability to readily access, share and process information on issues of common interest can fuel the practical innovation of new services driven by like-minded people across a wide variety of applications including health, home, family, and finance. For example, “Patients Like Me” helps patients share information about their conditions and treatment to help them manage difficult illnesses. Many community and volunteer groups need data about volunteers’ credentials and backgrounds before they can take them on.

2.3.1.2 Organisations

Incumbents

For incumbent service and product providers, (private and public-sector businesses, and government departments in their role as managers of data), data mobility provides the opportunity to build entirely new trust-based relationships based on consented information from empowered consumers. Most providers have a view of their customers which is bound by the services and products they have been delivering. For example, with Clubcard, Tesco knows what its customers buy at Tesco but not what they buy at Sainsbury’s or elsewhere while with Nectar, Sainsbury’s knows what its customers buy at Sainsbury’s, but not at Tesco. Neither Tesco nor Sainsbury’s knows the context of their customers’ lives. For example, what their hobbies are or where they go on holiday. This limited vision applies in all industry categories.

Personal data mobility can provide incumbents with the opportunity to round-out their understanding of customers, using the insights generated to: incrementally improve services and products; innovate new ones, and improve the effectiveness of marketing and operations. Economies of scale and scope of data inputs described in Section 2.2.2.1 and 2.2.2.2 can lead to reduced production costs and better-tailored and better-targeted products and services.

Particularly for larger incumbents, the effects of positive externalities described in Section 2.2.2.3 can become significant. More sharing of personal data by individuals with organisations can be used to improve products and services, to the benefits of all consumers and to the organisation. Personal data mobility can also enable closer collaboration between organisations, simplifying information exchange and data combination in addition to building alliances.

New entrants

Personal data mobility can open the door to new arenas of recombinant innovation for new entrants, especially around services and products requiring the integration of data from previously separate providers. Examples might include: ‘manage my pensions’, ‘manage my warranties’ and integrated financial advice. Incumbent services providers have little or no incentive to provide such services: why should Pension Provider A create a service that helps a customer keep in touch with Pension Provider B?

Because such market offerings fall between the stools of today’s value propositions, new entrants who are not held back by the legacy systems, financial incentives, mindsets and competitive priorities that often hamper existing providers, will be well positioned to provide them.

More ready access to different types of data can provide better insight of consumer behaviour and needs. This will enable new entrants to better shape and target innovative new products and services, thereby reducing barriers to market entry and risk.

The positive competitive effects that personal data mobility has on markets will enable consumers to respond more readily to new products and services introduced by new entrants, reducing friction and accelerating adoption.

2.3.2 Governors and regulators

Consideration of the implications of personal data mobility for the parties engaged in establishing and maintaining the rules that govern the functioning of the market includes:

- Government in the role of determining and establishing the law that governs the operation of the market.
- Regulators and authorities which ensure that the market operates in compliance with the law and established regulatory principles – maintaining healthy markets and fair treatment of market participants

2.3.2.1 Personal Data Mobility and the Digital Charter

Through its Digital Charter, the Government has committed to make the UK both the safest place to be online and the best place to start and grow a digital business. It wants the UK to lead the world in innovation-friendly regulation that encourages the technology sector, provides stability for businesses, increases public confidence and trust in new technologies, and creates the best possible basis on which the digital economy can thrive.

If well implemented, data mobility could be a significant contributor to all of these objectives. Indeed, without it, opportunities to innovate and create new value from personal data will remain restricted.

The table below outlines the main ways in which data mobility and the Digital Charter are mutually relevant.

Key principles in the Digital Charter	Relevance of data mobility
The internet should be free, open and accessible.	Data mobility is building on this principle applying it not only to generic information access and sharing but to personal data.
People should understand the rules that apply to them when they are online.	It is essential that there are clear and easy-to-understand rules, rights and responsibilities relating to data mobility - information that is going to be shared, potentially at scale, online
Personal data should be respected and used appropriately Protections should be in place to help keep people safe online, especially children.	This is absolutely core to the content and context of data mobility Safety must be a cornerstone of implementation of personal data mobility
The same rights that people have offline must be protected online.	The same applies to data mobility
The social and economic benefits brought by new technologies should be fairly shared.	Data mobility is potentially one of the most powerful mechanisms to help bring this about

Appendix A2.1 lists the Digital Charter’s work programme with a summary of the relevant contribution from data mobility.

2.3.2.2 Personal Data Mobility and the Industrial Strategy

The Government's Industrial Strategy focuses on four Grand Challenges of:

- AI and the data economy
- Clean Growth
- The Future of Mobility
- An Ageing Society

The Industrial Strategy also outlines five Foundations of Productivity - the essential attributes of every successful economy:

- Ideas – the world's most innovative economy
- People - to generate good jobs and greater earning power for all
- Infrastructure - a major upgrade
- Business Environment - To be the best place to start and grow a business
- Places: prosperous communities across the UK.

Appendix A2.2 provides more detail on the role of data mobility in addressing aspects of each of these Grand Challenges. It also outlines data mobility's relevance to the Foundations of Productivity.

2.3.3 Benefits of Personal Data Mobility for the Economy and Society

2.3.3.1 Benefits for the Economy

The potential benefits of personal data mobility are not restricted to the new services they make possible. The development of the supporting technologies, infrastructure, skills and capabilities delivers supply side benefits, enabling the economy to be more productive, leading to a boost in growth.

If the UK takes a lead in data portability firms developing these new technologies, skills and capabilities for the UK market will be in a good position to sell them to other countries wishing to adopt similar strategies, delivering an additional export boost. Examples of these new technologies and infrastructure include information logistics and interoperability tools e.g. providing data translation services, data governance, consent management and transparency services, and data security.

2.3.3.2 Benefits to Society

The public, social and charitable sectors service providers are on a constant quest to provide better, more personalised relevant and consolidated services (integrating the inputs of many different agencies) at lower cost. Very often the greatest barrier to this is the inability to access the data that they need or the costs of doing so. Personal data mobility could enable the creation of new data sets that help achieve these goals of services that are both better and cheaper to provide.

Many pressing issues in tackling poverty and addressing health, human rights, education and environmental issues rely on access to data and, often, personal data. Because data mobility means that access to data is no longer restricted to the organisation that originally collected and can now be shared on individuals' request, it enables the flow of data to initiatives seeking to use data in this way.

At the same time, in public services especially, there is an urgent need to integrate the activities of many different organisations and agencies to create truly consolidated person-centric services. However, different parts of the picture are held by different organisations in separate data silos and privacy and data protection regulations create barriers to data sharing where the individual is not directly involved. By enabling individuals to request that the data be shared, personal data mobility is a key enabler for the creation of these consolidated services.

3. CORE ISSUES AND CHALLENGES

3.1 Conclusions from this section

- Our analysis determined five Core Issues that are at the heart of the challenges associated with personal data mobility. The interrelated nature of the Key Challenges and the interconnected structure of the market system needed to develop personal data mobility mean that progressing one Key Challenge independently of others could create unintended consequences and risks.
- The Core Issues provide a clearer view of the complex multi-dimensional challenge space and can form the basis of a structured approach for approaching personal data mobility making it safe, easy and valuable.
- The Core Issues are:

Core Issue 1: Infrastructure & Standards:	A number of Key Challenges repeat across the stakeholders and relate to the need for common technologies, standards and services. Progress on these will reduce the cost barriers and risks preventing businesses taking action on personal data mobility, and will reduce the risk posed to citizens by inadequate infrastructure. Digital Strategy.
Core Issue 2: Individuals' Know How:	Consumers have a lack of know how and understanding of the digital market, and limited knowledge about their data, how it is used, and how they could use it. This makes individuals vulnerable to abuse and lacking in the skills required to access value through their data.
Core Issue 3: Adaptive Regulation:	Well-functioning markets require strong regulation and legislation. To match the pace of change in a fast-moving developing market such as personal data mobility, regulators and government need new levels of knowledge, skills and adaptiveness to ensure successful market development at pace.
Core Issue 4: Services & Applications:	There is a lack of services and applications that enable individuals to use personal data to create value for themselves and others. These fall into two categories: Personal Data Management Services, and Personal Information Management Services comprising Decision Support Services and Life Management Services.
Core Issue 5: Incumbent Business Case:	There is not a clear or compelling enough case for business to embrace personal data mobility with measurable costs and risks. There is a lack of proof points for the innovation opportunity.

3.2 Core Issues

Our analysis determined five Core Issues that are at the heart of personal data mobility. These were developed by prioritising and amalgamating the Key Challenges to the realisation of personal data mobility which emerged from our research.

The Core Issues approach is important because of the interrelated nature of the Key Challenges. The interconnected structure of the market system needed to develop personal data mobility creates multiple connected risks and consequences. Progressing one challenge independently of others could create unintended consequences and risks and potentially new challenges in the other parts of the market, or for other stakeholders.

The Core Issues analysis provides a clearer view of the complex multi-dimensional challenge space and can form the basis of a structured approach for tackling personal data mobility; with stakeholder motivations aligned.

Our analysis identified five Core Issues. The Core Issues are derived from the 18 Key Challenges (described in Section 3.4.) by analysing the characteristics of them from the perspectives of:

- Their inter-relationships with each other
- The different impacts they have on the success of personal data mobility
- The different impact they have across and on different stakeholders

The resulting Core Issues are:

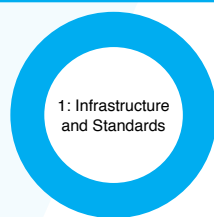
- **Core Issue 1:** Infrastructure and Standards
- **Core Issue 2:** Individuals' Know How
- **Core Issue 3:** Adaptive Regulation
- **Core Issue 4:** Services and Applications
- **Core Issue 5:** Incumbent Business Case

3.3 Core Issues – Implications for Stakeholders, and underlying Key Challenges

This section provides further detail on the Core Issues, relating them to their underlying Key Challenges (see Section 3.4 for details of Key Challenges) and describing what the Core Issues mean for each of the stakeholder groups. This helps understand in more detail how the market development agenda can be structured.

N.B. Due to the interrelated nature of the market the Key Challenges often repeat across the Core Issues.

Core Issue 1: Infrastructure and Standards



The development of common and robust standards, technologies and services is vital to the creation of a healthy market that has personal data mobility at its core. Until these are developed, the risks and costs of data mobility for all of the stakeholders are significantly increased, and the rate of market development and access to the opportunities is significantly slowed. There are a number of Key Challenges that relate to multiple stakeholders which evidence the need for infrastructure and standards.

Key Challenges:

- Primary Challenges: Digital Identity; Liability Models; Inadequate Consent Mechanisms; Interoperability; Safe Data Sharing; No Data Access Standardisation
- Secondary Challenges: Data Burden; Lack of Individuals' Information Tools

What does this mean for stakeholders?

Individuals	Whilst individuals are not immediately impacted by the lack of Infrastructure and Standards, until they are in place, individuals are being denied the services and applications that can be built when enabling infrastructure exists.
Incumbents	<p>Because the investment in infrastructure and standards requires coordination and significant investment it is, of all of the Core Issues, the greatest barrier to the development of a tenable business case for investment in the personal data mobility market. This creates a barrier which limits incumbents' access to the value from potential efficiency and productivity gains, and revenues from new services and applications. They are also unlikely to make their data portable.</p> <p>Some incumbent businesses will also see market growth and revenue opportunities in the development and delivery of the infrastructure and standards.</p>
New Entrants	<p>As there is a lack of infrastructure and standards, new entrants have to invest in creating them to enable their businesses to develop valuable new services or applications for individuals. To date, this has meant that the new services and applications have been slower to market and often investment has been diverted into infrastructure development.</p> <p>Further, lack of infrastructure and standards makes raising investment by the new entrants challenging. Market progress on infrastructure and standards it is highly likely to encourage investment in innovation and new entrants.</p>

“ *There is a gigantic opportunity as data matters a lot. The value from data is expanding daily.* ”

John Gibson Director of Data Science Consulting, ASI Data Science

Key observations:

The development of infrastructure and standards is a circular problem. Development involves significant investment from market suppliers such as technology companies or infrastructure providers. This investment requires measurable market demand from businesses and individuals.

Market demand is unlikely to be significant without the services and applications for individuals (Core Issue 4) and the incumbent business case (Core Issue 5) which will not be apparent until the infrastructure and standards are available. Market suppliers are therefore unlikely to prioritise the investment in the development of the infrastructure and standards.

Core Issue 2: Individuals' Know How



Individuals lack of know how of the digital market and about their data, its uses and how they could use it. Many individuals lack the skills to use current and future services and applications. This will disadvantage them as they may not be able to achieve increased personal efficiency and productivity and may miss out on costs savings and new value enabled by the services and applications. This makes the individuals vulnerable to abuse and lacking in the skills to access the value.

Key Challenges:

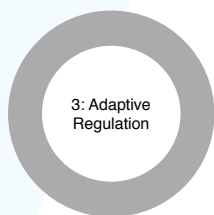
- Primary Challenges: Data Rights Not Known; Value Not Recognised By Individual; Individuals Lack Know How; Individuals' Risk Complacency
- Secondary Challenges: Safe Data Sharing; Inadequate Consent Mechanisms; Liability Models

What does this mean for stakeholders?

Individuals	A lack of know how makes individuals vulnerable to abuse and less able to access the value enabled to them by data mobility. A lack of digital data know how in the digital age creates disadvantages for individuals similar to those caused by a lack of the ability to read and write in the industrial economy. This has the potential to further accentuate a digital divide and wealth divide as data-driven services for individuals emerge ²¹ .
Incumbents	For incumbents, the lack of individuals' know how creates a vacuum of consumer demand as individuals are less likely to engage with new services and applications. This significantly contributes to a lack of business case for participation in data mobility. Because individuals generally have a poor understanding of the digital economy and use of data they are less likely to be able to manage the risks that personal data mobility creates and, in doing so, create risks for incumbents.
New Entrants	For new entrants, the lack of consumer know how limits access to consumers and therefore growth. Because the individuals lack know how they will be reluctant to use new data-driven services, and to share data, despite their new rights to data portability in GDPR. The lack of know how also offers new entrants an opportunity to provide services that are designed to reduce the need for know how and in turn educate individuals. Although this could require a significant investment it could also offer a point-of-difference for new entrants, providing the basis for a sustainable market position.

21. understanding.doteveryone.org.uk

Core Issue 3: Adaptive Regulation



Well-functioning markets require strong regulation and legislation. In a fast-moving market, regulators and government must have a level of knowledge, skills and adaptiveness to ensure the market develops successfully. Without regulation that can adapt it is hard to ensure that citizens are safe and are able to access the benefits available to them.

Key Challenges:

- Primary Challenges: Skills Gap; Traditional Regulation

What does this mean for stakeholders?

Individuals	Without strong and appropriate legislation and regulation the market will not be kept safe for individuals and may limit the value they can access.
Incumbents	Without strong and appropriate legislation and regulation the market could fail, leaving incumbents unable to realise the value of investment. On an international stage this has the potential to create long term disadvantage for incumbents that invest.
New Entrants	Without strong and appropriate legislation and regulation the market may fail, taking new entrants and their investors with it. This risk may discourage investment in the market and slow innovation and market new entrants.

Key Observation:

Without adaptive regulation there is a threat that the regulation is miss-shaped and/or out of step with opportunities and risks, significantly slowing development of the market opportunity. This may create constraints on the value of the market which in turn may constrain the appetite for investment.

To create adaptive regulation requires a significant focus, investment and change on behalf of government and regulators. This has been much discussed by governments and businesses and many businesses are clearly calling for this change.

Core Issue 4: Services and Applications



There is a lack of services and applications that enable individuals to gather, manage and share their personal data, and so to create new value in their lives.

These services and applications fall into three broad categories:

- **Personal Data Management Services (PDMS):** services or applications that enable the individual to gather, manage and share their personal data from multiple places and to use that data e.g. easy form filling, fast online checkout.
- **Decision Support Services:** services or applications which help individuals make decisions using their data to inform that decision or automate it, such as where to go to the gym while travelling. Currently, the information to enable these services is embedded within existing proprietary services or applications such as those provided by Amazon or Google. This makes it harder to gain the value from combining data from multiple services or applications and contributes to increased market concentration within those services.
- **Lives Management Services:** services or applications which bring together a complex set of decisions to help individuals manage their life better, such as organising children's education. Without these services individuals do not have the tools to act responsibly and safely in the market to ensure all players are protected. These services, if designed to deliver the value to the individuals will act as a part of the solution to the Individuals' Know How Core Issue.

Key Challenges:

- **Primary Challenges:** Data Burden; Lack Of Individuals' Information Tools; Value Not Recognised By Individuals; No Data Access Standardisation
- **Secondary Challenges:** Digital Identity; Data Rights Unknown; Risk Complacency; Safe Data Sharing

What does this mean for stakeholders?

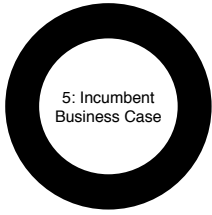
<p>Individuals</p>	<p>Unlike businesses, individuals lack strong services or applications to help them to manage and use their data. Because of this they are at risk of making mistakes with their data, and of putting themselves at risk from issues such as identity theft and fraud.</p> <p>They may also put others in the ecosystem at risk through inadvertently over sharing, for example exposing other individuals' data (sharing a friend's phone number with someone who doesn't need it) or an organisations data (sharing with the wrong person their bank account details which leaves the bank liable for damages or reputation damage²²).</p> <p>Without the new services and applications, individuals are likely to fear making a mistake or won't bother engaging in the first place, which will impact the benefits to them and other stakeholders. Also, in the absence of these services and applications individuals are likely be unable to be as productive or efficient as they could be.</p> <p>The burden on individuals of understanding and know-how is far greater without services and applications that help them manage and use their data. Well designed digital services working within a market enabled by strong regulatory and governance frameworks should provide services where the individual is not asked to check or ensure they are safe. A good example of this is in the health sector where the governance of the quality of medicine ensures the individual doesn't have to worry (by and large) about the safety and effectiveness of their medical treatment.</p>
<p>Incumbents</p>	<p>The lack of personal data management services (specifically to gather, manage and share individuals' data) prevents the market from being safe and easy. This increases the measurable risks and costs for incumbents which negatively impacts the business case for investment and data sharing.</p> <p>Because of the lack of services and applications for individuals, incumbents are not seeing the consumer demand for the services. They are therefore not inclined to prioritise the innovation growth opportunity in the development of new services and applications and are also unlikely to invest to make their data available for use by any service or application. This is a chicken and egg situation.</p>
<p>New Entrants</p>	<p>These tools are one of the main opportunities for new entrants. The lack of engagement by individuals and the lack of data from incumbents severely hampers the value that can be created by new entrants and the funding they can raise. As the new services and applications emerge they will stimulate new investment by new entrants on these and wider services.</p>

“ *Data Portability isn't the issue, it's what can be done with the data at the other end that matters.* ”

Liz Coll, Head of Digital Advocacy, Consumers International

22. [Ginnis S, Stamper P, Byrne A, Garrett C, Strong C \(2018\) Open Banking Data Sharing Dilemmas. Ipsos MORI Social Research Institute](#)

Core Issue 5: Incumbent Business Case



There is not a clear, or compelling enough case for business to embrace data mobility. It is relatively easy for business to identify and measure the risks and costs (many of which are amplified by the lack of infrastructure and standards).

However, because the greatest opportunity lies in the growth from innovation and, more broadly, in the benefits for society, the business case for investment is challenging for the majority of businesses.

Key Challenges:

- Primary Challenges: Brand Risk; Value Not Recognised by Individuals; Digital Identity; Liability Model; Interoperability; Safe Data Sharing; Cost Burden; No Data Access Standardisation
- Secondary Challenges: Lack Of Individuals' Information Tools; Inadequate Consent Mechanisms

What does this mean for stakeholders?

Individuals	Without a business case incumbents will not invest in releasing the data which will mean that individuals will not be empowered with their data and the services and applications that will enable them to be more efficient and productive.
Incumbents	Because of the lack of business case, incumbents will be unable to access the value from the potential efficiencies and or productivity, and the new services and applications which can create new revenue streams.
New Entrants	Because the business case for incumbents is not apparent there will be a lack of portable personal data available from the incumbents. This will hamper the new entrant's ability to develop services and applications and deliver value to their consumers and shareholders.

“ *If it wasn't for regulation, there wouldn't be any force for change.* ”

Jerry Norton, Head of Strategy, Financial Services, CGI

3.4 Key Challenges

The extensive research carried out in this study resulted the identification of a long list of over 90 challenges. As different stakeholders see and articulate challenges from different perspectives, there was some duplication in this list and we were able to rationalise the list, to the identify 18 Key Challenges.

The following table summarises the Key Challenges and indicates their impact on the stakeholder groups.

Key: **Green** = primary challenge for stakeholder.
Yellow = secondary challenge for stakeholder.

Summary of Key Challenges		Stakeholders		
Key Challenge	Description	Individual	Incumbent	New Entrant
Data burden	The envisaged involvement of individuals in accessing, managing and using their data creates a burden on the individual. Whilst individuals say they want to exercise more control over their data, very few want to invest more time and effort doing so. The data burden on individuals will increase unless they have the services or applications to help them manage their use of personal data.	Green	Yellow	Yellow
Value not recognised by individuals	Individuals do not understand the value of their data and what they should/could get in return for it ²³ . This means that they are unlikely to be able to engage in ways that best advance their interests.	Green	White	White
Data rights unknown to individuals	Individuals largely do not know what their data rights are or how to use them. Many feel, from experience, that there is nothing effective they can do to assert control over their data and have often given up trying. This could delay take-up of new opportunities and services and/or result in lax processes that open the door to abuse, scandals, negative media stories and a sentiment backlash.	Green	Green	Yellow
Individuals' lack of knowledge	Individuals largely do not understand what happens with their data and (linked to their lack of understanding of their data rights) and may tend to 'stick with the status quo' rather than engage in the opportunities in a more data-mobile market.	White	Green	Green
Individuals' risk complacency	Individuals being complacent about data sharing and the risks there-in, because (up until now) any problems have been 'masked' by the company managing the data. For example, if someone inadvertently shares information that allows someone else to remove money from their bank account, the bank covers the fraud in many instances. It may not be tenable for organisations to cover the fraud where they have decreasing levels of control over the access, quality and use of the data.	White	Green	Yellow
Lack of individuals' information tools	Not enough usable/desirable information services or applications available to individuals in market (Personal Information Management Services, PIMS). This means there is little value flowing to the individuals from the use of their data.	Green	Yellow	Yellow

Safe data sharing	Individuals, or organisations on behalf of the individual, sharing data, not knowing if it is safe to do so with a third party organisation or person. Partly, this relates to the need for robust processes for two-way identity assurance. But the bigger challenge is service providers that, deliberately or otherwise, gain individuals' consent to access data with promises to protect it, and then change their policies or break their promises.			
Resistance to data sharing	Businesses not naturally sharing data because they see it as key to their competitive advantage			
No data-access standardisation	The lack of standardisation of data access (what data will be accessed and how will it be accessed) prevents the dynamic and live use of data. This restricts the value that can be created. (This is separate to the interoperability of data.)			
Cost burden	Organisations, primarily incumbents, fearing that data mobility will create new data management costs in their business.			
Innovation opportunity missed	Organisations not seeing or being able to measure the innovation opportunity. Not being convinced that accessing additional data sets will make a significant impact on their profits or performance.			
Brand risk	Even if legal liability issues are clarified, incumbent organisations still fear reputational damage if data is ported to the wrong parties or used in ways which harm consumers. New entrants will also risk reputation damage likely to have less long-term brand investment and brand profile			
Liability risk	Organisations fearing a lack of clarity over where liability lies if data is ported that results in actions which harm consumers. This lack of clarity could leave the business or the consumer with liabilities that are poorly understood and potentially damaging. Strictly speaking, the data controller is not responsible for data once it has been ported. But other requirements (e.g. the responsibility for taking all security measures needed to ensure personal data is securely transmitted to the right destination, and to recommend appropriate format(s) and encryption measures to consumers receiving their own data ²⁴) create new grey areas where organisations could be blamed if things go wrong.			
Inadequate consent mechanisms	Lack of a robust, universally accepted and applied solutions for gaining informed consent for data processing. This exacerbates concerns about both potential costs, and liability for Incumbents and New Entrants.			

<p>Interoperability</p>	<p>Technical solutions and capabilities that enable the secure, easy and rapid exchange of data (technical, syntactic, semantic) are not yet advanced enough.</p> <p>Lack of standardised interoperability adds costs for all organisations implementing personal data mobility.</p> <p>A lack of interoperability standards creates potential for confusion over the data held and how it can be used, reducing the value of the market for all stakeholders.</p>			
<p>Digital identity</p>	<p>Lack of two-way digital identity assurance undermines and delays efforts to make personal data mobility safe, easy and valuable.</p> <p>A lack of Digital Identity exacerbates the challenge of Safe data Sharing; the risk of sharing the data with the wrong people / service providers. It also reduces the value of the data as personal data that is identifiable offers more opportunity for value creation and is one of the key enablers for recombinant innovation.</p>			
<p>Traditional regulation</p>	<p>Traditional approaches to regulation struggling to keep up with markets and technologies that are evolving extremely rapidly.</p> <p>The risk is that regulators remain at least one step behind which has the potential to either stifle growth or put stakeholders at risk.</p>			
<p>Regulator skills gap</p>	<p>Policy makers and regulators lack the digital skills and agility required to support a dynamic, fast moving market.</p>			

23. [Miller C, Coldicutt R, Kitcher H \(2018\) People, Power and Technology: The 2018 Digital Understanding Report. Doteveryone](#)

24. [Article 29 Working Party \(2016\) Guidelines on the right to data portability. Article 29 Data Protection Working Party](#)

4. ALIGNING THE STAKEHOLDER ENGAGEMENT

4.1 Conclusions from this section

Stakeholder engagement will play a critical and central role in the development of personal data mobility, which will require strong coordination.

The successful development of the personal data mobility market requires strong, coordinated and simultaneous stakeholder engagement. The multi-faceted and interrelated nature of personal data mobility challenges emphasise the need for active continuous participation by all stakeholders.

There are inevitably barriers to achieving this, with significant conflict in the motivations of many of the essential stakeholders. Many existing players benefit strongly from the status quo. Often competitive positions based on data assets rely on exclusive access to data. Movement from this position is frequently constrained by risks being more readily quantifiable than the strategic opportunities.

To achieve the engagement necessary, it is essential to have a well-developed understanding of the differing motivations of the key stakeholder groups. This study has provided the basis for this by examining stakeholder motivations specifically around the impact on each group of the key challenges to personal data mobility, as determined from the research. This analysis provides a key component for the development of an effective stakeholder engagement plan.

4.2 Aligning stakeholder engagement

The development of personal data mobility market requires a coordinated and strong development structure and effective stakeholder engagement. This is critical because all stakeholders are needed at the table, the motivations for the stakeholders are conflicted, and the challenges are interconnected and reinforcing.

4.2.1 All stakeholders are needed at the table

To develop the personal data mobility market, access is needed to multiple critical assets, capabilities and knowledge which are currently distributed across the stakeholders. The essential elements for success are:

To develop the personal data mobility market, access is needed to multiple critical assets, capabilities and knowledge which are currently distributed across the stakeholders. The essential elements for success are:

- Access to the data, to know what data is available and develop standards to make it interoperable.
- Data skills, both technical and data design skills.
- Access to the market, the individuals that will use the data, the knowledge of their needs and the ability to experiment with, and create value for the potential end users.
- Knowledge of and focus on the sensitivities of the consumer especially regarding privacy concerns.
- Knowledge of and responsibility for well-functioning markets.

Because of this it is essential to have all stakeholders actively participating in the development of the market.

4.2.2 The challenges are interconnected

As mentioned in the core issues and challenges section, the interconnected nature of the challenges to develop personal data mobility mean that progressing one challenge independently of others will create unintended consequences and risks.

For example, solving the data access challenge triggers the need for interoperability standards so that the data can be used when it is accessible. Solving interoperability standards and data access triggers the need for safe data sharing so that individuals and organisations know who they are sharing their data with and what these recipients will do with it. Solving safe data sharing requires a liability model so that everyone understands the risks they are taking and can manage them effectively. This interconnected nature of the challenges means that there is a need for coordination across the resolution of Core Issues.

4.2.3 Conflicting motivations

It is not unusual to need multiple stakeholders involved in the development of a market and their coordination is often required. However, the development of personal data mobility provides a significant challenge and a need for extraordinary coordination, facilitation and possibly coercion if the opportunities are to be realised within reasonable timescales. This coordination is not to be underestimated.

The reasons for this are because of the high stakes created by the current status of the personal data economy, and the challenges in developing the personal data mobility market.

- The current personal data economy and how it has developed means that those crucial stakeholders needed to develop the market have entrenched positions that prevent them from coming willingly to the table:
 - Culture and learnt behaviour: they have an inbuilt culture and learnt behaviour of data hoarding. This is primarily due to the fact that they see data as rivalrous rather than non-rivalrous, they are not working with data to exploit the shareable and almost infinite value of data, they are working with it as if it were finite and exhaustive. See section 1.
 - Competitive positions: their current and future competitive positions often focus on data as a key asset and having exclusive access to that data is seen as the unique asset rather than the way the data is used to create value.
 - Exploitation of asymmetries: many businesses are exploiting the asymmetries of data at the core of their current business models and maintain a competitive position by excluding others from having data access.
- The challenges in developing the market further exacerbate these entrenched positions of stakeholders:
 - Externalities: Access to the broader societal and individual benefits require greater data sharing than is measurably beneficial for any one organisation. Without coordination the societal benefit is likely to be significantly reduced.
 - Failure to self-coordinate: Organisations with seemingly conflicting motivations need to coordinate to access the opportunity. Much of the opportunity comes from combining data from multiple sources to create new value (recombinant innovation). This will require coordination across organisations with different data sources and often across sectors.

- **Measurable risks:** Because of a lack of infrastructure and standards there is an easy to identify and measurable set of risks that prevent participation. Brand and reputation risks are perceived as high, if data is not safely shared brands run the risk of reputation and possibly share price damage. This is further exacerbated, most significantly, by the lack of a liability model enabling businesses to clearly articulate and measure the liability that they and others are carrying by sharing personal data.
- **Measurable costs:** The lack of standards and infrastructure significantly increases the costs of data sharing, the need to invest in data access design, interoperability design and digital identity are all identifiable and measurable costs.
- **Non-measurable opportunity:** The recombinant innovation opportunity, being the largest opportunity for personal data mobility, is as yet unmeasurable.

4.3 Stakeholder motivations in detail

Given the need for strong and coordinated stakeholder engagement, it is essential to have a well-developed understanding of the differing motivations of the key stakeholder groups. The following summarises the challenges that have the greatest impact on each stakeholder group and outlines what it means for their motivation to engage in the development of personal data mobility.

4.3.1 Motivations for Incumbents

Many incumbents, new entrants and governments recognise the potential of data mobility to create significant growth and to support productivity and efficiencies. However, they can also see the risks and costs.

“ *If universal data mobility is to happen, it will have profound implications everywhere. Basic, simple rights for the individual will be needed and the legislative and legal structures to protect them.* ”

Jeremy Wilson, Vice Chairman, Barclays Corporate Bank

Key Challenges for Incumbents:

Inadequate Consent Mechanisms; Data Rights Unknown; Individuals Know How; Individual’s Risk Complacency; Safe Data Sharing; Cost Burden; Innovation Opportunity Missed; Brand Risk; Liability Risk; Inadequate Consent Mechanisms; Interoperability; Digital Identity; Traditional Regulation; Regulators Skills Gap

The private sector and public sector incumbents have overlapping and distinct motivational impacts which are outlined below.

Motivation impacts for incumbents; private sector and public sector:

- Brand risk of misuse and undefined / uncontrollable use of data will create cautious or negative approaches to data mobility which limit access to value for organisations, individuals, new entrants, and indeed society. This is exacerbated by the lack of clarity of liability models and solutions to safe data sharing, also by individuals’ risk complacency. Additionally, the lack of interoperability standards introduces an unknown, in both cost and timescales - discouraging market activity.

“ *For usage and applications to scale, there needs to be an organic growth or schema that defines integration and interoperability.* ”

Phil Windley, Chair of Sovrin Foundation

Motivation impacts for incumbents, private sector:

- Incumbents are likely to be motivated by bottom line, competitive position and a sustainable market and brand position. However, the challenges amplify the costs and risks which will reduce their commercial motivation. If a safe environment was available in which to innovate, where some of the risks and costs were negated, this would enable the commercial opportunities to be more readily identified.

“ *We need to reclaim the word innovation and redefine it to mean creating things that solve people's needs.* ”

Liz Coll, Head of Digital Advocacy, Consumers International

- Private sector businesses can see siloed personal data as a source of potential competitive advantage which creates a resistance to sharing data, especially with potential competitors. This will motivate resistance towards data mobility and could create tensions within the organisations, one side pushing for innovation another pulling for competitive advantage from siloed data.
- Those organisations that have data-led business models may find investment easier, which could lead to increased concentrations of data and commercial power.
- Because the cost of entry is high, due to many of the enabling tools not being commonly available, business may find it easier to invest in incremental benefits from existing products and services than on developing transformational, innovative offerings. This may further embed the data status quo.

Engagement implications for incumbents, private sector:

- For data mobility to succeed for private sector and public sector incumbents, the upside potential needs to be clearly demonstrated. For public sector organisations this may be the social benefits. For the private sector, it will be measurable demonstrations of the commercial opportunities. In both cases engagement relies on the development of clear, robust measures to minimise the risks and costs.

Motivations impacts for incumbents are, public sector:

- Incumbent government organisations, those with existing personal data, may find the internal costs challenging especially where large legacy systems and entrenched supplier contracts are in place. Some government organisations that have outsourced their data management may find that the rights to use of the data beyond the existing contracts are preclusive and may need renegotiation.
- Additionally, the opportunity to unleash productivity and efficiency gains will require strong digital and data skills which may be challenging to acquire.
- The risks of government entities making mistakes with the sharing of data, and of the data being incorrectly used, may create barriers to engagement. Government data is often sensitive and government are duty bound to make the citizen safe. Any misuse of data can have a significant effect on the reputation of government.

- Additionally, if government data is used by other businesses for recombinant innovation, they will need to know that the data is safe to use and will not increase their reputation risks. This may create a reluctance for new entrants to get involved unless there is a very well-structured programme of work to ensure the safety rails are in place.

Engagement implications for incumbents, public sector:

- Government organisations often hold sensitive, and sometimes unique or highly valuable, personal data sets such as health or tax or benefits. Sharing that comes with accentuated risks. This may create a motivation to not participate unless there is a safe and easy way to do so.
- The social benefits of data mobility may contribute to governmental bodies. This will require clear articulation of what the benefits are and how they are measured.
- Engagement with individuals will be created by the delivery of trusted digital services that create value for the. The full potential value for individuals will not be realised unless the market is designed to be safe, easy and valuable.

4.3.2 Motivation for New Entrants

As discussed in Section 2, data mobility opens up opportunities for innovation for new entrants, many of whom currently have to over-invest to deliver value to customers because of the challenges they face, especially in infrastructure and standards.

Key Challenges for New Entrants

Resistance To Data Sharing; Individual's Lack Of Knowledge; Safe Data Sharing; No Data Access
Standardisation; Inadequate Consent Mechanisms; Interoperability; Digital Identity; Traditional
Regulation

Motivation implications, new entrants

- New entrants will be motivated to work only with organisations that make their data available (e.g. Facebook), or where data is perceived as less valuable by the data manager, such as SMEs. This limits the value that can be created and will not reverse the existing concentrations of data power.
- New entrants that have invested in overcoming the infrastructure and standards challenges may be resistant to more coordinated investment in the market since it erodes the value of their investment.
- New entrants in the infrastructure market. These players may find it difficult to form an investment case due to the lack of coordinated requirements from the incumbents, new entrants and individuals.

“ *We cannot succeed without interoperability,*

Olivier Dion, CEO, OneCub

Engagement implications, new entrants:

- To accelerate the data mobility market by building on the investment of existing new entrants, the commercial motivations of either faster market growth and or easier investment will provide strong motivation levers.
- To sustainably prosper, new entrants providing services and applications for individuals need a healthy market. Positively coordinated activity towards a safe and easy data mobility market is likely to attract investment in creating value for individuals, and in infrastructure.

4.3.3 Motivation for individuals

Repeated surveys²⁵ testify to a strong desire by individuals to exercise more control over their data and to reap a greater share of the benefits of data use. But individuals are likely to resist doing additional work to exercise control over their data. Current market experience shows the tendency to ‘just ticking the [consent] box’ in order to access a service as quickly and easily as possible. This is often interpreted as a lack of desire for control.

Key Challenges for Individuals:

Value Not Recognised By Individuals; Data Burden; Data Rights Unknown; Lack of Individual’s Information Tools; Safe Data Sharing; Digital Identity

Motivation implication, individuals

- Individuals won’t actively participate until they can gain access to value. This doesn’t have to be value that saves them money, it can be a time-saving value proposition or indeed one that delivers peace of mind.

“ *Data Portability isn’t the issue, it’s what can be done with the data at the other end that matters.*

Liz Coll, Head of Digital Advocacy, Consumers International

- The experience of existing PDMS providers, offering the ability for the individual to exact control over their data, has shown that individuals do not want the burden of managing their own data. What they are seeking is benefit, which comes in the form of services that access the data in the PPDMS. These services must also be designed in a way that makes it easy for them to gain access to the value.
- Individuals want to know that they are using their data safely. At present, the risks related to many individuals’ actions with data are accepted by incumbent businesses. Not bearing the costs or risks of their action has led to a ‘designed in complacency’ that has the potential to encourage unsafe behaviours which could disadvantage both individuals and other stakeholders.

“ *Without a digital answer to dynamic safe data sharing, we will never achieve data mobility.*

Stephen Deadman, Global Deputy Chief Privacy Officer, Facebook

25. Please see the following reports: [Miller C, Coldicutt R, Kos A. \(2018\) People, Power and Technology: The 2018 Digital Attitudes Report. Doteveryone, Direct Marketing Association \(2018\) Data privacy: What the consumer really thinks. Direct Marketing Association, Fox B, Gurney N, Cavestany M, Van den Dam R \(2017\). The trust factor in the cognitive era, How CSP’s can capitalise on personal data while preserving privacy. IBM](#)

Engagement implications, individuals:

- During the early stages of market development, direct engagement with individuals is likely to be via design research or consumer research. This is likely to be most effecting when working with organisations that have direct communication channels to individuals.
- Consumer representative groups will also be a good route to understanding consumers needs from a safety and privacy perspective.

5. ENABLERS - EMERGENT SOLUTIONS AND RELEVANT MARKET ACTIVITIES

5.1 Conclusions from this section

- In the market there are multiple Enablers (emergent solutions and relevant market activities) that can help in progressing the personal data mobility Core Issues. However, there are no easy answers or quick fixes - none of the Enablers offer complete scalable solutions.
 - There are emergent solutions which can be built upon.
 - Market activities that provide invaluable learnings from relevant initiatives and research.
 - But development is largely uncoordinated with investment spread across multiple aspects of the market, services and infrastructure.
- The support that can be provided by Enablers varies across the Core Issues:

Core Issue 1: Infrastructure & Standards:	There are a good set of relevant emergent solutions in: the Open Banking implementation, digital identity initiatives, and development of interoperability standards. A strong research base evidencing the market need and the potential for PDMS. And recent market initiatives to support development.
Core Issue 2: Individuals' Know How:	Supported by sound understanding of the 'points of tension', identified by research and analysis done by a number of organisations. Multiple standards are in development which can reduce risks and improve ease for the individual. As PIMS and PDMS evolve, they can provide tools for increasing individuals' understanding and value.
Core Issue 3: Adaptive Regulation:	Discussed in initiatives such as midata, however, it is early days for this development. The UK Government Regulators Network, the Joint Government Regulator Consumer Forum and the Centre for Data Ethics and Innovation provide market activities with which to work and build. The Open Banking Governance Process begins to create a systematised approach to managing changing governance requirements.
Core Issue 4: Services & Applications:	<p>Good basis of market and consumer research on the types of data tools that individuals may need to make the market safer or easier. Multiple PIMS and PDMS already in market can provide a foundation to build value and utility for the individual.</p> <p>Market initiatives such as Blue Button provide learnings for the value and utility needed and used by individuals.</p>
Core Issue 5: Incumbent Business Case:	Need for the illustration/demonstration of value from recombinant innovation which is not easily apparent from the perspective of a siloed sector business. Some demonstration of this value in market initiatives such as the midataLab and MesInfos. PIMS also provide examples of value proposition for individuals. The Directed Innovation workshops in this study also illustrate the opportunities (see Section 6).

- Overall, there are many enabling building blocks, several of which support multiple Core Issues. Notable amongst these are: the comprehensive set of emergent solutions provided by Open Banking which are considered to be 12-18 months ahead of similar initiatives globally; PDMS and PIMS, where the UK is a market leader; and standards development activity, especially for interoperability.

- Market initiatives have generated important learnings which can accelerate the development of personal data mobility. These include:
 - Understanding of barriers to progress including lack of: senior sponsorship and strategic motivation; business engagement; pace and motivation within initiatives; appropriate funding; clarity in understanding challenges and enablers.
 - The structure of the development programme has a big influence over success. For example, Open Banking benefited from a robust market development team structure. Blue Button was managed collaboratively between business and Government, which accelerated results. IndiaStack, whilst driven strongly by technology, has experienced challenges around data ethics, security and value.
 - There is an international market, UK initiatives would benefit from collaboration and co-ordination.
 - IoT and Smart Cities have created environments with stakeholders and enablers in place on which personal data mobility initiatives can build.
- There are, however, some significant gaps:
 - There's been very little, if any, research or economic research into the innovation opportunities – some initiatives such as midataLab and Blue Button have started to demonstrate the value of this.
 - Some Key Challenges have no material emergent solutions or market activities – in particular Safe Data Sharing .
 - Design-led approaches have been applied increasingly over recent years to conceptualise new solutions. Whilst these have been helpful in generating new ideas, often they have not proved practical in translating concept into reality. The Directed Innovation approach demonstrated in this study has shown how rigorous business analysis frameworks can be combined with design-led techniques to both stimulate innovation and produce focused, practical solutions.

5.2 Our Analysis of Enablers

In our research, parallel to the analysis of Core Issues and Key Challenges for personal data mobility, we sought to identify emerging solutions and market activities and that could enable pace and accelerate benefits in the development of the personal data mobility market. These we collectively describe as Enablers.

We looked for Enablers that provide tangible building blocks, such as standards and technologies, and for elements such as methodologies and processes or engagement structures that could contribute to the development of scalable solutions. We looked for what went well and what didn't, and what could be learned.

The study identified a large number of Enablers and prioritised 50 as having particular relevance to personal data mobility. The Enabler Landscape in Appendix 9 provides a summary description of each of these Enablers.

Although none of the Enablers we analysed offer complete solutions to personal data mobility Key Challenges, a number are what we describe as Emergent Solutions; covering services, standards and technology. Others, in the category of Market Activities offer invaluable learnings from relevant initiatives and research.

This section provides a commentary on those Enablers (both Emergent Solutions and Market Activities) that most frequently and directly relate to the resolution of data mobility Core Issues in our analysis.

Several of the Enablers appeared in Section 1, which describes their contribution to the development of personal data portability concepts - culminating in the GDPR. These Enablers are further developed in this section because of the continued contribution they can make in the development of the personal data mobility market.

5.3 Emergent Solutions and Market Activities by Core Issue

The Enablers identified in our research support multiple Core Issues and provide a good foundation on which to develop the next steps towards the realisation of a personal data mobility enabled market.

The following table shows how the Enablers, classified under Emergent Solutions and Market Activities, map to the five Core Issues.

Enablers	Core issues				
	Lack of Data Mobility Enabling Tools	Lack of Data Consumer Know-How	Adaptive Regulation	Lack of Data Tools for Individuals	Incumbent Business Case
Emergent solutions					
UK Open Banking					
Open Banking Directory for Enrolment					
Open Banking Guide lines for Participants/3rd Party					
Open Banking Guide Dispute and Complaint Process					
Services					
Personal Information Management Services					
Personal Data Management Services					
Technology					
Digital Identity					
Nesta: DECODE					
Solid					
Standards					
Open Banking API Specifications					
Open Banking Security Standards					
ODI - Open Data Certificate					
Data Interoperability Standards Consortium					
USDoD System-to-System Data Model					
Factem					

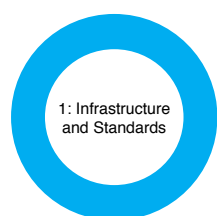
IEE Standards: Machine Readable Personal Privacy Terms					
Kantara					
Kantara - Identities of Things Discussion Group					
X-Road					
British Standards Institute					
BSI IoT Community					
NEXT LEAP					
TechUK					
INCITS					
EBU PEACH					
India Stack					
Berkeley University's Privacy Patterns					
UK					
midata Lab					
FCA Regulatory Sandbox					
Open Banking Governance Process					
OBIE					
International					
Digi.me and Icelandic Data					
India Stack					
Mesinfos/Rainbow Button					
Green Button					
Blue Button					
New UK					
Centre for Data Ethics and Innovation					
Alan Turing Institute					
UK Regulators Network					
UK Regulators Network					
Smart Data Review					
Government-Regulator Consumer Forum					
Data Trusts					
Research					
DotEveryone					
Consumers International					

Ipsos Mori					
Which?					
ODI: Making it Easier to Create Open Standards for Data					
ODI: Data Ethic Canvas					
ODI: R&D initiatives					

To help understand more fully the relevance of the Enablers we analysed their impact on each of the Core Issues. This enabled us to identify the impact of the Enablers in the context of each Core Issue and to determine where there may be significant gaps. Understanding the alignment of the Enablers to the Core Issues enables further understanding of the agenda for market development.

This analysis is summarised below.

Enablers of Core Issue 1: Infrastructure and Standards



The development of common and robust standards technologies and services, vital to the creation of a healthy market with personal data mobility at its core.

Key Challenges:

- Primary Challenges: Digital Identity; Liability Models; Inadequate Consent Mechanisms; Interoperability; Safe Data Sharing; No Data Access Standardisation.
- Secondary Challenges: Data Burden; Lack of Individuals' Information Tools.

Related Enablers

There is a good set of Enablers past, present and potentially future, related to this Core Issue:

- The Open Banking implementation provides a number of live and relevant Emergent Solutions. Significantly this includes: API Specification, Security Standards, Directory for Enrolment, 3rd Party support / guidelines, Dispute and Complaints Process.
- The various Digital Identity initiatives address a key and critical challenge for personal data mobility.
- A significant number of Emergent Solutions related to developing interoperability standards including: TechUK, US Department of Defense, Factern, Kantara, Green Button, Blue Button, X-Road, BSI / Hypercat, NEXTLEAP, INCITS.
- Multiple relevant consumer and citizen research studies that support the core market need including: DotEveryone, Which? Consumers International.
- The PDMS market provides a strong foundation for data management tools for individuals.
- Recent and new UK market initiatives including: Data Hubs; Turing Institute; Joint Government Regulator Forum, provide potential environments, skills or tools to support the development of personal data mobility.

Enablers of Core Issue 2: Individuals' Know How



Consumers' lack of know-how and understanding of the digital market and about their data, its uses and how they can use it.

This makes the consumers vulnerable to abuse and lacking in the skills to access the value.

Key Challenges:

- Primary Challenges: Data Rights Not Known; Value Not Recognised by Individual; Individuals Lack Know How; Individuals' Risk Complacency.
- Secondary Challenges: Safe Data Sharing; Inadequate Consent Mechanisms; Liability Models.

Related Enablers

The development of the know how of individuals across the market is supported by a very good understanding of the points of tension identified by the work done by Doteveryone, Which?, Consumers International, Alan Turing Institute and Ipsos Mori.

There are multiple standards that are being developed.

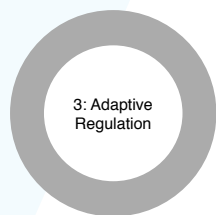
- Successful standards should provide an increased set of 'guardrails' which will serve to reduce risk and increase the value for all of the stakeholders including the individual.
- These standards should also help to reduce the need for in-depth know how for individuals, enabling them to remain safe, and to make it easy for them to gain access to value.

As services such PIMS and PDMS, which offer value and utility to individuals, evolve and gain a greater presence in the market, they can provide tools for increasing individuals' understanding, especially when they incorporate strong ethical design patterns.

Many of the market initiatives provide lessons learned on individuals' know how, primarily this has been illustrated or delivered via the proof-of-concept, or prototype, or live consumer services.

Additionally, market services such as the Open Banking Directory for Enrolment and the Open Banking Dispute and Complaint Process provide insight into the ways that the burden of know how can be removed from the individual by systematising safety and ease of use.

Enablers of Core Issue 3: Adaptive Regulation



Well-functioning markets require strong regulation and legislation. In a fast-moving developing market, regulators and government need a level of knowledge and skills and adaptiveness to ensure the market successfully develops.

Key Challenges:

- Primary Challenges: Skills Gap; Traditional Regulation.

Related Enablers

A new relationship between organisations and government/regulators has long been talked about and initiatives such as midata have tried to create environments to support this. However, it is early days for the development of adaptive regulation. The UK Government Regulators Network, the new Joint Government Regulator Consumer Forum and the Centre for Data Ethics and Innovation are UK market activities with which to work and build.

The Open Banking Governance Process begins to create a systematised approach to dynamically identifying and managing changing governance requirements.

Core Issue 4: Services & Applications



The lack of services and applications that enable individuals to gather, manage and share their personal data and so to create new value in their lives.

Key Challenges:

- Primary Challenges: Data Burden; Lack Of Individuals' Information Tools; Value Not Recognised By Individuals; No Data Access Standardisation.
- Secondary Challenges: Digital Identity; Data Rights Unknown; Risk Complacency; Safe Data Sharing.

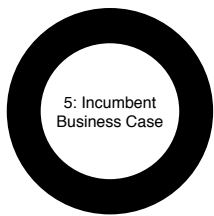
Related Enablers

The market and consumer research produced by Doteveryone, Consumers International and Which? provides a good foundation to consider the types of data tools that individuals may need to make the market safer or easier.

There are multiple PIMS and PDMS already in market which provide a strong foundation and body of knowledge on which to begin to build value and utility for the individual.

Market initiatives such as Blue Button provide strong learning for the value and utility needed and used by individuals. A deep understanding of these may provide an accelerant for data mobility.

Enablers of Core Issue 5: Incumbent Business Case



There is not a clear, or compelling enough case for business to embrace data mobility. It is relatively easy for business to identify and measure the risks and costs.

However, because the greatest opportunity lies in the growth from innovation and, more broadly, in the benefits for society, the business case for investment is challenging for the majority of businesses.

Key Challenges:

- Primary Challenges: Brand Risk; Value Not Recognised By Individuals; Digital Identity; Liability Model; Interoperability; Safe Data Sharing; Cost Burden; No Data Access Standardisation.
- Secondary Challenges: Lack Of Individuals' Information Tools; Inadequate Consent Mechanisms.

Related Enablers

Along with the proof of growth potential from personal data mobility, the business case relies on the reduction of costs and risks (see Infrastructure and Standards Core Issue above).

The illustration, articulation and proof of value for growth is especially important for the recombinant innovation opportunity which is not easily apparent from the perspective of a siloed sector / business / or data owner.

There has been some demonstration of the value from recombinant innovation in market initiatives such as the midataLab and MesInfos.

PIMS also provide in-market examples for the value proposition for individuals. And there is growing amount of consumer insight and market analysis that helps to clarify consumer need.

The Directed Innovation workshops carried out in this study also illustrate the opportunities (see Section 6).

5.4 Description of Enablers: Emergent Solutions and Market Activities

The subsections below provide overview descriptions of the Enablers under the following categories:

- Emergent Solutions
 - The Open Banking Initiative.
 - Services for personal information management.
 - Technology.
 - Standards.
- Market Activities
 - Initiatives.
 - Insight and research.

More detail of the Enabler Landscape is provided in Appendix 9.

5.4.1 Emergent Solutions

Emergent Solutions are enablers which have the potential to contribute to addressing some of the challenges in personal data mobility and accelerate its development.

5.4.1.1 The Open Banking Initiative

The UK leads the world in Open Banking²⁶- an initiative designed to facilitate data sharing to put customers in control of their data and make it easier to move, manage, and make more of their money.

Open Banking isn't based on enabling individuals to directly access their data. Rather it enables individuals to move data, or copies of their data, to new and different service providers.

Nevertheless, its core vision of using data sharing to enable innovation and value creation is strongly aligned to that of data mobility and many of the processes developed for Open Banking provide learnings for the implementation of data mobility. Unsurprisingly in this emerging area Open Banking appears to offer the most developed and tested building blocks for personal data mobility.

Of particular relevance are:

- The Open Banking Directory for enrolment:²⁷ the key architectural component that enables Third Party Providers (TPPs) to enrol with Open Banking and deliver payment initiation and account information services using APIs created by Account Servicing Payment Service Providers (ASPSPs).
Related Key Challenges: Safe Data Sharing, Business Resistance to Sharing, Consumer fear and Consumer Risk Complacency.
- Open Banking Dispute and Complaint Process²⁸: supports the exchange of information in relation to the management of payment initiation and account information service-related enquiries, complaints or disputes between Account Servicing Payment Service Providers (ASPSPs) and TPPs. It includes a Code of Best Practice incorporating principles and standards to be adhered to when following the process.

26. <https://www.openbanking.org.uk/customers/what-is-open-banking/>

27. <https://www.openbanking.org.uk/providers/directory/>

28. <https://www.openbanking.org.uk/providers/dispute-management-system/>

Related Key Challenges: New Liability Model; Safe Data Sharing; Business Resistance to Sharing, Consumer Risk Complacency. Consumer Fear and helps to manage Brand Risk.

- Specification for Open Banking APIs²⁹: published Open Data API specifications that allow API providers (e.g. banks, building societies and ATM providers) to develop API endpoints which can then be accessed by API users (e.g. TPPs) to build mobile and web applications for banking customers. These specifications allow providers to supply up to date, standardised information about the latest available products and services so that, for example, a comparison website can more easily and accurately gather information and thereby develop better services for end customers.

Related Key Challenges: Business Resistance to Sharing, Brand Risk, Interoperability, Cost Burden. It also potentially contributes to addressing the potential Monopolies of Data risk.

- Open Banking Security Standards³⁰: published the security standards that should be used for data transfers - the International Standard for Information Security (ISO27001).

Related Key Challenges: Interoperability, Business Resistance to Sharing, Brand Risk and Consumer Fear. Additionally, it helps mitigate the risk of amplified crime.

- The Open Banking Implementation Entity³¹: oversees the execution of Open Banking. It is governed by the CMA and funded by the UK's nine largest banks and building societies. It provides a potential Blueprint for oversight of data portability initiatives.

The Open Banking Initiative is generally considered to be about 12-18 months ahead of other similar, PSD2 related, initiatives to make data open. It is understood that many countries are now following this lead.

5.4.1.2 Services for personal information management

The UK leads the world in the development of PDMS (Personal Data Management Services) that help individuals collect, store, manage and share their own data under their control, and of PIMS (Personal Information Management Services) that use this data to provide tailored services that help individuals make decisions more effectively and manage their lives better. Ctrl-Shift maintains a database of organisations in this market which includes over 500 PIMS/PDMS organisations worldwide.

- A growing number of PDMS' such as Digi.me, HAT, MyLifeDigital, Mydex, Meeco and Port and many more offer individuals safe places to store their data and ways of controlling who their data is shared with, on what terms. Many of these services offer consents and permissions dashboards where individuals can quickly see all the consents they have issued via the service and where they can change or revoke their consents. Some are also enabling digital identity management. These PDMS services address a number of the challenges that individuals have if they wish to manage their data. They also help to educate consumers on their rights and the value of their personal data. Related Key Challenges: Data Burden, Innovation Opportunity Missed, Consent Failure, Lack of Consumer Tools, Data Rights Unknown, Brand Risk, Digital Identity.

29. <https://www.openbanking.org.uk/providers/standards/>

30. [Open Banking \(2018\) Participant Guide: Information security operations, A guide to implementing effective information security controls. Open Banking](#)

31. <https://www.openbanking.org.uk/about-us/>

- Life Management and Decision support services such as Onedox³², Flipper³³, Trov³⁴, Dressipi³⁵, Brolly³⁶, Cuvva³⁷, ginger.io³⁸, CheapEnergyClub³⁹. Decision Support services help individuals leverage their personal data to make better decisions delivering financial savings or risk reduction or lifestyle enhancement with convenience.

Life Management services go a stage further – automating the execution of mundane tasks (like energy switching) so the individual does not even need to get involved. Both provide services that offer value to individuals by enabling them to use their data for their own benefit.

Related Key Challenges: Data Burden, Innovation Opportunity Missed, Consent Failure, Lack of Consumer Tools, Data Rights Unknown, Unrecognised Consumer Value, Brand Risk, Digital Identity.

There has been significant investment in these services, however most still require further development to become scalable solutions to support a safe, easy and valuable personal data mobility market.

There have been many experiments and many resulting design approaches, architectures, business models and value propositions. A number of the PIMS have tackled the multi-faceted nature of the personal data mobility challenges. They have often had to invest beyond their core value proposition to deliver their customer proposition because of the lack of standards and infrastructure.

PDMS and PIMS developments provide a set of emergent solutions, skills, knowledge and understanding of the broader opportunity and ecosystem. This makes them strong contributor to the development of the personal data mobility market.

5.4.1.3 Technologies

Multiple technology developments relating to data security, data sharing and interoperability can contribute to the development of data mobility. Some specific initiatives of direct relevance include:

- Nesta DECODE⁴⁰ : DECODE is a cross-Europe EU, funded NESTA initiative to “provide tools that put individuals in control of whether they keep their personal data private or share it for the public good Related Key Challenges: Data Burden, Consent Failure, International Standards.
- SOLID⁴¹: Sir Tim Berners-Lee, the inventor of the World Wide Web, is working on the challenge of ‘true data ownership’ and improved privacy via the SOLID project with MIT. SOLID stands for ‘social linked data’ and is seeking to create conventions and tools for decentralised social applications based on linked data principles
Related Key Challenges: Consent Failure, interoperability, Consumer Fear, International Standards. It also potentially helps address the risk of concentrations of data.
- New identity solutions: Digital identity delivers enhanced security, privacy and convenience for consumers by removing the need for login names and passwords. Multiple and different digital identity solutions are being proposed in both the public and private sector. The UK Verify project⁴² has multiple providers. The private sector solution providers include Evernym and YOTI.

32. <https://www.onedox.com>

33. <https://flipper.community>

34. <https://www.trov.com>

35. <https://dressipi.com>

36. <https://www.heybrolly.com>

37. <https://www.cuvva.com>

38. <https://ginger.io>

39. <https://www.moneysavingexpert.com/cheapenergyclub>

40. <https://www.nesta.org.uk/project/decode/>

41. <https://solid.mit.edu>

42. <https://www.gov.uk/government/publications/introducing-govuk-verify/introducing-govuk-verify>

Verify gained less traction than expected as the customer experience resulted in lower sponsorship by government services than originally envisaged, meaning the rationale for consumers having a Verify account was diminished.

Related Key Challenges: Digital Identity

- Distributed Ledger Technologies (DLT): DLTs offer a potential technical solution to personal data management. There are numerous projects, initiatives and services that are exploring and using DLT to address challenges of delivering Digital Identity and verified attributes.

The characteristics of DLTs – greater security from being distributed rather than centralised, transaction immutability and a single version of truth, strong encryption, multi-person read and write capabilities – lend themselves to enabling distributed, secure, trackable personal data. Issues still exist with regard to the efficiency and scalability of DLT solutions but these are likely to be overcome relatively quickly given the investment in this space.

Related Key Challenges: Digital Identity

5.4.1.4 Standards

Much work is being done to create standards for data sharing and enhanced data protection and interoperability. There are multiple standards activities addressing interoperability, often with a similar outcome in sight, and some specifically focused on data sharing e.g. IoT. Specific initiatives include:

- The IEEE has established Working Group 7012⁴³ to develop standards for Machine Readable Personal Privacy Terms. Once this is promulgated, automated comparison of privacy terms can quickly identify those which include terms which are non-standard, and which may run counter to the rights or interests of the individual concerned.
Related Key Challenges: Consent Failure, Data Rights Unknown
- The BSI is developing a Publicly Available Specification (PAS)⁴⁴ for the sharing of personal data.
Related Key Challenges: Safe Data Sharing, Interoperability, Brand Risk.
- BSI IoT Community⁴⁵ is currently creating a trusted framework to shape, share, embed and support innovation with the safe and reliable use of IoT applications, data and devices through the interoperability of data between devices.
Related Key Challenges: Interoperability
- The Kantara Initiative⁴⁶ focuses on the development of specifications and conformity assessment programs for the digital identity and personal data ecosystems including the creation of an Identity Assurance Trust Framework and processes for User Managed Access (UMA).⁴⁷ The UMA project is developing specifications that allows an individual control the authorisation of data sharing and service access made between online services on the individual's behalf and to facilitate interoperable implementations of the specifications. Kantara is also developing a specification for Consent Receipts⁴⁸.
Related Key Challenges: Digital ID, Consent Failure, Safe Data Sharing, Interoperability
- The US Department of Defense has made publicly available the data model it created for the complex system-to-system communication required in safety-critical flight management software and unmanned aerial vehicle control⁴⁹.
Related Key Challenges: Interoperability

43. <https://standards.ieee.org/develop/project/7012.html>

44. <https://shop.bsigroup.com/Navigate-by/PAS/PAS-LP/PAS-homepage/>

45. <https://www.bsigroup.com/en-GB/industries-and-sectors/Internet-of-Things/>

46. <https://kantarainitiative.org/>

47. <https://kantarainitiative.org/groups/user-managed-access-work-group/>

48. <https://kantarainitiative.org/confluence/display/infosharing/Consent+Receipt+Specification>

49. <https://www.sae.org/servlets/works/documentHome.do?comtID=TEAAS4UCS>

- Factern is working on the development of a registry of entities (companies, assets, applications, devices authorities etc) within data sharing ecosystems, plus associated meta-data management.⁵⁰
Related Key Challenges: Interoperability
- The Open Data movement has already undertaken extensive work on interoperability issues including the Open Data Institute's development of Open Data Certificate to establish best practice in data sharing⁵¹. The experience of organisations such as the Data Interoperability Standards Forum can be drawn upon⁵².
Related Key Challenges: Interoperability
- TechUK has established an Interoperability Charter for data sharing in health and care and is supporting the establishment of INTEROpen⁵³ to develop open standards for interoperability in the health and social care sector. Such initiatives could be replicated across specific sectors.⁵⁴
Related Key Challenges: Interoperability
- Data Interoperability Standards Consortium⁵⁵: DISC's mission is to create a data environment where systems can be successfully designed, built and grown on common expectations of data. This enables increased interoperability, data ownership and advancements in analytics.
Related Key Challenges: Interoperability
- X-Road⁵⁶: X-Road is the data exchange layer for information systems in Estonia allowing the nation's various public and private sector e-service databases to link up and function in harmony. X-Road employs a versatile security solution, using multilevel authorization with a high-level log processing system and encrypted and time-stamped data traffic.

Public and private sector enterprises can connect their information system with the X-Road, enabling them to save resources, since a secure data exchange layer exists with all other X-Road members. Indirectly,

X-Road also enables citizens and officials to operate via different portals and applications (e.g. document management systems, institutional information systems.) in a more flexible and efficient manner. X-Road has also been implemented in countries such as Finland, Azerbaijan, Namibia and the Faroe Islands.

Related Key Challenges: Interoperability, Safe Data Sharing, Data Burden, Cost Burden

- NEXTLEAP⁵⁷ combines expertise from across different disciplines throughout Europe in computer science, protocol verification and philosophy to develop a set of comprehensive answers to questions surrounding privacy and society. These include, decentralised internet architecture, ethical foundations for the internet, modular specification of decentralised software modules. NEXTLEAP has created 13 deliverables.
Related Key Challenges: Interoperability, Digital Identity
- Hypercat⁵⁸ is a Global Alliance and standard (PAS 212) driving security and Interoperable for Internet of Things (IoT) for Industry and cities
Related Key Challenges: Interoperability

50. <https://www.f6s.com/factern>

51. <https://certificates.theodi.org/en/>

52. <http://datainteroperability.org/>

53. <https://www.interopen.org/>

54. <https://www.techuk.org/insights/news/item/5276-techuk-s-interoperability-charter>

55. <http://datainteroperability.org/>

56. <https://e-estonia.com/solutions/interoperability-services/x-road/>

57. <http://nextleap.eu>

58. www.hypercat.io

In addition, much work has been done by the Government Digital Service and others to create standardised, consistent design patterns. These clarify expectations and roles for all parties. They create standardised processes that reduce chances of confusion, error and interference. They also, encourage a sense of confidence and familiarity, whilst reducing the time and effort individuals have to invest in completing a process (thereby, also reducing the likelihood of their defaulting to less secure short cuts).

The GDS has produced a design manual which includes ways of using and adapting design patterns and which could be a springboard for related efforts in the creation of standard design patterns for Data Mobility⁵⁹.

Berkeley University also has a special initiative focused on the development of ‘privacy patterns’⁶⁰: that is, design solutions to common privacy problems — a way to translate “privacy-by-design” into practical advice for software engineering. The goal is to document common practices and standardise terminology.

5.4.2 Market initiatives

Market initiatives fall into two categories: previous or current initiatives, which provide multiple learnings that can inform the development of personal data mobility; and New Initiatives which provide opportunities to further support the development of data mobility and potentially develop into solutions to accelerate it.

5.4.2.1 The midata programme

midata: The UK’s original midata programme, which put the idea of data portability on the map. This includes the midata programme and the midataLab, which brought together over 25 UK organisations to experiment with the value that can be created with personal data.

- The midata programme⁶¹ initiated in 2012 and run by the Department for Business, Innovation and Skills (now BEIS), was an initiative to help consumers access and use data collected about them by service providers.

midata was intended to act as a platform for innovation. The programme sought voluntary engagement from businesses to make the data available to the individual. At the time the main challenges for businesses were the costs of making the data available, and the lack of clear business case or measurable opportunity. The programme triggered primary UK legislation designed to enforce the data release, this awaited the conclusions of the then early stage GDPR development to enact this at a regulatory level.

- The midata Innovation Lab⁶² (miL) was designed to explore a new midata-enabled scenario where consumers can choose to grant services providers access to their rich personal data where the data is used to inform and drive a range of innovative new information services.

The miL worked with 25 UK brands and a team of multi-disciplinary people together to explore the innovation opportunities in an open, safe environment. It leveraged real data donated by ‘data donors’ uploaded from their own personal data into secure personal data stores, from which any app developer could access the data (where permitted) and developed innovative services around the data. It built on the previous midata Hackathon.

Related Key Challenges: Consumer Data Burden, Innovation Opportunity Missed, Business Resistance to Sharing, Adaptive Regulation and Government Skills Gap.

59. <https://www.gov.uk/service-manual/design>

60. <https://privacypatterns.org/>

61. <https://www.gov.uk/government/news/the-midata-vision-of-consumer-empowerment>

62. <http://www.midatalab.org.uk>

Key learnings from the miL were:

- The new apps created a demand for data. midata focused on the supply of data and the two sides – demand and supply – that needed to be brought together. Innovation labs like the miL provided businesses, developers, regulators and policy makers with an opportunity to accelerate innovation in a safe environment in a way that gets the best out of all parties.
- Concerns about privacy and data security run deep for individuals and for businesses. Issues, such as consumer protection, are as much about engineering as policy or regulation, as they depend on designing and inter-operating safe data sharing systems.
- Business, legal and technical enablers need to advance hand in hand as they are interdependent, and need to be managed in a way that reflects this.
- To engage brands, the model has to be sustainable and have sustainable funding.
- In a lab environment it is possible to experiment fruitfully to identify innovation opportunities, without real data.
- Working together in a multi-disciplinary team enabled very rapid progress, cross fertilising knowledge and learning from each discipline and accelerating the resolution of problems or challenges.
- Initiatives like the miL can greatly accelerate the development of new concepts and value and rapidly identify the opportunities and the risks that need addressing.
- It is critical to address the data access rights when developing data sharing concepts.

Key learnings specifically in relation to consumers:

- Convenience is all important.
- Consumers differ significantly in their concerns and priorities.
- Customer segmentation applies as much to new information services as traditional products and so there is no one-size-fits-all solution.
- Trust was a key takeaway from the findings of the miL. Consumers make decisions about data sharing depending on their opinion of the company including the purpose of the service and the brand offering.
- The clearer the benefit shown by new information services, the more willing people are to share data.
- Switching was not the only use to which consumers wanted to put their data - improved lifestyle and time savings are just as important and, in some cases, more important than financial savings.
- Empowering consumers with control is a benefit in its own right.
- Apps and services that give consumers choice and control are much more likely to be used than those that don't.
- Inclusion of personal data specifically held by the Government, for example NHS data, also added significant benefit when designing new apps and services.
- Finally, for consumers privacy and the misuse of data remains a key concern and needs to be addressed for the personal information market to flourish.

“ *From its earliest days, we always said midata was a platform for innovation; the launch pad for a new breed of personal information services. The midata Innovation Lab is an effective demonstration of this innovation opportunity.*

Professor Sir Nigel Shadbolt, Chairman and Co-Founder, Open Data Institute

“ *...there is a lot to be gained from being open and using the information gathered from customers with their consent and knowledge.*

Jo Swinson, Consumers Affairs Minister 2013

5.4.2.2 FCA Regulatory Sandbox

FCA Regulatory Sandbox⁶³: The Sandbox is designed to allow businesses to test innovative products, services, business models and delivery mechanisms in the real market, with real consumers. It has been operating for two years, and could provide a model for other regulators to encourage safe innovation as it relates to data mobility.

5.4.2.3 Open Banking Governance Process

Open Banking Governance Process⁶⁴: Within Open Banking any change or amendment to documents are made by utilising the Open Banking governance process, which includes consultation with various different working groups. This has the potential to contribute to the development of adaptive regulation.

5.4.2.4 International initiatives

A number of international initiatives have pioneered different aspects of data mobility. These include:

The USA Blue Button⁶⁵ Initiative.

- In 2010 the U.S. Department of Veteran Affairs (VA) launched the Blue Button initiative to give veterans the ability to access and download their medical records from their 'MyHealthVet' online portal. In 2013 the Blue Button service was expanded to include a standardised, machine-readable data format.
- With the Blue Button, a patient is provided with a highly visible, clickable button to download his or her medical records or other health information in digital form from a secure website offered by their doctors, insurers, pharmacies or other health-related service.
- The initiative has spread with many healthcare providers now offering access to health information online. More than 16,000 healthcare organisations and providers are now listed on the Blue Button Connector, a tool to help patients and consumers access their health records online. And an estimated 150 million Americans have accessed their health records online from health professionals, medical laboratories, retail pharmacy chains, and state immunization registries.
- Services developed on the back of the Blue Button initiative have included: appointment scheduling, medication reminders and remote monitoring; an app to help consumers manage congestive heart failure with hospital support via mobile and connected devices.

63. <https://www.fca.org.uk/firms/regulatory-sandbox>

64. [Open Banking \(2018\) Operational Governance Rules and Guidelines for March 2017 Open Data. Open Banking](#)

65. <https://obamawhitehouse.archives.gov/blog/2016/03/15/my-data-empowering-all-americans-personal-data-access>

- This programme warrants deeper understanding to identify its current status and options for collaboration, and any enabling tools that could be used to accelerate personal data mobility.
Related Key Challenges: Cost Burden, Safe Data Sharing, Business Resistance to Sharing, Innovation Opportunity Missed, Consumer /fear, Brand Risk. It also offers insights into the management of the risks of monopolies.

The USA Green Button⁶⁶ initiative

- launched in 2012, Green Button gave Americans online access to their detailed electricity usage, facilitating virtual energy audits to identify inefficiencies and money opportunities for both residential and commercial customers.

Consumers were able to download securely detailed energy usage data with a simple click of a literal “Green Button” on electricity utilities’ websites. Additionally, consumers could grant third party developers and service providers direct access to their Green Button data, e.g. to compare their usage with local government open data on energy usage patterns.

The Green Button initiative was based on a common technical standard, the ESPI (Energy Services Provider Interface) and was developed in collaboration with the Smart Grid Interoperability Panel and the PAP10 working group. The ESPI standard described how to represent energy usage information in an XML format and how to enable the exchange of that information between utilities and third parties on behalf of consumers. Together these defined a flexible file format for Green Button based on ratified standards from NAESB (North American Energy Standards Board). By July 2015, more than 150 utilities and service providers had committed to providing over 60 million U.S. households access to their own Green Button energy data in a consumer- and computer-friendly format.

- This programme warrants deeper understanding to identify its current status and options for collaboration, and any enabling tools that could be used to accelerate data mobility.
Related Key Challenges: Data Burden, Consent Failure, Consumer Fear, Data rights Unknown, Interoperability and Business Resistance to Sharing. It also offers insights into the management of the risks of monopolies.

Digi.me Iceland

- Digi.me, a PIMS business, created, in cooperation with the Icelandic Government, the world’s first patient facing health data API in 2016/17⁶⁷. Based on this, and incorporation of other data (financial, wearables etc) digi.me has a business in Iceland that uses Iceland as a living lab for the consumer centric personal data ecosystem. Several hackathons, business experiments, and new consumer centred apps have been created as a result in Iceland to date.

Information including prescriptions and medications, vaccinations, allergies and medical admissions is available through an API which integrates with digi.me, and which was created with the support of the country’s Directorate of Health. Iceland was chosen as a test bed because it is an exceptionally privacy-aware, tech-savvy and forward-looking nation.

Related Key Challenges of Data Burden, Consent Failure and Data Right Unknown.

66. <https://www.energy.gov/data/green-button>

67. <https://blog.digi.me/2017/05/31/digi-me-allowing-icelandic-citizens-to-download-their-own-health-data-in-world-first/>

IndiaStack

- IndiaStack⁶⁸ is a set of APIs that allows governments, businesses, start-ups and developers to utilise a unique digital Infrastructure to support presence-less, paperless, and cashless service delivery in India, eventually serving 1.5bn citizens. The Open API team at iSPIRT has been a pro-bono partner in the development, evolution, and evangelisation of these APIs and systems.
- The IndiaStack has four technology layers. First, universal biometric digital identity. Secondly, creating digital records, eliminating the need for paper collection & storage. Thirdly, a single interface to all the country's bank accounts & wallets to democratise payments. And finally developing a consent mechanism that allows data to move freely and securely to democratise the market.
Related Key Challenges: Data Burden, Consent Failure, Lack of Consumer Tools, Interoperability, Digital Identity.

These initiatives have gone furthest in attempting to actually implement data mobility and have most experience of the potential pitfalls as well as the opportunities. There is much that can be learned from them.

Additionally, data mobility could be key to the success of tomorrow's Smart City. The UK has a strong record of Smart City initiatives including the Transforming Cities Fund⁶⁹. These initiatives often have Data Hubs with related interoperability such as Hypercat⁷⁰. They also have large-scale community engagement and a business base.

These experiences and approaches could be applied to demonstrating the innovation potential of personal data mobility.

5.4.2.5 New initiatives

Many new and recent initiatives in the UK have the potential to help accelerate progress as personal data mobility evolves. These include:

Smart Data Review

- Smart Data Review⁷¹: As part of its Green Paper on Modernising Consumer Markets, the UK Government is launching a 'Smart Data' review into how to ensure data portability is implemented in a way which supports consumers getting better deals in regulated markets. The review will seek to identify how competition can be used to stimulate innovation and better deals for consumers, including identifying the markets where data portability can have the most beneficial impact.

This could act as a catalyst for action. However, there is a risk that if it focuses on increasing competition through better enabling customers to switch provider, it may be counter-productive to stimulating innovation and growth.

Joint government-regulator Consumer Forum

- Joint government-regulator Consumer Forum⁷²: Also, in the Green Paper on Modernising Consumer Markets, the Government is establishing a new joint Government-regulator Consumer Forum,

68. <http://indiastack.org/>

69. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/689407/transforming-cities-fund-call-for-proposals.pdf

70. <http://www.hypercat.io/>

71. [Department for Business, Energy and Industrial Strategy \(2018\) Modernising Consumer Markets. Department for Business, Energy & Industrial Strategy](#)

72. [Department for Business, Energy and Industrial Strategy \(2018\) Modernising Consumer Markets. Department for Business, Energy & Industrial Strategy](#)

chaired by the Minister for Consumer Affairs. This will comprise senior representatives from across government and regulators, bringing in other experts, such as the CMA as appropriate to discuss overarching priorities for the regulated sectors.

This could act to assist with Adaptive Regulation especially in cross sector / recombinant innovation initiatives.

Data Trusts

- Data Trusts⁷³: From the most recent Government AI paper, there is a recommendation to develop Data Trusts. These trusts will facilitate the sharing of data between organisations holding data and organisations looking to use data to develop AI. The trusts would incorporate proven and trusted frameworks and agreements to ensure exchanges are secure and mutually beneficial.

This initiative could provide structures, standards, T&Cs and other tools to support the development of data mobility.

Centre for Data Ethics and Innovation

- Centre for Data Ethics and Innovation⁷⁴: A consultation paper for the CDEI was issued in June 2018. The envisaged role of the CDEI is that it will have an explicit and unique mandate to advise the government on the measures which are needed to ensure safe and ethical innovation in data and AI.

It will convene, connect and build upon the best evidence, insights and practices available and translate these into direct, real-world actions that enhance the way in which data and AI are used. Ethics sit at the core of data use for all advanced digital businesses and provides a foundation for principles, policies and governance of data.

Other new initiatives

- Other recent initiatives that may be able to play a part in addressing data mobility challenges are:
 - Alan Turing Institute⁷⁵: it's objective is to help make the UK the best place in the world for data science and AI research, collaboration and business
 - The UK Regulators Network⁷⁶ (UKRN): provides a forum to think about cross sector regulatory requirements

5.4.3 Insight and Research

Many organisations and institutions are conducting research into issues relating to personal data, highlighting problems which need addressing, and suggesting ways forward. Separately and together they are contributing to an ongoing process of educating stakeholders - which is vital if personal data mobility is to mature and flourish.

73. [Hall Professor Dame Wendy, Pesenti J \(2018\) Growing the Artificial Intelligence Industry in the UK. Department of Digital, Culture, Media and Sport & Department for Business, Energy & Industrial Strategy](#)

74. <https://www.gov.uk/government/consultations/consultation-on-the-centre-for-data-ethics-and-innovation/centre-for-data-ethics-and-innovation-consultation#the-centres-role-and-objectives>

75. <https://www.turing.ac.uk/about-us/>

76. <http://www.ukrn.org.uk>

The following research has particular relevance to the development of personal data mobility:

- ODI research and development, specifically relevant are:
 - Data Ethics Canvas⁷⁷ – designed to help identify potential ethical issues associated with data projects or activities, and broadening access to personal data while protecting privacy and creating fair markets.
 - Data Sharing decisions – examining what makes people share data and what causes them to build or lose trust. Also considering what technologies are required to make data available for different business models.
- DotEveryone⁷⁸: a think-tank which champions responsible technology for the good of everyone in society. It explores how technology is changing society, undertaking research (Digital Attitudes and Digital Understanding) and building proofs of concepts, and partnering with other organisations to provoke and deliver mainstream change.

Recent research highlights: a lack of consumer awareness about what personal data is collected, how it is collected and how free services make money; that consumers who do want to find out what data is collected and how it is used struggle to do so; that many feel uncomfortable about profiling and targeted advertising. It has recently produced reports on Digital Understanding⁷⁹ (understanding what is necessary to cope in a digital world) and Digital Attitudes⁸⁰.

“*Digitisation is remodelling consumer markets, and the use of data about our consumer lives has already brought huge benefits and great potential for empowerment. However, many people feel powerless to understand either the growing commercial observation or its effects.*”

Control, Alt or Delete? The Future of Consumer Data, Which?

- Which?: the UK’s largest independent consumer body with more than 1.5 million members and supporters. Its policy team identifies where consumers are experiencing problems and advocates for policy solutions. It recently published new research “Control, Alt or Delete? The Future of Consumer Data”, on consumer attitudes and behaviours as they relate to personal data⁸¹.

Key findings of Which? report are that consumers: lack knowledge of how much data is collected and how their data is traded in the data ecosystem; feel it is unfair when they understand and want more control but feel disempowered and that a power imbalance exists; have limited understanding of data profiling and decisions based on inferred data makes them uncomfortable; rationally disengage from T&Cs, as reading them costs more in time than any benefit gained.

- Consumers International: brings together over 200 member organisations in more than 100 countries to empower and champion the rights of consumers everywhere. It is the voice of consumers in international policy-making forums and the global marketplace to ensure they are treated safely, fairly and honestly.

It is placing increasing emphasis on digital rights and recently launched its Digital Index⁸², a collection of global digital policies and initiatives that aim to protect and empower consumers.

77. <https://theodi.org/article/data-ethics-canvas/>

78. <https://www.onedox.com>

79. Miller C, Coldicutt R, Kitcher H. (2018) People, Power and Technology: The 2018 Digital Understanding Report. Doteveryone.

80. Miller C, Coldicutt R, Kos A. (2018) People, Power and Technology: The 2018 Digital Attitudes Report. Doteveryone

81. Which? (2018) Control, Alt or Delete? The future of consumer data. Which?

82. <https://www.consumersinternational.org/what-we-do/digital/digital-index/>

Current campaign focusing on the privacy and security risks posed by internet of things and recent publications include: Building a Digital World Consumers Can Trust⁸³; Testing our Trust: Consumers and the Internet of Things⁸⁴; Securing our Trust in the Internet of Things⁸⁵.

- IPSOS MORI Open Banking research: the market research firm has compiled a series of research reports looking at different aspects of Open Banking with high relevance to data mobility. They include 'Open Banking - the great data giveaway?'⁸⁶, 'Open Banking data sharing dilemmas'⁸⁷, and how trust and corporate reputation will affect the roll out of Open Banking⁸⁸.
- In addition, there is a large and growing body of academic research into individuals' perceptions of the value of their data and their understanding of what data organisations collect and what organisations do with these data. Seminal research in this area includes Allesandro Acquisti's, University of Pennsylvania, paper on learned helplessness in data.

83. [Consumers International and The Federation of German Consumer Organisations \(2017\) Building a Digital World Consumers Can Trust. Consumers International and The Federation of German Consumer Organisations](#)

84. [Consumers International \(2017\) Testing Our Trust: Consumers and the Internet of Things. Consumers International](#)

85. [ANEC, BEUC, Consumers International and ICRT \(2017\) Securing Consumer Trust in the Internet of Things, Principles and Recommendations. 2017](#)

86. <https://www.ipsos.com/ipsos-mori/en-uk/open-banking-great-data-giveaway>

87. [Ginnis S, Stamper P, Byrne A, Garrett C, Strong C \(2018\) Open Banking Data Sharing Dilemmas. Ipsos MORI Social Research Institute](#)

88. <https://www.ipsos.com/ipsos-mori/en-uk/how-trust-and-corporate-reputation-will-affect-roll-out-open-banking>

6. DEMONSTRATION OF A FRAMEWORK FOR DATA DRIVEN INNOVATION

6.1 Conclusions from this section

- The study included the development of a new framework which provided a valuable demonstration of how a data and design driven approach can be effective in creating solutions to Core Issues and challenges in personal data mobility. This entailed the development of a Directed Innovation Framework.
- Design thinking is most valuable when it is rooted in sound analysis and a clear focus on creating value for individuals – avoiding ‘activity without productivity’.
 - The Directed Innovation Framework achieves this by blending business analysis and structure, together with agile thinking, enabled by design-led techniques.
 - Resulting in ‘directed innovation’ that, whilst not constraining the creative process, guides thinking, within a focussed problem space, towards compelling and practical solutions.
- The application of each stage of the Directed Innovation Framework to Key Challenges for personal data mobility demonstrated the value and relevance of the approach:
 - The Preparation and Planning stage showed how the Challenge Focus could be based effectively on Key Challenges. Centring the Value Focus on the LifeDepartment/CVO of Home enabled the exploration of a rich set of consumer needs across a wide range of data types and market sectors.
 - The Design Jam brought together a high-quality, multi-disciplinary team in high-energy collaborative workshops, the group explored, designed, paper prototyped, new digital service concepts, to expose the effects of personal data mobility challenges on them.
 - The framework includes an Intervention Stack which was a highly effective tool in ensuring that all levels of intervention were considered for possible solutions to the Key Challenges. It reinforced that solutions can, and should, exist across a range of different response types, from discrete features or labels, to full services, industry standards, open infrastructure and governing frameworks
 - The synthesis and development stage of the Directed Innovation Framework showed how the Design Jam output could be analysed to determine key themes within user needs. These can be used as a set of guiding principles, around which data mobility enabled services can be designed which address challenges in personal data mobility.
 - The synthesis stage also demonstrated how concepts from the Design Jam can be brought to life by developing prototypes of hypothetical services. This showed how tangible risks related to personal data mobility challenges could be surfaced, with the Intervention Stack guiding the types of response.
- The Directed Innovation Framework has been validated to a level which demonstrates the merit of its further development to become an effective tool in the delivery of personal data mobility, and for wider use in the development of other policy explorations.

6.2 Directed Innovation approach

This section of the report describes the work carried out in Part 2 of the study on the demonstration of a tool for use in the exploration and development of solutions to Core Issues and challenges in personal data mobility. This entailed the development of a Directed Innovation Framework.

The Directed Innovation Framework blends business analysis and structure which is focused on creating value for individuals, together with agile thinking enabled by design-led techniques. The result is a ‘directed innovation’ approach that, whilst not constraining the creative process, augments and guides thinking, within a focussed problem space, towards compelling and practical solutions.

Personal data mobility is an excellent subject in which to explore the use of such a framework because of the enormous innovation potential it offers, and the rich data-driven nature of the opportunity.

In this part of this study Ctrl-Shift, in collaboration with data product and service design studio, Normally, developed a demonstrator of a Directed Innovation Framework, and used it to explore a number of personal data mobility scenarios.

The following sections describe the outcomes from applying the Directed Innovation Framework to personal data mobility challenges. Appendix 6 provides details of the Directed Innovation Framework approach. Normally’s report can also be found in Appendix 7.

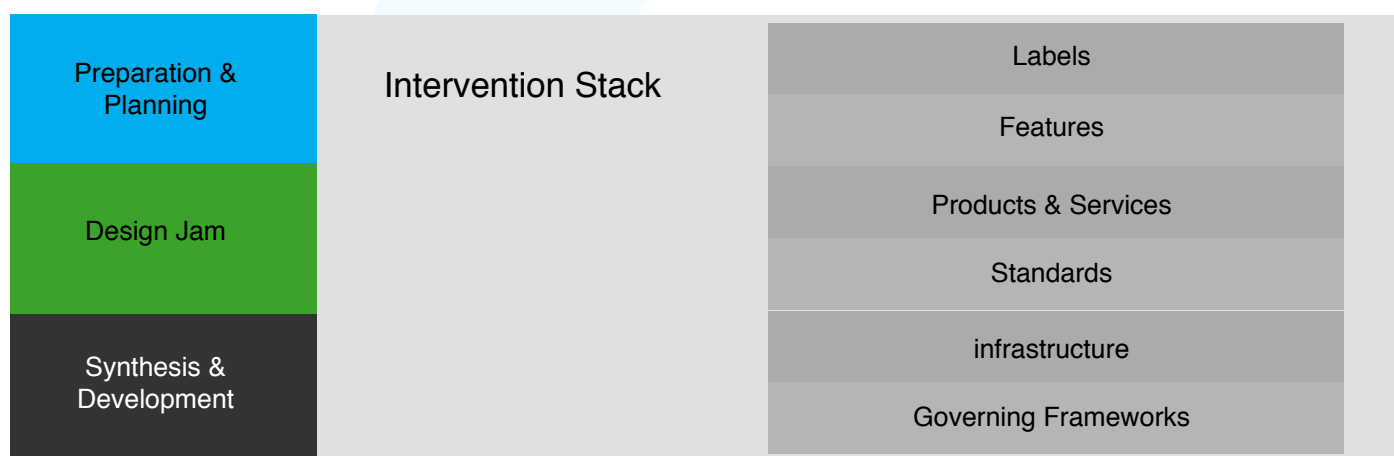
6.3 The Directed Innovation Framework approach

The Directed Innovation Framework applied in this study blends and builds on two proven methodologies. This creates a powerful tool for the structured engagement of multidisciplinary expertise in the synthesis of potentially game-changing solutions, with clear identification of challenges, and focused innovative thinking.

The two underlying methodologies are:

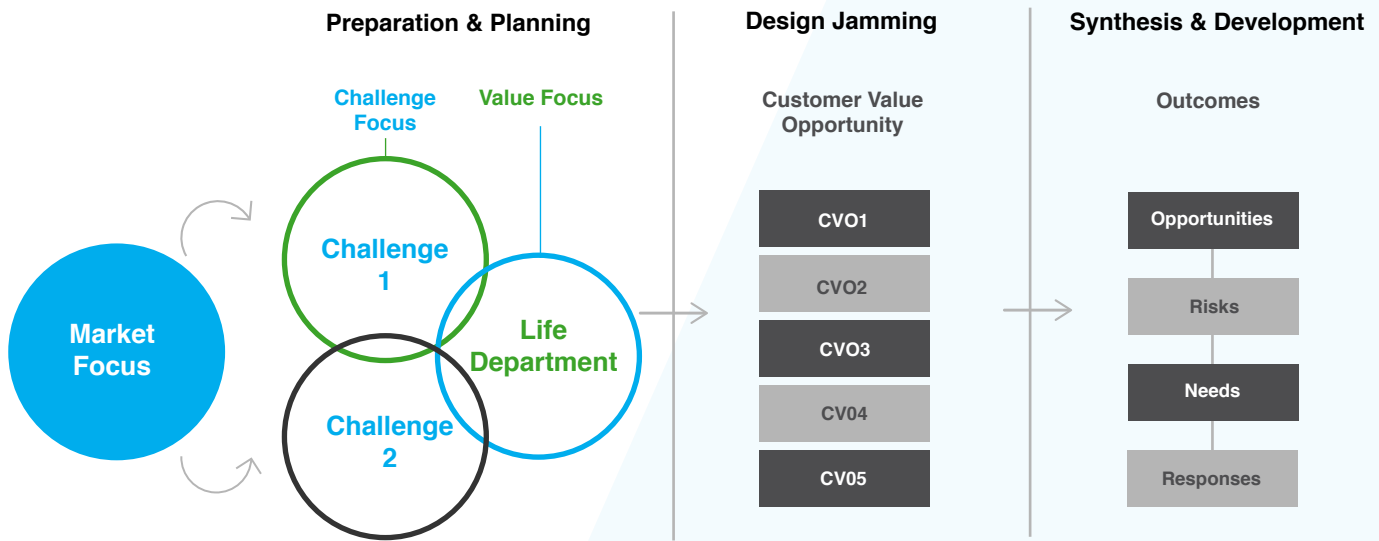
- Ctrl-Shift’s Life Department and Customer Value Opportunity (CVO) methodology
- Normally’s Collaborative Speculation design-led approach

The key components of the Directed Innovation Framework can be illustrated as follows:



6.4 Application of the Directed Innovation Framework approach to personal data mobility

The activities involved in applying the Directed Innovation Framework to the personal mobility challenge can be illustrated as follows:



6.4.1 Preparation and Planning

The Planning and Preparation stage centred on defining the ‘field of play’ for the Collaborative Speculation to take place in the Design Jam and subsequent synthesis and development. This concentrated on defining the ‘Challenge Focus’ and ‘Value Focus’:

- The ‘Challenge Focus’ was defined by the selecting two of the personal data mobility Key Challenges identified in this study which were particularly strong candidates for demonstrating the potential value of the Directed Innovation Framework. These were:
 - Data Burden: Data management being a burden to the individual. While individuals say they want to exercise more control over their data, very few want to invest more time and effort doing so and, unlike organisations, have no tools to help them do so.
 - Safe Data Sharing: Individuals or organisations sharing data on behalf of the individual, not knowing if it is safe to the share data (unless the third party is a tried and tested brand).
- The ‘Value Focus’ was defined by a Life Department and ‘Customer Value’ Opportunities: We chose the ‘Home’ Life Department because there are clear consumer needs that data portability can impact, and great value to be explored across a wide range of data types and market sectors. Within the Home Life Department, Ctrl-Shift research has identified 38 different customer value opportunities. Examination of these CVOs in relation to personal data mobility led to the selection of five opportunity areas we elected to bring to the Design Jam participants to explore.

The defined key market characteristic and conditions were:

- Data mobility needs to be safe
Individuals don’t know if it is safe to share data with a organisation or person, unless it is a tried and tested brand. Partly, this relates to the need for robust processes for two-way identity assurance.
- Data mobility needs to be easy
Data management is a burden to the individual. While individuals say they want to exercise more control over their data, very few want to invest more time and effort doing so, and data mobility could increase the effort needed.

- Data mobility needs to be valuable

Individuals don't understand the value of their data and what they should/could get in return for it. This means they might not be willing to engage in ways that best advance their interests.

6.4.2 Design Jam

The Design Jam brought together a multi-disciplinary teams of 35 experts in a series of high energy collaborative workshops. These include people who would normally not work together to take on challenges that no one organisation can tackle by themselves. A full list of participants is provided in Appendix 5.2.

In a short space of time the group explored, designed, prototyped, tested and iterated new data-driven concepts with end users and stakeholders.

The heart of the Design Jam was Scenario Mapping of the five selected CVOs. These were:

- Home insurance claim Scenario - A fire or flood has damaged or destroyed most of your house and its contents and you need to put in an insurance claim. You need to retrieve proof of ownership of the contents of your house and send to your insurer.
- Under-utilised assets Scenario - We all possess, have access to, or rights over many unused or underutilised assets (equipment, spaces, facilities, skills). Identify assets that aren't being used but could be used by someone else, display their availability, connect them with potential users, and manage their use.
- Move house Scenario - You have lived in your current home for years. You have invested in your community; your children are settled in school and you have accrued many supplier relationships. You have to move 200 miles away for work. Choose where to live, organise moving, set up a new home, and establish your new life.
- Weekly shopping Scenario - Each member of the family has their own dietary requirements, activities and schedule. Different family members buy groceries and household necessities from a wide range of shops, sometimes planned and sometimes spontaneous, often duplicated. Identify what is needed, plan what meals to eat, and automate the purchase of all necessary items for your household.
- Childcare share Scenario - You share a nanny with another family. You have both agreed a basic schedule with the nanny, but it sometimes changes on short notice. The nanny incurs costs when out, e.g. for activities and food. Schedule and track the nanny's working hours with both families, manage logistics, salary payments and expenses.

The participants were split into teams for each of the CVOs. The first task for each team was to map the future scenario for the opportunity they were assigned – completing a worksheet for each step including data requirements.

Three further steps were carried out in the Design Jam to develop the future scenarios:

- Challenge analysis
The teams analysed their journey to identify how challenges may manifest in their future scenarios, paying particular attention to the challenge focus areas – data mobility is perceived as unsafe, complicated and not very useful.

By having groups share their analysis with other jam participants we collectively built-on the knowledge with perspectives from all stakeholders in the room.

- **Concept creation**
Having defined their future scenarios and interrogated the CVOs for challenges, participants co-created solutions within their groups using the Intervention Stack as a prompt to consider all the different types of response they could utilise.
- **Design & prototyping**
Finally, participants were asked to bring their concepts to life. They created sketches, mocked up designs and even created clickable prototypes which could be shared with other jam participants to get critical feedback and to cross-pollinate ideas.

The learnings and outputs from the Design Jam demonstrated the effectiveness of the approach in exploring personal data mobility risks and solutions. They provided a strong foundation to speculate on different outcomes and synthesise potential responses.

6.4.3 Synthesis and development

In the third stage of the Directed Innovation Framework the output of the Design Jam was analysed to examine further the underlying Data Burden and Safe Data Sharing problems that had been addressed by the group. This identified almost 40 separate needs that users might have when engaging with data mobility enabled services.

Cluster analysis uncovered six themes within these needs. These themes represent a set of principles around which data mobile services can be designed that will help ease the Data Burden and Enable the Safe Sharing of data. These were: respect privacy, be visible, reliable, controllable, fair and liable.

6.4.4 Development of hypothetical services (Case Studies)

Following the Design Jam analysis, three hypothetical services (Case Studies) were selected from the paper prototypes built in the Design Jam, to explore the risks and responses in greater detail. The three services represent three major opportunity areas in personal data mobility: resource sharing, automation and asset management. They are:

1. Circle – Childcare Sharing

Representing the Resource Sharing opportunity area,

A fictitious service enabling several families to share care responsibilities between themselves and/or professional childcare providers. It uses data mobility to understand the groups changing commitments and care needs.

2. Moveme – Automated Estate Agency & Property Management

Representing the Automation opportunity, area.

A fictitious estate agent which automates many aspects of the process of moving house. It uses data mobility to gain insights on the lifestyle needs and commitments of you and the people you live with.

3. Ownr – Personal Assets Management

Representing the Managing Assets opportunity area.

A fictitious asset management service which helps people to better utilise the items they own. It uses data mobility to help users identify and evidence the assets they own, manage their liability, and to appropriately insure them.

The services were designed to cover wide variety of circumstances that affect the Safe Sharing of data and impact on the Data Burden. For example, the fictitious childcare sharing service 'Circle' involved minors and a potentially vulnerable work force, whereas the fictitious estate agent 'Moveme' automated the critical process of purchasing a property and relocating a family. The third hypothetical service, asset management platform 'Ownr', was deliberately dealing with more mundane tasks so as to explore safety and burden when users are less invested in the service.

6.5 Testing the Directed Innovation response to data mobility risks in hypothetical services.

Each of the three hypothetical services were developed and explored to a level where tangible risks related to the two Key Challenges could be surfaced. Using the Intervention Stack to guide the thinking on the types of response, design solutions to the risks were created. This work provided valuable demonstrations of ways in which the Directed Innovation Framework can be effective in helping address Key Challenges in personal data mobility, and the value of the Intervention Stack in classifying and shaping the most effective form of response.

Details of the three hypothetical services and the risk and responses evaluated are provided in Appendix 7.

7. CONCLUSIONS

This section draws together and summarises the conclusions from this study.

7.1 Personal Data:

- Personal data lies at the heart of many of the most promising applications for consumer benefit, economic growth and public good in a fast-evolving digital economy:
 - The recombinant and non-rivalrous characteristics of data (ability to limitlessly re-combine and never ‘use up’) can enable unprecedented growth potential in innovation and value from personal data.
 - Further rapid growth is enabled by uptake of technologies such as Artificial Intelligence (AI) and the Internet of Things, which can be fuelled by personal data.
- However, there are barriers to realising the great potential of personal data:
 - A high proportion of personal data is locked in organisational silos where only one organisation controls it - limiting the scope of what the data can be used for, and by whom.
 - Systemic issues exist in the digital data economy, including data breaches, consumer mistrust, uneven sharing of benefits, and deepening concentrations of data and market power.
 - These issues may well be exacerbated by growing data volumes and the impact of new technologies, and developments around personal data must respond to these issues.
- There are market failures which could provide strong cases for Government intervention:
 - Barriers to entry: impeding businesses’ entry into market.
 - Asymmetric information: where some market participants are disadvantaged by having less access to data and related tools.
 - Coordination failures: market participants failure to coordinate on issues such as standards and new collaborative business models.
 - Externalities: that prevent optimal investment of effort and resources in data mobility.
- Interventions aimed at addressing these market failures are likely to bring greater benefit to the individual and society, than to businesses. These market failures are covered by the response to Core Issues (see Section 7.5 below).

7.2 Data Portability:

- Personal data portability is well established in a business-to-business context, but business transactions rarely involve the individuals who are the subjects of the data.
 - Important initiatives have paved the way towards establishing the rights of individuals over the use of their personal data. These include midata, PDMS and PIMS, Mesinfos, PSD2, Blue Button and Green Button.
- The GDPR has enshrined the data portability rights of the individual over their personal data, creating a firm legal basis for initiatives to promote economic and societal use of personal data, and for organisational change and policy reform.
- However, GDPR data portability does not provide the environment or tools for growth from data portability, does not provide the structures to support value generation from personal data.

- GDPR opens up new risks:
 - In the absence of a safe and secure environment for the transaction of personal data, the new rights individuals have over their data introduce new potential risks for both them and the organisations with which they interact.

7.3 Data Mobility

- This vision of personal data mobility goes beyond data portability as specified by the GDPR:
 - Data mobility can realise the true potential of personal data by enabling its safe and efficient use where it can create maximum value - with personal, social and economic benefits distributed fairly.
- Personal data mobility can enable new data-enabled innovation and efficiency in the market, creating better outcomes for individuals and organisations alike.
 - In so doing it can be a major contributor to the UK economy in the 21st century.
- We are at an inflexion point. Enhancing the mobility of personal data offers the potential for explosive growth in innovation, efficiency and productivity.
 - To achieve this, the development of data mobility must also respond to the systemic issues in the digital data market.
 - In doing so, data mobility can contribute to unleashing the full personal, social and economic potential of personal data.

7.4 Opportunities in Data Mobility

- The opportunities identified in this study strongly support the view that personal data mobility can transform the value of personal data for all market participants – enabling the next major advance of both the digital and overall economy.
- The opportunities presented by personal data mobility fall into three main categories:
 - Recombinant Innovation: Combining data traditionally held by different parties in new ways, enabled by personal data mobility, can be a major growth across the digital economy, including: product and service design and delivery, business models, platforms, ecosystems, technology, and infrastructure.
 - Productivity and efficiency improvements: enabled by economies of scale and scope in the use of personal data; and a multiplier effect (Positive Externalities), where increased sharing by individuals of their data with businesses can be used for the benefit of all consumers.

The economic analysis commissioned by this study estimates the impact from personal data mobility enabled productivity and efficiency benefits of approximately £27.8bn increase in GDP.

The contribution to the economy that digital innovation driven by incumbents, new entrants, peer-to-peer markets and individuals themselves is likely to be significantly greater.

- Competition and market dynamics: personal data mobility can support healthy and fair markets, with reduced friction that can stimulate competitive innovation, and greater and simpler consumer choice.
- Personal data mobility can offer benefits to all participants in the digital economy:
 - Individuals, groups and communities: decisions regarding the mobility of personal data will significantly be in the hands of the individual.

This empowerment will have material value, enabling people to gain a greater share of value in tomorrow's digital economy, both in their engagement with providers and in direct leverage of their own personal data.

- Organisations can build new trust-based relationships with empowered consumers.

Incumbent organisations (private and public-sector businesses, and government departments in their role as managers of data) can gain new insights to incrementally improve services and products; innovate new ones, and improve the effectiveness of marketing and operations. Economies of scale and scope of data inputs, and positive externalities can reduce production costs and deliver better tailored products and services.

Personal data mobility can also enable closer collaboration between organisations.

- New Entrants: personal data mobility can open the door to new arenas of recombinant innovation, especially where integration of data from previously separate providers is required.

Barriers to market entry and risks can be reduced through better insight into consumer behaviours and needs, enabling better targeting of innovative new products and services. The positive competitive effects of data mobility on markets will enable consumers to more readily switch to new products, reducing friction and accelerating adoption.

- Governors and regulators: personal data mobility can be a significant contributor to all of the objectives of the Digital Charter. Indeed, without it, opportunities to innovate and create new value from personal data will remain restricted.

Personal data mobility can also make a significant contribution to the Industrial Strategy – addressing aspects of each of the Grand Challenges, and being directly relevant to the Foundations of Productivity.

- Development of supporting technologies, infrastructure, skills and capabilities can deliver supply side benefits, enabling the economy to be more productive, and boosting growth.

If the UK takes a lead in developing these new capabilities, the UK will have increased export opportunity through their deployment overseas.

- Personal data mobility can deliver social benefit with more personalised, joined up services at lower cost.

Tackling poverty and addressing health, human rights, education and environmental issues often relies on access to personal data from a variety of sources. With personal data mobility, data would no longer be restricted to the organisation that originally collected it, enabling the flow of data to the services that require it.

7.5 Core Issues and Key Challenges

- Our analysis determined five Core Issues that are at the heart of personal data mobility. These were developed by prioritising and amalgamating the 18 Key Challenges to the realisation of personal data mobility which emerged from our research:
 - The Core Issues structure provides a clearer view of the complex multidimensional challenge space, and can form the basis of a planned approach for tackling personal data mobility.
 - The Key Challenges are interrelated as they exist within an interconnected structure of the market system needed to develop personal data mobility. Progressing one Key Challenge independently of others could create unintended consequences and risks because of their multiple impacts on different stakeholders.

- The Core Issues are:

<p>Core Issue 1: Infrastructure & Standards:</p>	<p>The need for common technologies, standards and services, reflecting a number of Key Challenges that repeat across the stakeholder groups.</p> <p>Progress on these will reduce the cost barriers and risks preventing businesses taking action on personal data mobility.</p> <p>And, by reducing risk for citizens will contribute to the success of the government's Digital Strategy.</p>
<p>Core Issue 2: Individuals' Know How:</p>	<p>Consumers have a lack of know how and understanding of the digital market, and limited knowledge about their data, how it is used, and how they could use it.</p> <p>This makes the individuals vulnerable to abuse and lacking in the skills to access the opportunity.</p>
<p>Core Issue 3: Adaptive Regulation:</p>	<p>Well-functioning markets require strong regulation and legislation.</p> <p>To match the pace of change in a fast-moving developing market such as personal data mobility, regulators and government need new levels of knowledge, skills and adaptiveness, to ensure successful market development at pace.</p>
<p>Core Issue 4: Services & Applications:</p>	<p>There is a lack of services and applications that enable Individuals to use personal data to create value for them and others.</p> <p>These fall into two categories: Personal Data Management Services, and Personal Information Management Services comprising Decision Support Services and Life Management Services.</p>
<p>Core Issue 5: Incumbent Business Case:</p>	<p>There is not a clear, or compelling enough case for business to embrace personal data mobility with measurable costs and risks created largely by Core Issue 1 & 2.</p> <p>There is a lack of proof points for the innovation opportunity.</p>

7.6 Gaining the Necessary Stakeholder Engagement

- Stakeholder engagement will play a critical and central role in the development of personal data mobility which will require strong coordination.

- The successful development of the personal data mobility market requires strong, coordinated and simultaneous stakeholder engagement. The multi-faceted and interrelated nature of personal data mobility challenges emphasise the need for active continuous participation by all stakeholders.
- There are inevitably barriers to achieving this, with significant conflict in the motivations of many of the essential stakeholders. Many existing players benefit strongly from the status quo. Often competitive positions based on data assets rely on exclusive access to data. Movement from this position is frequently constrained by risks being more readily quantifiable than the strategic opportunities.
- To achieve the engagement necessary, it is essential to have a well-developed understanding of the differing motivations of the key stakeholder groups. This study has provided the basis for this by examining stakeholder motivations specifically around the impact on each group of the key challenges to personal data mobility, as determined from the research. This analysis provides a key component for the development of an effective stakeholder engagement plan.

7.7 Enablers - Emergent Solutions and Relevant Market Activities

- In the market there are multiple Enablers (emergent solutions and relevant market activities) that can help in addressing the personal data mobility Core Issues. However, there are no easy answers or quick fixes - none of the Enablers offer complete scalable solutions.
 - There are emergent solutions which can be built upon, and market activities that provide invaluable learnings from relevant initiatives and research.
 - But development is largely uncoordinated with investment spread across multiple aspects of the market, services and infrastructure.

The support that can be provided by Enablers varies across the Core Issues. This is summarised in the following table:

<p>Core Issue 1: Infrastructure & Standards:</p>	<p>A good set of Enablers with relevant emergent solutions in the Open Banking implementation, digital identity initiatives, and development of interoperability standards.</p> <p>A strong research base evidencing the market need, and the potential for PDMS and recent market initiatives to support development.</p>
<p>Core Issue 2: Individuals' Know How:</p>	<p>Supported by sound understanding of the 'points of tension', identified by research and analysis done by a number of organisations.</p> <p>Multiple standards in development which can reduce risks and improve ease for the individual. As PIMS and PDMS evolve, they can provide tools for increasing individuals' understanding and value.</p>
<p>Core Issue 3: Adaptive Regulation:</p>	<p>Discussed in initiatives such as Midata, however, it is early days for this development.</p> <p>The UK Government Regulators Network, the Joint Government Regulator Consumer Forum and the Centre for Data Ethics and Innovation provide market activities with which to work and build.</p> <p>The Open Banking Governance Process begins to create a systematised to managing changing governance requirements.</p>

<p>Core Issue 4: Services & Applications:</p>	<p>Good basis of market and consumer research on the types of data tools that individuals may need to make the market safer or easier.</p> <p>Multiple PIMS and PDMS already in market can provide a foundation to build value and utility for the individual.</p> <p>Market initiatives such as Blue Button provide learnings for the value and utility needed and used by individuals.</p>
<p>Core Issue 5: Incumbent Business Case:</p>	<p>Need for the illustration/demonstration of value from recombinant innovation - not easily apparent from the perspective of a siloed sector business.</p> <p>Some demonstration of this value in market initiatives such as the midataLab and MesInfos. PIMS also provide examples of value proposition for individuals.</p> <p>The Directed Innovation workshops in this study also illustrate the opportunities.</p>

- There are many enabling building blocks which support multiple Core Issues. Notable amongst these are:
 - The comprehensive set of tools provided by Open Banking which are considered to be 12-18 months ahead of similar initiatives globally.
 - PDMS and PIMS, where the UK is a market leader.
 - Standards development activity, especially for interoperability.
- Market initiatives have generated important learnings which can accelerate the development of personal data mobility. These include:
 - Understanding of barriers to progress, including lack of senior sponsorship and strategic motivation, business engagement, pace and motivation within initiatives, appropriate funding, clarity in understanding challenges and enablers.
 - The structure of the development programme has a big influence over success. For example, Open Banking benefited from a robust market development team structure. IndiaStack, whilst driven strongly by technology has experienced challenges around data ethics, security and value. Blue Button was managed collaboratively between business and Government, and that accelerated results.
 - There is an international market and UK initiatives would benefit from collaboration and coordination.
 - IoT and Smart Cities have created environments with stakeholders and enablers in place on which personal data mobility initiatives can build.
- However, there are significant gaps where there is little support from Enablers, indeed some of the Key Challenges have no material enablers – in particular Safe Data Sharing. So, these will need to be developed.

7.8 Demonstration of a Framework for Data-Driven Innovation

- The study included the development of a new framework which provided a valuable demonstration of how a 'Directed Innovation' approach can be effective in creating solutions to Core Issues and challenges in personal data mobility.

- Design thinking is most valuable when it is rooted in sound analysis and a clear focus on creating value for individuals – avoiding ‘activity without productivity’.
- The Directed Innovation Framework achieves this by blending a rigorous consumer value-focused analytical approach, together with agile thinking, enabled by design-based techniques.
- The application of each stage of the Directed Innovation Framework to Key Challenges for personal data mobility demonstrated the value and relevance of the approach:

<p>1. Preparation & Planning</p>	<p>The preparation and planning stage showed how the challenge focus could be based effectively on Key Challenges from the personal data mobility research.</p> <p>Centring the Value Focus on the Life Department/Customer Value Opportunity of Home enabled the exploration of a rich set of consumer needs across a wide range of data types and market sectors.</p>
<p>2. Design Jam</p>	<p>The Design Jam brought together a high-quality, multi-disciplinary team in high-energy collaborative workshops.</p> <p>The group explored, designed, paper-prototyped, new digital service concepts, to expose the effects of personal data mobility challenges on them.</p> <p>The Directed Innovation Framework includes an Intervention Stack which was a highly effective tool in ensuring that all levels of intervention were considered in the Design Jam for possible solutions to the Key Challenges.</p> <p>The Intervention Stack reinforced that solutions can, and should, exist across a range of different response types, from discrete features or labels, to full services, industry standards, open infrastructure and governing frameworks.</p>
<p>3. Synthesis and Development</p>	<p>The synthesis and development stage of the Directed Innovation Framework showed how the Design Jam output could be analysed to determine key themes within user needs.</p> <p>These can be used as a set of guiding principles, around which data mobility enabled services can be designed which address challenges in personal data mobility.</p> <p>This stage also demonstrated how concepts from the Design Jam can be brought to life by developing prototypes of hypothetical services. This showed how tangible risks related to personal data mobility challenges could be surfaced - with the Intervention Stack guiding the types of response.</p>

- The Directed Innovation Framework has been validated to a level which demonstrates the merit of its further development to become an effective tool in the delivery of personal data mobility, and for wider use in the development of other policy explorations.

7.9 Personal Data Mobility market development

- Drawing together the learnings from this study, specifically in the areas of: core issues at the heart of data mobility; stakeholder engagement and motivation; enabling initiatives in the market, and the value of Directed Innovation techniques, the study has identified the key steps to successful development of the personal data mobility market.

7.9.1 Establishment of a personal data mobility Coordinating Entity (CE)

- Because of the complex coordination and facilitation requirements, and because there are and will be pockets of data mobility development within sectors, there is a need for an entity which can facilitate and coordinate the delivery of the personal data mobility market. To be successful this entity needs the following characteristics:
 - Empowered – have the teeth or the recourse to teeth to enforce action.
 - Commercially independent.
 - Impartial – be known to be unbiased.
 - Have capacity and funds to support engagement.
 - Be able to coordinate across sectors.
 - Have market authority – strong skills and knowledge and with the capacity to drive the coordination.
- To achieve the above, government would need to have involvement in the Coordinating Entity, either in a leading role, or providing active strategic support to it.
- Action on the development of the personal data mobility market can be effectively structured around the resolution of the five Core Issues identified in this study. These Core Issues group logically into two distinct but closely related Development Agendas for both the CE and for business.

7.9.2 CE-led Personal Data Mobility Development Agenda

- Core Issues 1 (Infrastructure & Standards), 2 (Individuals' Know how) and 3 (Adaptive Regulation) cannot be resolved by a single organisation and when considered together with the market failures described in Section 1.4.3, present a strong case for government intervention and facilitation. Together they form the CE-led Personal Data Mobility Development Agenda. Key objectives of the CE-led Personal Data Mobility Development Agenda will be to make the market safe and easy, and enable value to be effectively and sustainably developed.

- Core Issue 1: Infrastructure and standards:
The key challenges within this Core issue are: safe data sharing; liability models; inadequate consent mechanisms; digital identity; interoperability; lack of data access standardisation. Without coordinated, and government-supported action to collectively and collaboratively develop the Infrastructure and Standards, access to value from personal data mobility will be slow and will potentially cause increased market risks for all stakeholders.

The lack of infrastructure has and will continue to hamper investment in innovation and therefore market growth. Action on this Core Issue can address many of the cost and risk barriers that currently impede active engagement by businesses.

- Core Issue 2: Individuals' Know How:
Action on this Core Issue will enable and empower individuals to gain access to new value created by personal data mobility in a safe and secure way. Individuals' know how needs to be built in coordination with the other market developments to achieve maximum effective stimulation of engagement and demand.

- **Core Issue 3: Adaptive Regulation:**
Adaptive Regulation, in parallel with infrastructure development, ensures that the legislative and regulatory environment reflects the pace and direction of the personal data mobility market and its underpinning technology - dynamically ensuring a balance between growth and safety. Using a collaborative approach, adaptive regulation also develops the business confidence to support innovation and, for individuals, that misuse will be addressed.

7.9.3 Business-led Personal Data Mobility Development Agenda

- Core Issue 4 (Services & Applications) and Core Issue 5 (Incumbent Business Case) deliver the value to individuals, organisations and the economy, which is the purview of business (private and public sector and new entrants) with involvement from, and coordination oversight between the two Development Agendas also being provided by the CE.

- **Core Issue 4: Services and Applications**
New access to personal data will enable the development of new services and applications for individuals that help them be more effective in using their data to make decisions, and manage their lives more efficiently. This will also unlock new value for businesses.

The development of consumer-facing personal data services and applications will help to inform the development of Infrastructure and Standards, Individuals' Know How, and Adaptive Regulation.

- **Core Issue 5: Incumbent Business Case**
Reduction of the costs and risks caused by Core Issues 1, 2 and 3 will foster the development of business cases for incumbents to invest in this market. This will lead to greater participation in the market, be that making data available, accessing the productivity and efficiency, or delivering new innovation, which creates new revenues.
- It is important to note that the business case for businesses may only become positive as the costs and risks associated with Core Issues 1, 2 and 3 are reduced.
- The development agendas for government and business should optimally run in parallel. This is because:
 - They very valuably inform each other.
 - Independently they don't and won't deliver the value of personal data mobility.
 - Independently they trigger other challenges and or new risks and challenges. For example, data access without resolving safe data sharing stalls value creation.
 - Due to their interconnectedness all stakeholders can make a valuable contribution to both Development Agendas.

8. RECOMMENDATIONS

This report makes three major recommendations to support directly the development of the personal data mobility market, as described in Section 7.9.

8.1 Recommendation 1: Create a personal data mobility Coordinating Entity.

Establish a personal data mobility industry working group with immediate responsibilities to:

- Design a coordinating entity, using the Open Banking Working Group and Open Banking Implementation Entity as templates.
- The coordinating entity requires the following characteristics to be successful:
 - Empowered – have teeth or the recourse to teeth to enforce action
 - Commercially independent
 - Impartial – be known to be unbiased
 - Have capacity and funds to support engagement
 - Be able to coordinate across sectors
 - Have market authority – strong skills and knowledge and with the capacity to drive the coordination
- Codify and promote reusable solutions that have been developed in existing initiatives.
- Enable ways of sharing knowledge and solutions for personal data mobility.
- Use the Directed Innovation Framework to: explore solutions; inform business cases; identify intervention requirements; and inform the design of the CE.

8.2 Recommendation 2: Progress priority items from the CE-led Personal Data Mobility development agenda across the Core Issues of Infrastructure and Standards, Individuals' Know How, and Adaptive Regulation.

8.2.1 Infrastructure and Standards

Infrastructure and standards make the market safe and easy and reduce the cost of entry into the market. There are three Key Challenges within infrastructure and standards that require priority action:

- **Safe Data Sharing:** Data Portability as defined and supported as a legal right for individuals in the GDPR creates a potential risk for all stakeholders.
 - The CE should facilitate government and industry collaboration to identify ways to mitigate the potential harms ensuing from data portability as an individuals' legal right.
 - Safe data sharing should be an early focus of this approach, to tackle the threat of misuse of data that is increased by data portability.
- **Liability models:** Tackling the liability issues around data portability should be another important priority. Open Banking has highlighted that the lack of a robust liability model for data sharing is a blocker for the development of data mobility services. This is likely to require legal changes. The time needed in order to create legislation means that addressing this gap in the landscape must happen sooner rather than later. Open Banking presents an opportunity to develop this liability model within a functioning data mobility environment.

- We recommend that the CE works with OBIE to establish a liability model for Open Banking that would be transferable to other sectors and applications.
- Interoperability: Ensuring that interoperable standards and accessible tools for data sharing are available will accelerate data mobility progress by lowering friction and costs, providing impetus for investment. There are a large number of interoperability initiatives and nascent solutions in market that can be leveraged.
- Support the development of interoperability – identify and promote reusable solutions and actively support the development of standards.

8.2.2 Individuals' Know How

Consumer demand for services that leverage data mobility will be vital in developing the case for business investment. This demand must be generated responsibly, and coordinated with the development of better public understanding of data protection principles, or the safety and effectiveness of the ecosystem will be threatened.

- Work with DCMS, NCSC, the ICO and other regulators to ensure that the right to data portability is prominent in future communications campaigns around data protection and cyber security. Data sharing skills should also be included in digital skills programmes to build understanding of the data ecosystem, where data mobility could create a valuable good news story.
- Work with consumer groups such as Which?, Doteveryone, and Consumers International to support the development of Individuals' Know How.

8.2.3 Adaptive Regulation

It is important that broader data-related regulation is up-to-date and structured in a manner that supports growth. The fast-moving and emergent nature of the personal data market means that a traditional approach to regulation will create blockers and limit the market's potential.

- Create a structure to enable the development of iterative and adaptive regulation that will allow government bodies to respond quickly to new opportunities and challenges in the market. This structure be developed using the Directed Innovation Framework approach that was demonstrated in this project.
- Close collaboration between government, innovators and regulators, using scoping workshops as a tool in policy development, applying the Directed Innovation Framework to highlight areas of regulation requiring review to support the progress of data mobility.

8.3 Recommendation 3: Progress priority requirements from the business-led Personal Data Mobility Development Agenda

It is for businesses and industry to lead on building the products and services that populate the data mobility ecosystem, however, government also has a role to play in the facilitation of the development of the business case.

We recommend the following actions:

- Establish an industry working group, as described in Recommendation 1, to agree how support from government would be best focused.
- Support developers of applications and services:
 - Create a personal data mobility Sandbox, similar to the FCA Sandbox, using the Directed Innovation Framework as a foundation. This would support the development of innovative services, help codify the value for individuals and for businesses, and inform the adaptive regulation requirements.

- PDMS/PIMS businesses, along with organisations such as TechUK and InnovateUK, have a crucial role to play in ensuring the Sandbox meets the needs of developers of new data applications and services. We recommend that they actively participate in the Sandbox initiative, both to shape its development so that it meets the needs of innovators, and to use it to develop new data mobility applications and services.
- As they are a particularly rich source of best practice in the development of new services using personal data, it would be particularly beneficial for the data mobility working group to engage with the PDMS/PIMS community.
- Applications and services that leverage data mobility will only gain traction if they deliver value to consumers. Delivering value requires research and analysis to locate value opportunities and design thinking to unlock these opportunities. We recommend that businesses seeking to create new services follow this integrated approach, as per the Directed Innovation Framework outlined in this report.
- Government data can create huge value, and taking the lead in releasing data will encourage the private sector to follow suit. It also presents an opportunity to establish a set of standards and solutions that will lower the development burden for incumbents and innovators alike. We recommend working with government departments and initiatives to support the creation of personal data mobility value:
 - The Smart Data review and other initiatives to consider cross sectoral reuse of data to be a priority when opening up data.
 - The National Data Strategy should ensure that the potential for innovation be a factor when deciding which Government data sets are considered for being opened.
 - Government to be open about its methods that it uses when sharing data sets.



/APPENDICES

APPENDIX 1: GDPR ARTICLE 20

The new European General Data Protection Regulations introduce a new right to data portability (Article 20), in addition to the long standing right of ‘Subject Data Access’ (Article 15 of the Data Protection Act 1998). This provides a strong legal basis for initiatives designed to promote the benefits of data mobility.

This Appendix reviews some of the more detailed legal questions raised by this new right.

A1.1 Questions raised by Article 20

The new right to data portability introduced in the European General Data Protection Regulations says:

“The data subject shall have the right to receive the personal data concerning him or her, which he or she has provided to a controller, in a structured, commonly used and machine-readable format and have the right to transmit those data to another controller without hindrance from the controller to which the personal data have been provided, where:

- a. the processing is based on consent pursuant to point (a) of Article 6(1) or point (a) of Article 9(2) or on a contract pursuant to point (b) of Article 6(1); and*
- b. the processing is carried out by automated means.”*

Data Protection Act, Article 15.3 says:

“The controller shall provide a copy of the personal data undergoing processing. For any further copies requested by the data subject, the controller may charge a reasonable fee based on administrative costs. Where the data subject makes the request by electronic means, and unless otherwise requested by the data subject, the information shall be provided in a commonly used electronic form.”

These clauses are, inevitably, open to some interpretation. And there are some inconsistencies between them.

Focusing on Article 20:

- The clause creates a right to receive and to transmit data concerning him or her but it does not define any criteria about where the data is to be received. Could a data controller refuse to port the data on the grounds that it is not being ported to a safe, secure destination?
- The clause is silent as to the underlying purpose of portability: there is a difference between portability for the purposes of human rights and transparency and portability for the purposes of economic value creation.
- What does ‘personal data concerning him or her, which he or she has provided to a controller’ mean? The Article 29 Working Party explains that:

“The right to data portability covers data provided knowingly and actively by the data subject as well as the personal data generated by his or her activity. This new right cannot be undermined and limited to the personal information directly communicated by the data subject for example, on an online form.”

It goes on to say:

“inferred data and derived data are created by the data controller on the basis of the data ‘provided by the data subject’. These personal data do not fall within the scope of the right to data portability. For example, a credit score or the outcome of an assessment regarding the health of a user is a typical example of inferred data. Even though such data may be part of a profile kept by a data controller and are inferred or derived from the analysis of data provided by the data subject (through his actions for example), these data will typically not be considered as “provided by the data subject” and thus will not be within scope of this new right.”

Further, the Working Party says:

“Data controllers should provide as many metadata with the data as possible at the best possible level of granularity, which preserves the precise meaning of exchanged information. As an example, providing an individual with .pdf versions of an email inbox would not be sufficiently structured. E-mail data must be provided in a format which preserves all the meta-data, to allow the effective re-use of the data. As such, when selecting a data format in which to provide the personal data, the data controller should consider how this format would impact or hinder the individual’s right to re-use the data.”

A1.2 Questions arising from differences in interpretation

While these are helpful clarifications there may still be differences of opinion as to interpretation, especially given inconsistencies with Article 15’s reference to “a copy of the personal data undergoing processing” - which is a much broader definition.

- Does the Article 15 provision to charge for further copies apply also to ported data?
- Clause 68 of GDPR says the right to portability should apply where “the processing is necessary for the performance of a contract.” Who defines what data is ‘necessary for the performance of a contract’? Does it create an obligation on data controllers to tag data according to the legal grounds on which it is being used e.g. ‘necessary for the performance of contract’, ‘consented’, ‘legitimate interest’ etc?
- What does ‘structured, commonly used and machine-readable format’ mean? Can data controllers specify what structured, commonly used and machine-readable formats they are prepared to use? What happens if they refuse to operate well-formed APIs?
- How should clause 1b) ‘processing is carried out by automated means’ be interpreted. Does it mean that if any manual intervention is required, data controllers are not required to port the data?
- It does not specify how requests to port data should be handled. Does the request have to come from the individual data subject, or could it come from a third party acting on behalf of the data subject? If so, what processes would the data controller have to go through to verify that the third-party request is genuine?
- Article 12 of GDPR allows data controllers to charge a fee for the provision of personal data “because of the repetitive character” of requests. But the Article 29 Working Party says “there should be very few cases where the data controller would be able to justify a refusal to deliver the requested information, even regarding multiple data portability requests ... it is very unlikely that the answering of multiple data portability requests should generally be considered to impose an excessive burden.”

There are also potential inconsistencies between Articles 20 and 15.

- They have different definitions of data that can be copied and moved (as above)
- While Article 20 refers to “structured, commonly used and machine-readable format”. Article 15 refers to ‘commonly used electronic form’. Are these different, or the same?

Such questions will be resolved, over time. In the meantime, however, the issues outlined in this Appendix could create an atmosphere of uncertainty and therefore caution.

APPENDIX 2: DATA MOBILITY: THE DIGITAL CHARTER AND THE INDUSTRIAL STRATEGY

This Appendix discusses the role of data mobility in supporting the Digital Charter and in helping address the four Grand Challenges of the Government's Industrial Strategy.

A2.1 Data Mobility and the Digital Charter

Through its Digital Charter, the Government has committed to make the UK both the safest place to be online and the best place to start and grow a digital business. It wants the UK to lead the world in innovation-friendly regulation that encourages the tech sector, provides stability for businesses, increases public confidence and trust in new technologies, and creates the best possible basis on which the digital economy can thrive.

The table below lists the Digital Charter's work programme with a summary of the relevant contribution from data mobility

Digital Charter work programme	Contribution/relevance of data mobility
Digital economy – building a thriving ecosystem where technology companies can start and grow	The core argument in favour of data mobility is that opens up the opportunity for new uses of data, by new users, to create new services. Reducing barriers to entry by making data available to new, innovative companies is key to building a thriving ecosystem
Online harms – protecting people from harmful content and behaviour, including building understanding and resilience, and working with industry to encourage the development of technological solutions	There are risks to be guarded against to ensure that data mobility does not lead to individuals feeling they are losing rather than gaining control over their data (because it is now being accessed and used by many more parties). Implementation of data mobility needs to be designed to avoid these harms, and a key element of this is the technological solutions to ensure that data is shared safely, and that individuals have the tools to easily manage and control this data sharing.
Liability – looking at the legal liability that online platforms have for the content shared on their sites, including considering how we could get more effective action through better use of the existing legal frameworks and definition	Data mobility raises important matters relating to liability, not specifically to 'content shared on sites' but to data shared between different parties. There is an urgent need for clarity on these issues.

<p>Data and artificial intelligence (AI) ethics and innovation – ensuring data is used in safe and ethical way, and when decisions are made based on data, these are fair and appropriately transparent</p>	<p>Mobile data will be a key factor in new applications of AI - and the critical criteria of safety, ethics, fairness and transparency apply completely to any ported data that fuels these AI applications.</p> <p>The very availability of this data may provide a significant spur to innovation on this front</p>
<p>Disinformation – limiting the spread and impact of disinformation intended to mislead for political, personal and/or financial gain</p>	<p>Data mobility relevant in that it will simplify access to information that could support such actions.</p>
<p>Digital markets – ensuring digital markets are working well, including through supporting data portability and the better use, control and sharing of data</p>	<p>Clearly, achieving data mobility is key to making digital markets work well, as has already been recognised</p>
<p>Cyber security – supporting businesses and other organisations to take the steps necessary to keep themselves and individuals safe from malicious cyber activity, including by reducing the burden of responsibility on end-users</p>	<p>The cyber security implications and requirements of data mobility are central to its success</p>

A2.2 Data Mobility and the Industrial Strategy

The UK Government’s Industrial Strategy lays out four ‘Grand Challenges’. The table below outlines data mobility’s relevance to each of them.

Grand challenge	Relevance of data mobility
<p>AI & Data Economy We will put the UK at the forefront of the artificial intelligence and data revolution</p>	<p>The Government’s goal of making the UK a “global centre for artificial intelligence and data-driven innovation” relies fundamentally on safe, efficient, mass scale data mobility.</p> <p>Data mobility is important to enabling “the rapid adoption of AI technologies at scale”.</p> <p>Data mobility is key to “removing barriers to innovation and ensuring that data is used in a way that is both safe and fair to individuals”. And data mobility needs to be implemented in ways that ensure this outcome and avoid unintended negative consequences.</p> <p>The implementation challenges of data mobility should be high on the agenda of the new Centre for Data Ethics and Innovation.</p>

	<p>A key impact of data mobility is the creation of new, never-seen-before information services provided by both new entrants and existing incumbents. The provision of such services is a key driver for the creation of the jobs of the future, and the skills needed for these jobs.</p>
<p>Clean Growth We will maximise the advantages for UK industry from the global shift to clean growth</p>	<p>While data mobility is not key to the development of clean energy technologies, it may be a crucial enabler, assisting the design, marketing and operational implementation of smart consumer services designed to engage households in initiatives to reduce carbon emissions, change energy usage behaviours and embrace new, cleaner energy technologies.</p>
<p>Future of Mobility We will become a world leader in the way people, goods and services move</p>	<p>One of the key mobility challenges citizens face is understanding and managing how different available modes of transport fit their travel purposes. Data mobility is key to the creation of services that enable the creation of much more efficient ‘joined up’ integrated travel.</p> <p>One of the goals of this challenge is to “explore ways to use data to accelerate development of new mobility services and enable the more effective operation of our transport system”. Data mobility lies at the heart of this.</p>
<p>Ageing Society We will harness the power of innovation to help meet the needs of an ageing society</p>	<p>One of the major factors inhibiting the provision of low cost, humane and efficient services that enable an ageing population to “lead independent, fulfilled lives, continuing to contribute to society” is the ability to integrate the inputs of multiple service providers across the public and private sectors, charities and so on.</p> <p>Data mobility is a key enabler to this challenge by facilitating data to flow, in privacy protecting ways, to and from the agencies that need to access it, with the individuals’ permission and under her control. This is especially true when it comes to the application of “smart home technologies, wearable devices and tech enabled health and care services”.</p>

One part of “leveraging our health data to improve health outcomes” is access to and use of data. As the Industrial Strategy recognises, the NHS generates powerful datasets that could be harnessed in a safe, fair and secure manner to develop new tools to diagnose and treat illness earlier.”

Integrating these insights, tools and treatments into individuals’ lives is one of the big opportunities opened up by data mobility.

In short, having access to the right information at the right time is vital if we to innovate to meet the needs of ageing society. Data mobility addresses this challenge, enabling “care providers to adapt their business models to changing demands, encouraging new models of care to develop and flourish”.

The Industrial Strategy outlines five Foundations of Productivity - the essential attributes of every successful economy. The table below outlines data mobility’s relevance to these five foundations.

Foundation of Productivity	Relevance of data mobility
<p>Ideas: the world’s most innovative economy</p>	<p>One of the main purposes of data mobility is to help drive innovation and growth, especially the creation of new, never-seen before data driven services that meet previously unmet consumer needs. Well executed data mobility will help the UK “do more to ensure our excellence in discovery translates into its application in industrial and commercial practices, and so into increased productivity.”</p> <p>As the Industrial Strategy notes innovation “can come from radical transformation or incremental improvements; from within a business or from a new insurgent”. As this paper shows, data mobility enables both.</p> <p>One way to maximise the potential of data mobility is to use it as one of the focal points in Government plans to “build research and innovation excellence in the UK”.</p>

	<p>Data mobility is a prime candidate for investment by both the second wave of the Industrial Strategy Challenge programme and the Strategic Priorities Fund.</p> <p>The Government’s commitment to an agile approach to regulation “that promotes innovation, the growth of new sectors and innovative market entrants” speaks directly to the challenges and opportunities of data mobility.</p>
<p>People To generate good jobs and greater earning power for all</p>	<p>The Government’s commitment to driving up digital skills is an important contributor to the success of data mobility - and implementation of data mobility may provide a useful vehicle by which these skills can be developed.</p> <p>Data mobility and specific applications such as the development of personal lifelong learning records could be an important enabler of efforts to help people to “learn and train throughout their lives”.</p> <p>Making the provision of new data driven service enabled by data mobility an innovation ‘hotspot’ could be one way of supporting the Government’s goal of being “an attractive destination for the world’s most talented and innovative people”.</p>
<p>Infrastructure - A major upgrade</p>	<p>The Industrial Strategy says: “We must make sure our infrastructure choices not only provide the basics for the economy, they must actively support our long-term productivity, providing greater certainty and clear strategic direction.” Building the infrastructure that enables safe, resilient, efficient, mass-scale data mobility ticks all these boxes.</p> <p>The creation of a national data sharing infrastructure including, for example, the mass availability of personal data management services, should be on the agenda of the National Infrastructure Commission.</p> <p>The Industrial Strategy notes: “ Well targeted investment can drive economic development, particularly when implemented as part of a wider programme of interventions to address the unique circumstances of each area.” The infrastructure needed to enable data mobility and deliver ongoing innovation and growth of data driven services is an excellent case in point.</p>

Such investment would help “ increase the UK’s competitiveness in transformative parts of the global economy.”

Data mobility can become a key pillar of the Digital Strategy alongside other imperatives such as superfast broadband and 5G.

The maximum, safe, citizen-empowering use of personal data needs to be seen as complementing the development of other data assets such as geospatial data and company information.

As the Industrial Strategy says: “Now is the right time to harness the growing momentum around data driven technologies, placing the UK at the cutting edge of trusted and innovative deployment of data.”

Business Environment - To be the best place to start and grow a business

One way to ensure this is to bring down barriers to entry, in particular the barriers to entry created by the siloed, restrictive way in which personal data is collected and used.

The Government’s partnership approach to working with sectors is ideal to the development of a new service sector of the economy drawing on the opportunities created by safe, mobile personal data.

The diffusion of good practice is essential to the development of this new service sector.

The implementation of data mobility could be placed on the agenda of the new regional Digital Innovation Hubs currently under development.

The Government’s plans to “establish data trusts, an innovative approach to stimulating fair, safe and equitable data sharing between parties” is equally key to the successful implementation of data mobility.

One opportunity that the new Future Sectors team could profitably explore is the potential emerging sector of PIMS (Personal Information Management Services) supported by a new infrastructure of PDMS (Personal Data Management Services).

Places - To have prosperous communities throughout the UK

The development of new services that use personal data to help individuals and households make better decisions and manage their lives better is place agnostic.

It does not favour the capital over the regions. It applies equally to every locality, and can contribute significantly to the development of local economies

APPENDIX 3: EXAMPLES OF POTENTIAL DATA MOBILITY ENABLED INNOVATION

This Appendix illustrates examples of the vast array of different forms this innovation and growth could take.

Theme	Description	Benefits	
		Individual	Organisation
HEALTH & SOCIAL CARE	Integrate data from individuals' interactions with multiple providers (e.g. hospitals, GPs, specialist doctors, pharmacists, other health professionals, support workers, etc.) to enable joined up service provision.	<ul style="list-style-type: none"> • better service/ treatment • less hassle 	<ul style="list-style-type: none"> • better service • reduced costs • lower compliance costs /risks
HEALTH MANAGEMENT	Integrate data from gyms, hospitals, GPs, keep fit devices, calorie intake etc for personal trainers, medics to provide advice.	<ul style="list-style-type: none"> • better service • better health 	<ul style="list-style-type: none"> • better service at same or lower cost
PENSIONS	Details of all pensions ported to a pension management service. The individual has easily accessible records of all pension pots to the same place.	<ul style="list-style-type: none"> • convenience • reduced effort • better overview and management of pensions and the possibility to choose more sustainable pension funds 	<ul style="list-style-type: none"> • reduce administration costs

Theme	Description	Benefits	
		Individual	Organisation
‘ALWAYS ON THE BEST DEAL’	‘Concierge’ shopping services for utilities connect information about the individual’s current tariffs, energy usage, household details, etc. to help the individual get and stay on the best deal without having to spend hours uploading information to comparison sites.	<ul style="list-style-type: none"> • save money • save time 	<ul style="list-style-type: none"> • customer acquisition for competitive providers • commission for service provider
MONEY MANAGEMENT	Data ported from multiple financial service providers creates a complete picture of an individual’s financial position as the basis for the provision of financial advice.	<ul style="list-style-type: none"> • better advice • less hassle 	<ul style="list-style-type: none"> • better service • improved customer insight
‘MY WARDROBE’	Receipts from clothes purchases combined to create a ‘virtual wardrobe’ so specialist services can recommend next best purchases e.g. ‘this would go really well with that’.	<ul style="list-style-type: none"> • better recommendations • save time 	<ul style="list-style-type: none"> • customer insight supports innovation • sales opportunities • marketing efficiencies
Find the right film/video	Combine data ported from many media providers (e.g. BBC, ITV, Netflix, Sky, Amazon, etc.) to create a complete picture of viewing preferences, to drive better recommendations.	<ul style="list-style-type: none"> • better recommendations 	<ul style="list-style-type: none"> • customer insight supports innovation • sales opportunities • marketing efficiencies

Theme	Description	Benefits	
		Individual	Organisation
LIFE-LONG LEARNING RECORD	Individuals keep a record of all exams passed, qualifications and experience gained, work experience, etc. to populate CVs and get advice on career development.	<ul style="list-style-type: none"> • better advice 	<ul style="list-style-type: none"> • better recruitment at lower cost
PERSONAL HEALTH RECORD	Individuals keep their own record of conditions, illnesses, inoculations, vaccinations, treatments and basic information such as blood type so that the information can be shared with existing and new medical practitioners, whether at home or abroad.	<ul style="list-style-type: none"> • better treatment • new insights 	<ul style="list-style-type: none"> • better service outcomes at lower cost • service innovation
CONSENT MANAGEMENT	A single dashboard helps individual see and manage all consents and permissions with all organisations	<ul style="list-style-type: none"> • reduced hassle • more able to assert rights • more control • consumer understanding 	<ul style="list-style-type: none"> • reduce admin costs • improve compliance & service
WARRANTY MANAGEMENT	Data related to big ticket purchases, including associated warranties and guarantees is ported to a warranty dashboard for quick & easy access when something goes wrong	<ul style="list-style-type: none"> • reduced hassle • more able to assert rights 	<ul style="list-style-type: none"> • improve customer service at lower admin cost
SUPPORT RESEARCH	Individuals give researchers permission to access 'joined up' data sets to gain new insights	<ul style="list-style-type: none"> • support public good research 	<ul style="list-style-type: none"> • customer insight at lower cost

Theme	Description	Benefits	
		Individual	Organisation
MANAGE HOUSEHOLD BUDGETS	Use data downloaded from supermarket loyalty schemes (e.g. Clubcard, Nectar, etc.) plus automatically captured receipt data to better understand where the money goes, how to manage it better, keep track of calorie consumption or food miles and carbon footprint	<ul style="list-style-type: none"> • better services • new insights • more control 	<ul style="list-style-type: none"> • customer insight • service innovation

APPENDIX 4: DATA MOBILITY ECONOMIC CONSIDERATIONS

Data mobility
Economic considerations



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/ Table of contents

1. Introduction	124
2. Effects of data mobility on productivity, innovation and competition	124
2.1. Summary	124
2.2. Productivity	124
2.3. Innovation	126
2.4. Competition	127
2.5. Consumer empowerment	130
3. Illustrative quantification of the economic impact of data mobility	130
4. Rationale for intervention	131
4.1. Net benefits of intervention	131
4.2. Market failure	132
4.3. Distributional considerations	133
References	134
Index of Tables, Figures and Boxes	136
Annex 1	137
A1.1. Increased use of data	137
A1.2. Positive externalities	138
Annex 2	140
A2.1. Scaling the impact rate	142
Annex 3	143
Annex 4	144

1. Introduction

This report is a companion piece to the Ctrl-Shift report on Data Mobility for DCMS, July 2018.

The report covers:

- a discussion of economic impacts of data mobility⁸⁹ on productivity, innovation and competition;
- an illustrative quantification of the potential value of data mobility to the UK economy; and
- a discussion of the rationale for government intervention in support of data mobility

2. Effects of data mobility on productivity, innovation and competition

2.1 Summary

The economic impacts of data mobility have two sources: a reduction in the cost of transferring data and the ability to combine data from different sources. The relevant effects include:

- higher productivity;
- innovation from combining data in new ways across organisations and across industry ‘silos’;
- an increase in market competition; and,
- consumer empowerment.

2.2 Productivity

For firms whose business relies significantly on data, a key effect of mobility is that acquiring data becomes cheaper, and data becomes more available and accessible. Therefore, they can use more data. For firms that do not collect their own data, this effect can be large⁹⁰. In addition, data mobility facilitates combining different data sources, which enables firms to use the most appropriate data in their production processes. The key benefits are:

- **Increased use of data, increasing productivity:** cheaper and more accessible data means that firms can use more of it, which increases productivity⁹¹.
- **Economies of scope of inputs:** putting together different types of data can reduce average production costs. For instance, different types of data provide a clearer picture of the consumer, making targeted marketing more efficiently and therefore less expensive.
- **Positive externalities:** certain use cases produce value that benefits more parties than those involved in the transaction. For instance, in public health applications, the use of more data may improve quality of diagnoses (including for patients that did not provide data themselves).

89. The vision for data mobility is a world where data (including personal data) flows safely and efficiently to where it can create maximum possible value, with personal, business, social and economic benefits distributed fairly and appropriately. Data mobility is a broader concept than ‘data portability’ as defined in current legislation (GDPR Art. 20). In particular, the discussion of data mobility does not take into consideration any restrictions on the type of personal data that can be ported. However, it is still assumed that GDPR applies to the use of personal data, including in relation to the lawful basis for processing (i.e. mobility is assumed to require the consent of the data subject). Note also that many of the benefits of data mobility are not restricted to mobility of personal data, but apply to all types of data that are currently held in data silos.

90. Note that using more data has an ambiguous impact on consumers as an increase in the amount data being used may increase privacy risks. See Wohlfarth (2017).

91. Assuming a production process in which data currently underutilised compared with the optimum input mix.

2.2.1 Increased use of data, increasing productivity and efficiency

Data mobility enables firms to access more data, which increases outputs and improves efficiency.

For firms, over a certain output range⁹², any production process in which data is used as a factor of production will benefit from more data being used. Being able to use the right data – type and quantity – allows firms to achieve optimal productive efficiency. See Annex 1 for details. Note that with data mobility these benefits are available to firms that don't collect their own data directly from users, which includes new entrants and intermediaries.

2.2.2 Economies of scope of inputs

Using more varied data lowers production costs.

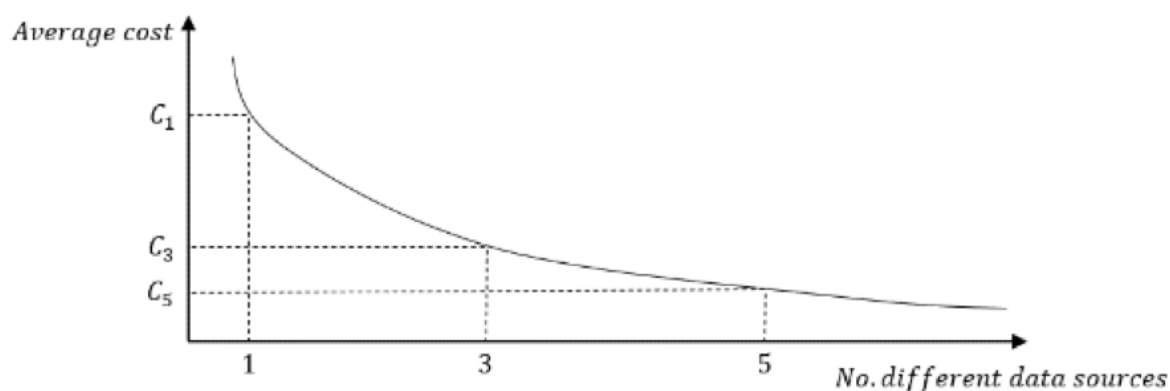
Data mobility can also create efficiencies through “economies of scope of inputs”⁹³: putting together different types of data that were traditionally held in silos can reduce average production costs.

For example, access to more sources of data can provide better insight of consumer behaviour, and is an important driver of consumer-data analytics (Bean, 2016; Howarth, 2016; Van den Driest, Sthanunathan, & Weed, 2016; Wilson, n.d.). Better insights can decrease average production costs through:

- more efficient product development;
- more tailored products (decreasing the cost of sales); and
- more effective marketing.

The figure below shows the concept graphically. For every different data source that a firm uses, the variety of the data used increases. This in turn reduces the average cost of production for firms.

Figure 1: Economies of scope of inputs



Source: London Economics

⁹². In practice, in any given process, the benefit of adding more data is likely to diminish at some point

⁹³. This concept is different from the established concept of economies of scope. That concept deals with firms' outputs rather than inputs.

Data mobility might enable economies of scope of inputs by opening up data collected by different firms. However, this depends on the ability of firms to correctly identify and access the relevant data.

For consumers, better insights from more varied data sources can mean more tailored products, including individualised prices. Prices that reflect individuals' willingness to pay can increase overall economic efficiency. However, for consumers as a group, price discrimination can have a negative impact.

2.2.3 Positive externalities

Wider value is produced by sharing data that benefits more parties than those involved in the data transaction.

Consumers sharing data with firms can create positive externalities. When a consumer shares her data with a firm, this data can be used by the firm to improve its products or develop new ones. This benefits not only the consumer who originally shared the data, but the aggregation of such data across a large number of consumers has the potential to benefit all consumers. The importance of data-driven product development and refinement is recognised in the marketing sector (e.g. Aswani, 2017; Cameron, 2015; Leroux, 2016; Saffer, 2014; Wall, 2014).

Network externalities provide a special case of positive externalities. For products that are said to exhibit network externalities, the value of the products becomes higher when more people use it. An example is a telephone network, which becomes more useful as more people are connected to it.

Because of positive (network) externalities, sharing data has positive impacts on society as a whole, and not just the parties involved in the data transaction. A consequence of this is that people do not share enough data. Annex A1.2 provides a more detailed explanation why this is the case, but the summary is as follows. Society as a whole benefits more from data sharing than any individual. However, when deciding how much data to share, the individual does not take society into account. Therefore, the individual will share less than society demands. This consequence provides a rationale for government intervention, as discussed in Section 4.2.4.

External benefits might be particularly high in, for example, the healthcare sector but could also be substantial in certain financial services applications, e.g. due to better risk assessment, and in infrastructure and transport planning.

2.3 Innovation

In addition to stimulating the use of data in production, data mobility means that diverse data sources can be combined to create innovative products or innovative production methods. For example, traditional health data can be combined with lifestyle monitoring to produce better diagnostic tools.

2.3.1 Data-combining, or recombinant, innovation

Combining data traditionally held by different parties can enable the development of innovative products and production methods.

The effect on innovation of combining data currently held in separate ‘silos’ is possibly very significant. There is clear potential that combining different types of data in novel ways produces benefits. This type of ‘recombinant’ innovation may over time become one of the key benefits of mobility.

For instance, this type of innovation can lead to superior diagnostics and treatments in the healthcare sector. Through data mobility, traditional healthcare information, such as medical histories, can be combined with emerging healthcare information, such as lifestyle monitoring. These two separate types of data provide a different picture of one’s health. Therefore, combining them provides a more complete picture, which can feed into the health services provided to the individual.

Recombinant innovation can also lead to the rise of new products. A case study, in this regard, is the invention of satellite navigation. This invention was only possible when map data could be combined with location data.

It is likely that certain data types will be more widely usable than others. Location data, for example, is likely to have beneficial applications across many different sectors. Other than satellite navigation, location data could for instance be used to offer localised shopping recommendations.

By its very nature, it is difficult to model the economic effects of recombinant innovation. Because different data sources can be combined in seemingly innumerable number of ways, it is arduous to predict the way innovation will go. However, the potential of combining data sources makes it undoubtedly an important driver for future growth.

2.4 Competition

Data mobility leads to reduced frictions in the market, which impacts competition. The level of competition influences the level of innovation.

The immediate economic effect of the introduction of data mobility is a reduction in frictions in transactions involving personal data. Rather than re-entering information or waiting for data to accumulate, a consumer can simply ask for their data to be transferred. Consumers switching to other services or products is often seen as the most direct effect of data mobility (Almunia, 2012; Graef, Verschakelen, & Valcke, 2013; Graef, 2016). Depending on the data in question, a large amount of data may be transferred⁹⁴. This has direct benefits in terms of time savings and increased convenience for consumers, but also has an impact on competition.

94. For example, transferring an individual’s transaction history with a given firm over a lengthy period of time would involve large volumes of data.

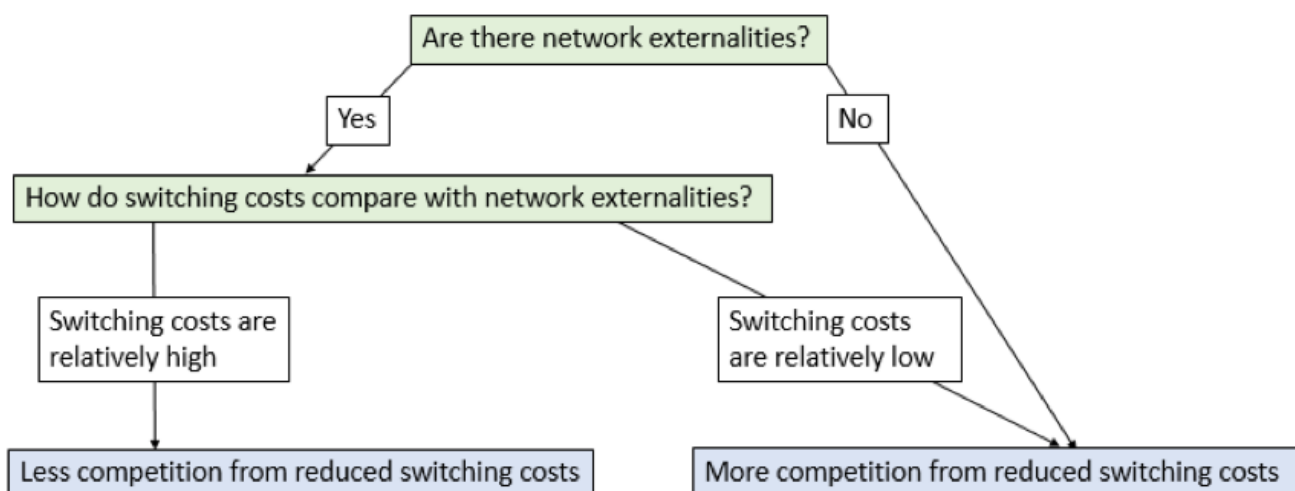
2.4.1 'Switching' and competition

Reduced switching costs enabled by data mobility can increase or decrease the level of competition, depending on market characteristics.

Other things being equal, reducing frictions can, overall, be expected to lead to more competition; consumers can more easily react to price signals and use the supplier that offers the best deal (which could also involve non-price attributes). However, the impact of particular effects brought on by reduced frictions will depend on market characteristics.

Figure 2: 'Switching' and competition

Source: London Economics



If the use of a product or service relies on user-provided data (e.g. contact and profile information when signing up for a website) or user-generated data (e.g. shopping history), the lack of mobility can make switching costly. Consumers who want to switch would have to re-enter their information, and some data may be lost altogether. High switching costs create a barrier for new firms to enter a market. With high switching costs, it is difficult for new firms to attract customers which are already serviced by other firms. The difficulty to build a customer base, means that new firms are less likely to be profitable. This barrier to entry hampers competition.

The effect of lower switching costs on market structure depends on market characteristics. Lower switching costs can lead to more intense competition, but can also strengthen the market power of incumbents. The result of reduced friction might just be that consumers gravitate towards the dominant supplier, thereby increasing market concentration.

The outcome depends on the relationship between reduced switching cost and other market characteristics, such as the presence and extent of network externalities⁹⁵.

95. See Suleymanova & Wey (2011) for an in-depth theoretical treatment of the interaction of network effects and switching costs. See Section 0 for an explanation of the concept of network externalities.

Markets relying heavily on data, such as financial services, e-commerce and entertainment, are often characterised by having network externalities. These arise because more product use means that the producer has more data to refine and tailor its product to the consumer. This, in turn, creates more value for the consumers.

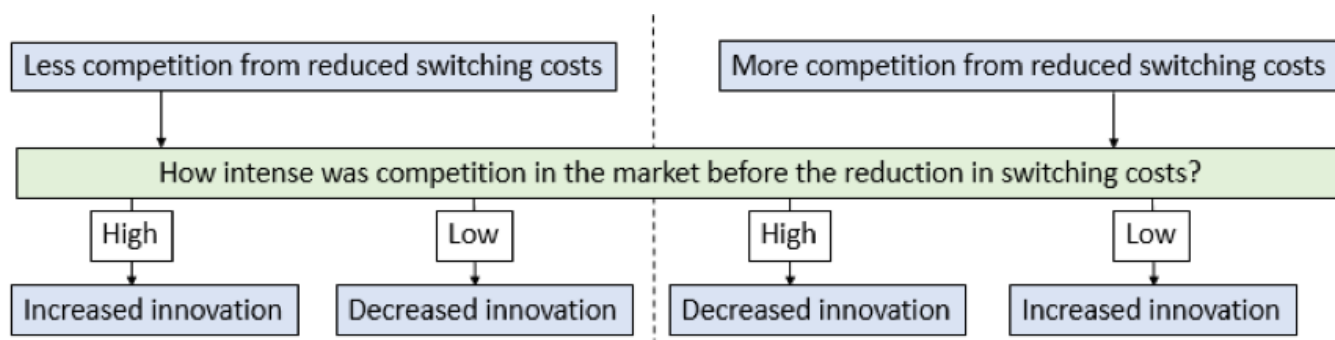
Such markets might be particularly susceptible to increasing concentration as a result of lower switching costs, which make it easier for consumer to switch to the dominant firm as their preferred supplier.

2.4.2 Competition and innovation

Innovation is likely increased by more competition if a market is highly concentrated but likely decreased if a market is highly competitive.

Data mobility can stimulate innovation, but again this depends on market characteristics. In economic theory the link between competition and innovation in an industry is ambiguous and depends, for example, on the pre-existing level of competition (Aghion et al., 2005).

Figure 3: Competition and innovation



Source: London Economics

More precisely, there are two opposing effects underlying the association between competition and innovation. On the one hand, profits that successful innovators can expect become smaller if more competition is introduced. This implies that more competition leads to **less** innovation, because the pay-off from innovating is lower. On the other hand, the benefits of ‘escaping the competition’ by offering improved products and services increases with stronger competition. This implies that more competition leads to **more** innovation. The strength of these opposing effects depends on the level of market competition.

Broadly, more competition – enabled by data mobility – in an **already competitive** market is likely to **decrease** innovation. Conversely, more competition in a **highly concentrated** market is likely to **increase** innovation⁹⁶. In turn, innovation can create completely new markets, which reduces the market power of incumbents in existing markets.

96. The relationship between competition and innovation is subject to ongoing debate in the economics literature. Aghion et al. (2014) confirm the mechanisms involved in an economic experiment. Tingvall & Poldahl (2006) observe the predicted relation but not robustly. Polder & Veldhuizen (2012) observe the predicted relation for Dutch industries. However, Hashmi (2013) fails to confirm the existence of the predicted relation. Instead, he finds a “mildly negative” relation. Similarly, Correa (2012) does not find the predicted relation. Using the same dataset as Aghion et al (2005), but recognising a structural break in the data, he finds a positive competition/innovation relation from 1973 to 1982, and no relation between 1983 and 1994.

2.5 Consumer empowerment

Data mobility is valuable to consumers; it allows them to extract some of the costs savings made by firms, or produce additional value by combining their own data.

The gains in efficiency that data mobility brings to an economy can also empower consumers. Decisions regarding mobility ultimately fall on the consumer. It is them who determine whether data is opened up to firms. This could allow them to extract some of the cost savings made by firms, or appropriate a share of increased revenues. A consumer can withhold data from firms providing 'bad offers' and give it to firms providing 'good offers'.

In addition, data mobility allows individuals to combine different types of their own data, for instance in a personal data store. This may unlock additional benefits. For example, consumers can provide firms with more valuable data by combining it themselves. Consumers could be able to extract this added value.

Consumers can also obtain benefits directly. An example is the analysis of data with direct relevance to them. Health-related applications that provide different lifestyle monitoring data are an obvious example. Combining, say, heart rate monitoring data with sleep cycle data may provide a better overview of one's health.

3. Illustrative quantification of the economic impact of data mobility

Data mobility may increase GDP by £27.8 billion (not including the effects of increased innovation).

Substantial economic benefits can be expected from data mobility. This section provides an indicative quantification of potential benefits by extrapolating from recent research on the benefits of Open Banking⁹⁷. We use this estimate together with assumptions on impacts in different economic sectors to obtain an impact estimate for the UK economy as a whole⁹⁸.

The quantification of the potential impact of data mobility follows three steps. These are as follows:

1. estimate the value of data mobility for a sector and define this as a proportion of GDP;
2. adjust this proportion, or impact rate, for the fact that not all sectors will be impacted equally;
3. apply the adjusted impact rate to economy-wide GDP.

This quantification of the value for data mobility is anchored in the financial services sector. Open Banking was introduced and is recognised by the ICO as a way to fulfil the data portability requirements of the GDPR.

97. Trustpilot (2018)

98. This estimate is not based on detailed assumptions about sector-level value chains or applications of data portability. The assumption is that impacts of data mobility are proportional to the impact of Open Banking in terms of the data intensity of a given sector.

A 2018 study by CEBR found that Open Banking creates £1.069 billion⁹⁹ of additional GDP for the UK (Trustpilot, 2018). By comparing this with the size of the UK retail banking sector, a sector-specific ‘impact rate’ of data mobility can be derived¹⁰⁰. This sector-specific impact rate can be generalised to estimate the impact of data mobility across sectors. This is based on the assumption that data mobility has benefits that are proportional to the data intensity of different sectors.

The sector-specific impact rate needs to be adjusted to account for the fact that not all sectors will be impacted equally by data mobility. The adjustment is anchored in research by Ctrl-Shift on Personal Information Management Services (Ctrl-Shift, 2014). This research identifies a number of data flows, or data enabled ‘core relationships’ that individuals may have with businesses. These core relationships are used to adjust the sector-specific impact rate to an economy-wide impact rate¹⁰¹.

The estimated economy-wide impact of data mobility is an increase of GDP of approximately £27.8 billion. Details of the calculation are provided Annex 2.

4. Rationale for intervention

A high-level assessment was undertaken analysing the rationale for potential government intervention to support data mobility. This assessment was verified through interviews with market participants¹⁰². The challenges to the implementation of data mobility identified during these interviews were assessed in terms of:

- the potential benefit, relative to cost, of addressing the challenge;
- the existence of identifiable market failure(s); and,
- the distribution of benefits and costs, in particular whether consumers are systematically disadvantaged by the way data is used by businesses.

4.1 Net benefits of intervention

Net benefits are likely high for interventions that: 1) strengthen GDPR data portability requirements, 2) address the lack of a liability framework, or 3) demonstrate consumer value.

High net benefits are associated with measures that give additional heft to the data portability requirement contained in GDPR, increasing its positive economic impact. High benefits are also likely for supporting measures such as defining and promoting standards for data and interchange technologies.

The lack of a liability framework in data mobility forms a distinct cluster of challenges. Potentially, benefits are high for this cluster and the necessary intervention is likely to be low cost.

Finally, high net benefits might be achieved by creating demonstrators in the form of use cases involving public sector data. Ideally, such use cases would generate benefits directly, while at the same time addressing consumer uncertainty about the benefits and risks of data mobility.

99. This estimate is based on reductions of risk premiums due to increased transparency. However, it acknowledges that Open Banking may lead to wider economic benefits.

100. The size of the UK retail and business banking sector has been estimated at £35 billion to £39 billion in gross value added (Oliver Wyman, 2016). Therefore, the ‘impact rate’ is derived by dividing the additional GDP impact by the mid-point estimate of the size of the UK retail and business banking sector.

IR = $1.069/37 \approx 0.029$. Note that Open Banking is only available to consumers and small- and medium-sized enterprises. Therefore, the impact rate based on the entire retail and business banking sector (including large businesses), underestimates the impact on the actual population that is targeted by Open Banking.

101. See Annex 1 for more details on the calculation of the adjustment rate, and the estimate of the impact of data mobility.

102. See Annex 2 for details of the methodology

Given the low perceived value by consumers, relatively low net benefits were assessed for measures to:

- speed up the implementation of mobility-related legislation;
- confidence building measures, such as providing government guidelines, or ‘rules of the road’, for consumers’ use of their own data.

This is based on the assessment that consumer attitudes towards mobility depend more on compelling use cases, and less on the legal framework (which is obscure to the average user) or abstract concerns about trust and information.

Similarly the net benefits of encouraging mobility as a means of supplier switching (following the model of the current account switch service) are likely to be low. This encouragement does not address the fundamental behavioural issues underlying a lack of switching; cognitive limitations prevent consumers from recognising the value of switching.

Another set of challenges that can be deprioritised relate to issues of market structure. In particular, measures to prevent the emergence of dominant firms/platforms based on voluntary data flows are likely to be:

- ineffective: certain markets will naturally tend towards concentration, e.g. markets exhibiting network externalities. If these natural tendencies are particularly strong, concentration will happen regardless of government intervention. Therefore, government intervention to limit concentration will be ineffective.
- counterproductive: by preventing possible domination, government intervention limits the potential for profit that innovators can reap. This makes firms less willing to invest in risky, developing markets. In other words, too stringent government intervention may stifle innovation in the early stages of a market because it discourages investment.

4.2 Market failure

Strong cases for government intervention happen when markets fail. Market failures may be: 1) barriers to entry, 2) asymmetric information, 3) coordination failures, or 4) existence of externalities.

A strong case for intervention promoting data mobility is based on market failures. These failures prevent businesses and consumers from making the best use of their data. The key failures that can be identified are:

- barriers to entry: anything stopping new firms from entering a market;
- asymmetric information: some market participants know more about the market than others;
- coordination failures: market participants fail to coordinate on issues, such as standards, where coordination would be mutually beneficial; and,
- externalities: actions of one person impact others without this being reflected in a price.

4.2.1 Barriers to entry

Lack of access to consumer data prevents entrants from effectively competing in markets where such data is an important driver of sales. When entrants cannot effectively compete, they are unlikely to enter a market in the first place, which reduces the level of competition.

As noted in Section 2.4.1, barriers to entry may arise if switching between firms is costly because data cannot migrate along with consumers. This is exacerbated by business models that are created around the notion of data as strategic asset, not to be shared with others.

4.2.2 Asymmetric information

Asymmetric information is a problem in two ways:

- asymmetry between businesses: data-driven businesses understand the value of data better than 'analogue' businesses, including traditional industries and most SMEs; and,
- asymmetry between businesses and consumers: businesses are better able to assess the value of consumer data.

In both cases, there are market participants that understand the value of data better than others. This might lead to undesirable outcomes for the market participants with poorer knowledge. For instance, consumers that do not understand the value of their data might be willing to give it up too easily.

4.2.3. Coordination failure

Coordination failure is a major problem in relation to standards and technologies, but also in relation to new collaborative business models. These new business models often go against ingrained business instincts. Business are used to treat data as an asset to be protected, not to be shared. However, it can be mutually beneficial for firms to share data if that means they all obtain richer datasets.

4.2.4. Externalities

Finally, there are externalities, both positive and negative, that prevent optimal investment of effort and resources in data mobility. Furthermore, externalities also impact the amount of data sharing in society.

As noted in Section 2.2.2, positive externalities might lead to an amount of data sharing that is less than optimal for society at large. The mirror image is that negative externalities might lead to oversharing of data. Government interventions can bring society closer to its best outcome.

4.3 Distributional considerations

Government intervention is likely to benefit consumers most.

Most of the market failures are likely to benefit businesses at the expense of consumer welfare. This is particularly evident in the case of barriers to entry and asymmetric information. Barriers to entry benefit incumbent firms, and harm consumers by preventing the benefits from competition, such as choice and lower prices, from materialising. Asymmetric information can lead to data not being used to solve consumer problems, but only to increase sales, because the consumer does not understand the value of her data.

As a consequence of this, interventions aimed at alleviating market failures arising from immobile data are likely to benefit the consumer, at the expense of producer welfare. The benefits of mobile data should mirror the market failures created by immobile data.

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Index of Tables, Figures and Boxes

Tables

Table 1 Industry, core relationships and GVA	140
Table 2 Glossary	144

Figures

Figure 1	Economies of scope of inputs	125
Figure 2	'Switching' and competition	128
Figure 3	Competition and innovation	129
Figure 4	Increased use of data	137
Figure 5	Positive externalities for sharing data	138

Annex 1: Additional description of relevant economic theory.

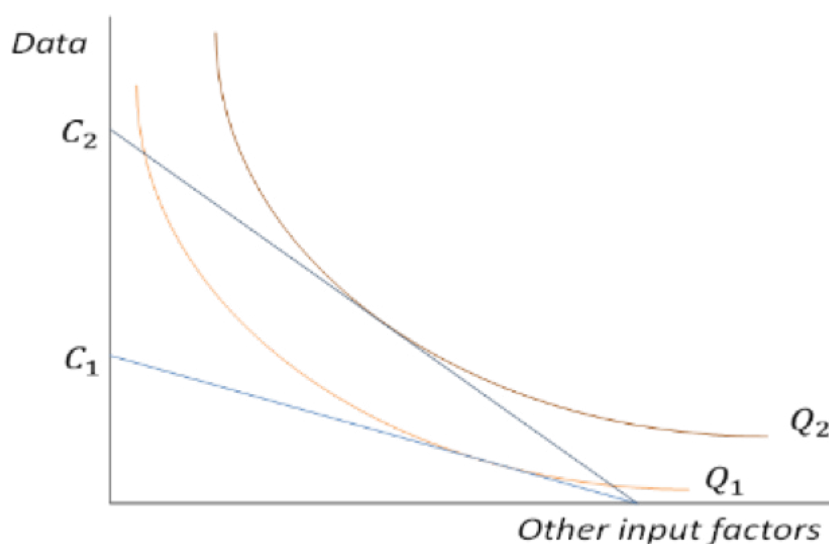
This annex presents additional description of the relevant theories regarding data mobility outlined in Section 2. The theories explained here are related to:

- increased used of data; and,
- positive externalities

A1.1 Increased use of data

As noted in Section 2.2.1, data mobility leads to easier access to data for firms. Ease of access to data is directly related to the cost of using data in production. If data is easier to access, less resources are required to obtain it. Therefore, it is cheaper to use. The figure below shows the impact that lower costs have on production.

Figure 4: Increased use of data



Source: London Economics

The situation before data mobility is given by C_1 and Q_1 . C_1 denotes all combinations of data and other input factors – such as labour, marketing, or use of capital – with the same costs Q_1 , denotes all combinations of data and other input factors that produce that same level of quantity. Firms efficiently produce the quantity Q_1 ¹⁰³.

Firms choose an optimal level of inputs they use, given their constraints. However, the constraints mean that they underutilise data. It is too expensive to obtain. With data mobility, data becomes cheaper; the line representing the same costs shifts from C_1 to C_2 . This enables firms to use more data and produce at a higher level of output Q_2 .

103. Firms produce a given quantity at the lowest possible costs where the isoquant (Q) and isocost lines (C) touch but do not cross.

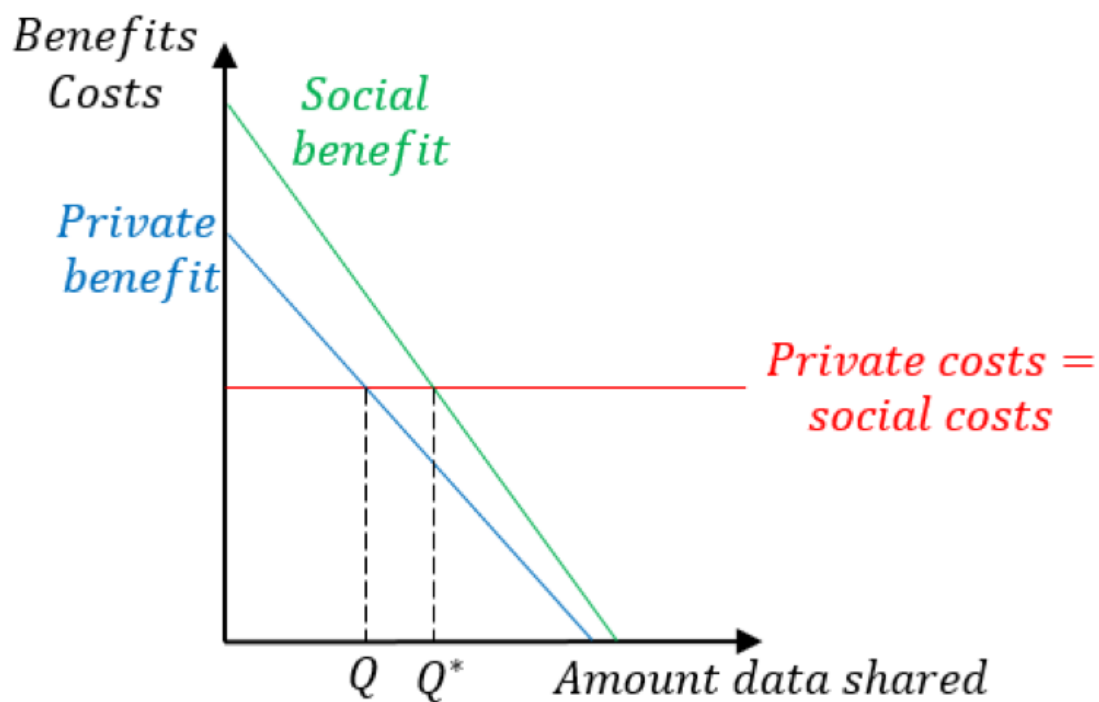
A1.2 Positive externalities

As noted in Section 2.2.2, data sharing creates positive externalities. A consequence is that the amount of data sharing in society is less than optimal. Figure 5 shows marginal costs and benefits for society and private entities. Marginal costs (benefits) are the additional costs (benefits) required to produce (consume) one additional unit of a product. Here, that additional unit is a byte of data being shared in the economy.

For simplicity, we assume that the marginal cost for sharing are constant. Each byte of data shared imposes the same amount of additional costs on the firm. These costs might arise because, for instance, more storage capacity is required with a higher amount of data held by a firm.

In line with standard economic theory, we assume that marginal benefits are diminishing. If a consumer has already shared much data, an additional byte of data shared will be less beneficial. The existence of a positive externality implies that sharing data is more beneficial for society as a whole than for any single individual; social marginal benefits are higher than private marginal benefits. This is represented in the figure by the fact that the social marginal benefit line (in green) lies above the private marginal benefit line (in blue) for each amount of data shared.

Figure 5: Positive externalities for sharing data



Note: marginal costs and benefits are shown on the same axis, even though they are distinct concepts. This is feasible because costs and benefits both measure value, and can be expressed in the same units (typically money).

Source: London Economics

The amount of data shared in the economy will, in absence of government intervention, depend on **private** benefits and costs only. More precisely, it is determined by the amount of data sharing where the private marginal benefits are equal to private marginal costs Q .

For lower amounts, consumers receive more benefits from sharing than it costs the firms. Therefore, firms could charge consumers a reasonable price¹⁰⁴ to accommodate more data sharing. For higher amounts, the benefits to consumers are lower than the costs to firms. No price for data sharing exists that satisfies both consumers and firms.

Society's optimum level of data sharing is determined by social marginal benefits and costs. This social optimum of data sharing in the figure above is Q^* . Due to positive externality, the actual amount of data shared is less than the social optimum $Q < Q^*$.

¹⁰⁴. Note that this does not necessarily need to be a direct, monetary transaction. A more abstract 'price' could be the consumers giving up some level of privacy to allow firms to reap higher profits.

Annex 2: Economy-wide impact of data mobility

As explained in Section 3, the economy-wide impact of data mobility is estimated by generalising the sector-specific impact of Open Banking on the retail finance sector. As footnote 100 shows, the sector specific impact rate is calculated as: $IR = 1.069/37 \approx 0.029$.

This sector specific-impact rate is used to estimate an economy-wide impact of data mobility by adjusting it for the data intensity of different sectors. The adjustment is anchored in research by Ctrl-Shift on Personal Information Management Services (Ctrl-Shift, 2014). This research identifies a number of data flows, or data enabled ‘core relationships’ that individuals may have with businesses.

Firstly, core relationships identified by Ctrl-Shift are mapped to industries by NACE code, and added up within sector. The underlying assumption is that industries with a larger number of core relationships have more to gain from data mobility.

Table 1 provides the NACE codes used, the industries the codes represent and the number of core relationships mapped to each industry.

Table 1: Industry, core relationships and GVAa

NACE	Type of industry	# core relationships	Core relationships, % of financial services	GVA, % of total
35	Electricity, gas, steam and air conditioning	2	33.3%	1.6%
36	Water collection, treatment and supply	1	16.7%	0.6%
43.2	Electrical, plumbing and other construction installation activities	3	50%	2.3% ^a
47	Retail trade, except of motor vehicles and motorcycles	23	383.3%	5.4%
49.1 / 49.3 / 51.1	Rail and air passenger transport, other passenger land transport	5	83.3%	2.4% ^b
55	Accommodation	2	33.3%	0.8%

NACE	Type of industry	# core relationships	Core relationships, % of financial services	GVA, % of total
58 / 59 / 60	Publishing, motion pictures, TV and radio	5	83.3%	1.7%
61	Telecommunications	4	66.7%	1.7%
64	Financial services, except insurance and pension funding	6	100%	4.1%
65	Insurance and pension funding	7	116.7%	1.3%
85	Education	8	133.3%	5.8%
86	Human health	5	83.3	5.5%
R	Arts, entertainment and recreation	5	83.3	1.5%
96	Other personal service activities	4	66.7%	1.0%
97	Activities of households as employers of domestic personnel	1	16.7%	0.5% ^c
	Other sectors	0	0%	63.9

a This includes the GVA for all businesses classified under '43' as the available data was not granular enough.

b This includes the GVA for all businesses classified under '49' and '51' as the available data was not granular enough.

c This includes the GVA for all business classified under '98' as the available data was not granular enough.

Secondly, the number of core relationships need to be standardised to the financial services sector; the impact rate defined above has been calculated for this sector. A 'relative potential' indicator is calculated for each sector by dividing the number of its core relationships by the number for the financial services sector, i.e. 6. This 'relative potential' indicator expresses the potential benefits of data mobility for a given sector relative to the financial services sector. These indicators are given in the fourth column in Table 1 (in percentages).

Thirdly, these 'relative potential' indicators have to be averaged to obtain an economy-wide 'relative potential' indicator, i.e. adjustment rate. To account for sector size, this average is weighted on sector GVA. The proportion of each sector's GVA as proportion of the total is given in the fifth column in Table 1.

The adjustment rate is calculated as follows:

$$AR = \sum_{i=1}^{16} RP_i * RGVA_i \approx 0.47$$

where i denotes the sixteen industries defined in the table, RP_i indicates the relative potential indicator for sector and $RGV A_i$ is the relative GVA value for sector i .

The adjustment rate is applied to the impact rate to obtain the adjusted impacted rate:

$$AIR = IR * AR = 0.029 * 0.47 \approx 0.014$$

A2.1 Scaling the impact rate

Lastly, the adjusted impact rate is scaled by applying it to nominal GDP. The Office for National Statistics estimates a nominal GDP (that is, in 2017 pound sterling) of approximately £2.04 trillion.

This results in an estimated impact of data mobility of:

$$\text{Impact} = \text{GDP} * \text{AIR} = \text{£}2.04 \text{ trillion} * 0.014 \approx \text{£}27.8 \text{ billion}$$

Hence, the estimated economy-wide impact of data mobility is an increase of GDP of approximately £27.8 billion.

Annex 3: Methodology

The content of this report was built around three elements:

- In-house expertise on the economics of data and data protection;
- desk research; and
- stakeholder interviews.

Initial assessments of the economic implications of data mobility (Section 2), the rationale for government intervention (Section 4) and the cost-benefit analysis structure (Section 5) were based on in-house experience. This expertise was supplemented by additional desk research, particularly in Section 2.

A small number of interviews with selected organisations were conducted to test and amend the assessments outlined above. The organisations interviewed were:

- digi.me
- HAT Data Exchange
- ICO
- Krowdthink
- The Open Data Institute

For a full list of stakeholders interviewed for this report and the associated main report see, Appendix 5 in the main report.

The assessment of net benefits of intervention (Section 4.1) was based on potential interventions identified by Ctrl-Shift in the course of developing the main report associated with this report. The methodology underlying the quantification of the economic impact of data mobility is outlined in Section 3 and Annex 2.

Annex 4: Glossary

Table 2: Glossary

Concept	Definition	Example
Asymmetric information	The existence of market participants with more information than others	Used car sellers know more about the cars they sell than the buyers
Barriers to entry	Anything stopping new firms from entering a market	Taxi licencing
Coordination failure	Failure of a market to coordinate on issues where coordination would be mutually beneficial	Failure to set standards
Economies of scale of inputs	Average production costs are lower as more inputs are used	More precise prediction with more information
Economies of scope of inputs	Average production costs are lower as more varied inputs are used	Better marketing targeting with a more complete consumer picture
Externalities	Actions of one person impact others without this being reflected in a price	Pollution, vaccines
Network externalities	The value of a product/service becomes higher when more people use it	Telephones, social media
Recombinant innovation	Creation of new products and services by combining existing ideas, products, etc.	Use of maps and satellite data to create Sat Navs

APPENDIX 5: CONTRIBUTORS AND PARTICIPANTS

This Appendix lists the participants in the research carried out in this study and in the Design Jam.

A5.1 Research Participants

Name	Company	Role
Biju Mukund	Unilever	Global Head of Consumer Data Privacy and Governance
Jamie Barnard	Unilever	General Counsel - Global Media, Marketing and eCommerce
Craig Belsham	BEIS	Assistant Director, Consumer Policy & Enforcement
Rory Bailey	Money Dashboard	Head of Operations
Liz Coll	Consumers International	Head of Digital Advocacy
Irene Ng	HAT	CEO
Steve Wood	ICO	Deputy Commissioner
Phil Windley	Sovrin Foundation	Chair
Geoff Revill	KrowdThink	CEO
Julian Ranger	Digi.me	Chairman & Founder
Jim Conning	Royal Mail	Managing Director, Data Services
Sue Daley	TechUK	Head of Programme, Could, Data, Analytics & AI
Sarah McVittie	Dressipi	Co-Founder
Dame Wendy Hall	University of Southampton	Professor of Computer Science in Electronics and Computer Science, Director of the Web Science Institute
David Alexander	MyDex	CEO
Matt Hammerstein	Barclays	Managing Director, Head of Barclaycard UK and Retail Lending
John Gibson	ASI Data Science	Director of Data Science Consulting
Dr Victoria Nash	Oxford Internet Institute	Deputy Director, Policy and Research Fellow
Jerry Norton	CGI	Head of Strategy, Financial Services
Jeni Tennison	ODI	CEO
Jack Hardinges	ODI	Policy Advisor
Doc and Joyce Searls	Harvard University	Fellows
Daniel Kaplan	FING	Former CEO
Ben Helps	Factern	CEO
Tom Symons	Nesta	Principal Researcher, Government Innovation
Pol Navarro	TSB Bank	Digital Innovation & Transformation Director

Name	Company	Role
Jim Wadsworth	Vocalink	UK Product Director
Nick North	BBC	Director of Audiences
Antony Jenkins	10X Banking	CEO
Stephen Deadman	Facebook	Global Deputy Chief Privacy Officer
Alex Charles	StepStone	CPO
Stephen Bordignon	Australian Competition & Consumers Commission	Director, Infrastructure Regulation Division
Jasmine Tan	Australian Competition & Consumers Commission	Assistant Director, Access to Data Team
Ian Sayers	Danske Bank	Head of Architecture
Jeremy Wilson	Barclays	Vice Chairman Barclays Corporate Bank
Olivier Dion	OneCub	CEO
Miles Cheetham	Open Banking	Head of Propositions

A5.2 Design Jam Participants

Name	Company	Role
Luke Ryder	Barclays	Director, External Engagements
Isabel Cooke	Barclays	Vice President, Senior Proposition Manager, Digital Identity
William Knight	BEIS	Economic Advisor at Department for Business, Energy and Industrial Strategy (BEIS)
Tom Byam-Cook	BGL Group	Director New Ventures
Sam Gray	British Gas (now SongKick)	Product Manager
Sandra Stincic	BT	Principal Researcher
Dr Bill Roberts	Competition and Markets Authority	Assistant Director, Remedies, Business and Financial Analysis
Noel Tarleton	Competition and Markets Authority	Noel Tarleton Competition & Markets Authority
Pascal Wheeler	Digi.me	Creative Director
Manish Burman	Facebook	Software Engineer
Yiannis Papagiannis	Facebook	Software Engineer
Adam Bargoff	Facebook	Public and Privacy Policy
Ben Helps	Factern	Interim CEO
Yossi Borenstein	FirstCarQuote	Principal Data Scientist
Dr Xiao Ma	Hub of All Things	Co-Founder and Commercial Director
Jonathan Holtby	Hub of All Things	Community Manager
David Alexander	MyDex	CEO
Julian Saunders	PORT.im	CEO
Sam Everington	Starling Bank	Lead Engineer, Open Banking & Payment Services

Name	Company	Role
Jeremy Wilson	Barclays Corporate Banking	Vice Chairman
Nic Oliver	People.io	Founder and CEO
Simon Gosling	Unruly	Futurist
Rachel Wilson	ODI	Senior Software Engineer
Gila Sacks	DCMS	Director, Digital and Tech Policy
Oliver Buckley	DCMS	Deputy Director, Digital Charter & Data Ethics
Sabine Gerdon	DCMS	Strategy Adviser - Digital Charter
Hannah Hood	DCMS	Digital Markets, Digital and Tech Policy
Chris Downs	Normally	CEO
Marei Wollersberger	Normally	Futures Director/Co-Founder
Tom Scott	Normally	Senior Designer
Phillip Blaikie	Normally	Digital Product Designer
Peter Dalton	Normally	Designer
Sara Salsinha	Normally	Designer
Graeme Jones	Digital Thinking Ltd/Ctrl-Shift	Director/Associate
Alex Charles	StepStone	CPO Career Services - New Product and Technology Leadership Services

APPENDIX 6 DATA-DRIVEN INNOVATION FRAMEWORK

This Appendix describes a tool for use in the exploration and development of safe, secure and trusted digital services – in this study applied to personal data mobility solutions. The tool is a new data-driven Innovation Framework, using ‘directed innovation’ techniques.

A6.1 Rationale for the ‘directed innovation’ approach

Organisations typically place emphasis on analytical thinking in decision making and problem solving. Analytical techniques help them forward plan, reduce risks and grow businesses and markets. However, there are challenges too complex, wide-reaching and unknown to comprehend through analysis alone.

These Design-led approaches to business problem solving have emerged over a number of years. These have introduced new design-based techniques that bring together diverse talents to: shape and align understanding of new business challenge and opportunity; rapidly innovate new concepts, and iterate prototype solutions.

These design-led approaches have brought more agile and creative ways to grasp and explore complex tactical? business issues. However, because of their conceptual nature, the outputs can be difficult to translate readily into ‘industrial-strength’ solutions.

To help organisations embrace new strategic opportunity in the digital economy a new approach is needed that blends the best aspects of business analysis and structure, together with the freer thinking enabled by design-led techniques. In effect, a framework for ‘directed innovation’ that, whilst not constraining the creative process, augments and guides thinking, within a focussed problem space, towards compelling, targeted and executable solutions.

Personal data mobility is an excellent subject in which to explore the use of such a framework because of the enormous innovation potential it offers, and the rich data-driven nature of the opportunity.

Ctrl-Shift, in collaboration with data product and service design studio, Normally, developed a demonstrator of a ‘directed innovation’ approach, the Directed Innovation Framework, and used it to explore a number of personal data mobility scenarios.

The following sections describe the Directed Innovation Framework approach and the outcomes from its use.

A6.2 Directed Innovation Framework approach

The Directed Innovation Framework blends and builds on two proven methodologies. This creates a powerful tool for the structured engagement of multi-disciplinary expertise in the synthesis of potentially game-changing solutions, with clear identification of challenges, and focused innovative thinking.

The two underlying methodologies are:

- Ctrl-Shift’s Life Department and Customer Value Opportunity methodology
- Normally’s Collaborative Speculation design approach

A6.2.1 Life Departments and Customer Value Opportunity methodology

Ctrl-Shift's approach has been developed over nine years of specialisation in the fast-changing personal information economy. It enables often novel, even radical, sometimes intangible new data-driven concepts, to be understood, explored and developed in a structured, real-world context.

New consumer value opportunity can be brought to life most vividly in the context of people's daily lives, and the things they want and need to do.

Our Life Departments and Customer Value Opportunities (CVOs) form a rigorous evaluation framework which enables the identification of the most fruitful real-life outcomes for everyday people. They can cover every aspect of life management and decision support that uses digital data.

The framework prioritises the greater value opportunities that are achieved through the use of potentially broader sets of data. This takes the value beyond the 'I've got this data, what value can I create with it?' to a 'I want to deliver this value, what data do I need to deliver it?'. Critically, this supports the development of recombinant innovation.

We classify eight Life Departments in which individuals manage their lives: Health and Well Being, Family and Social, Home and environment, Learning and Work, Lifestyle and shopping, Money and Finance, Travel and Transport.

CVOs are tasks that individuals undertake which could be carried out in more efficient or more valuable ways if supported by the intelligent use of digital data. Ctrl-Shift has defined and classified over 160 of these CVOs.

In this consumer value-led approach, the Life Departments and CVOs that support them, are evaluated to identify routine and episodic, simple and complex value opportunities in people's lives. This brings a deep understand of the degree of impact digital data has on each CVO, and enables rapid prioritisation and focus of action.

Within the Directed Innovation Framework, this highly consumer-value-centric approach, together with the rigorous analysis carried out in this study of personal data mobility Core Issues and Key Challenges, provided a firm foundation and clear framing for the Collaborative Speculation stages. It also ensured that output from all stages could be referenced back and tested against the analysis findings and practical consumer needs.

A6.2.2 Collaborative Speculation

Collaborative Speculation is a 'design framework' – combining aspects of design thinking and speculative design – to imagine, interrogate and design for possible or probable futures.

Collaborative Speculation builds on the central tenet of design thinking that problem solving is best achieved when it is human centred, collaborative and iterative. Design thinking has been used to co-design many things from mobile phones and medical devices to public services and transit systems.

Examples:

Life Department: Home

CVO: Track and manage my receipts
(Simple Routine)

CVO: Help plan and manage DIY
(Simple Episodic)

CVO: Plan and manage home
extension (Complex episodic)

By bringing together different disciplines around one central entity – the people affected by design decisions – design thinking yields better user experiences, generates business value and minimises negative impact on wider society.

If design thinking is focused on problem solving, then speculative design is about ‘problem finding’. Collaborative Speculation also draws on this practice to imagine data services, not as they are but as they might be in a data mobile world we are yet to fully experience.

Collaborative Speculation relies on three key principles:

1. Participant Diversity

Bringing together multiple, diverse experiences, perspectives and expertise together to explore, address and respond to the complexity. For the personal data mobility exploration, we brought together policy makers, engineers, entrepreneurs, designers, business leaders and third sector representatives.

2. Informed Audience

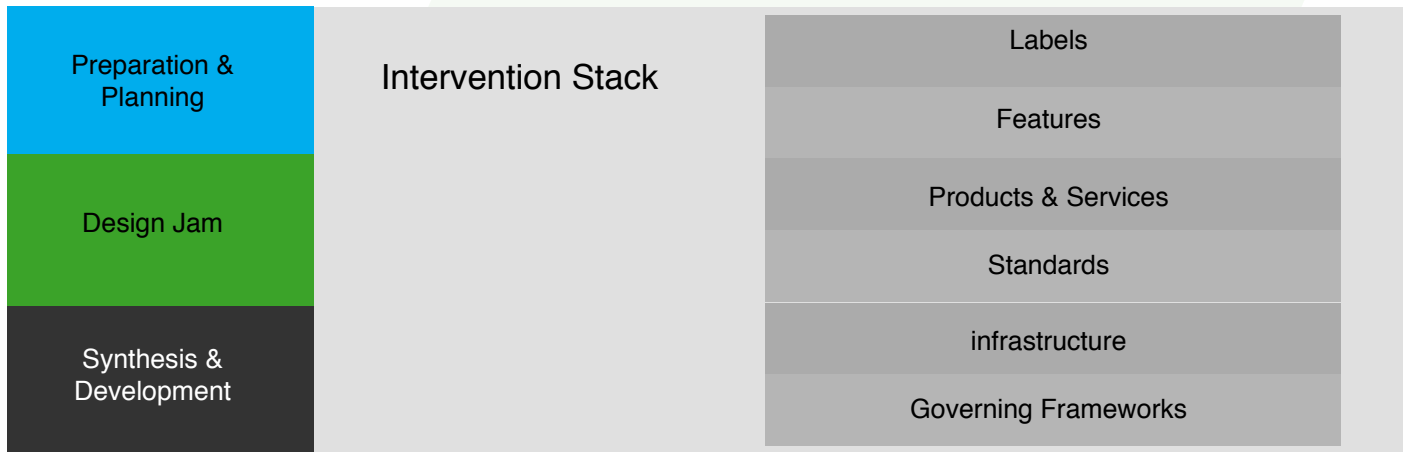
To enable true collaboration, it is important the participants are given a similar level of baseline understanding of the addressable challenge. Subject matter expert presentations at the outset of the Design Jam contribute significantly to this level-setting.

3. Productive Environment

The environment in which participants collaborate is essential to the quality of the outcome. Productivity and the focus on ‘making’ are central to the success of a speculative collaboration. Design Jams are a tool we use at the centre of the collaboration effort. These are described below.

A6.3 Components of the Directed Innovation Framework

The key components of the Directed Innovation Framework can be illustrated as follows:



The three stages of the framework are:

1. Preparation and planning

In this stage we first set market objectives and create a framework in which solutions can be organised and delivered – ensuring that our speculations drive towards the dynamics of successful market development

Following human-centred design principles, we also ensure that ideas are developed around the real needs of customers.

2. Design Jam

Design Jams are structured and facilitated collaboration sessions that bring the diverse participants together with designers to explore the challenges, imagine opportunities and speculate on solutions by building and analysing future product and service prototypes.

3. Synthesis and development

This stage involves the analysis of outputs from the Design Jam to crystallise the underlying issues and needs that were being addressed by the group, followed by cluster analysis to determine key themes within these needs.

Further development of hypothetical services (Case Studies), selected from the paper prototypes built in the Design Jam, that directed innovation led solutions can solve.

Intervention Stack

The Intervention Stack is a vital tool, used through all three stages of the framework to ensure that all levels of intervention are consideration for possible solutions.

The Intervention Stack reinforces that solutions can, and should, exist across a range of response types and mechanisms, from small labels or discrete features to full services, industry standards, open infrastructure and governing frameworks.

Whilst some challenges may be served by a single layer of the stack it's likely that many will require the interplay of several mechanisms.



Labels

Explanatory information that informs the user of the terms under which their data is being collected, stored and used. Labels do not affect the experience - they are merely informational.

e.g. Food nutrition labels, clothes washing labels or road traffic signs.



Features

Service and product features are controls that allow the user to affect how their data is used - on their own terms. We expect to see new features and controls to help manage data burden and enable safe data sharing.

e.g. 'Share' features are a standard in social products - but not in personal banking apps. Privacy controls are often possible at a 'post' and 'setting level'



Products & Services

New services or products will emerge designed specifically to help people manage the data burden and ensure safe data sharing.

e.g. Personal Information Management Services (PIMS), personal asset registers or information intermediaries (human and AI).



Standards

Standards do not need to be fully understood by end users - but knowing that products and services operate on them gives confidence in safety by design.

e.g. Http is a standard that we understand the internet operates on - but we also know that https is an encrypted implementation of that standard.



Infrastructure

Infrastructure provides that mechanism on which safe data sharing can operate. The question is - who will provide the infrastructure and will it ever be a layer that the end user interacts with?

e.g. Fibre optic broadband networks or the National Grid.



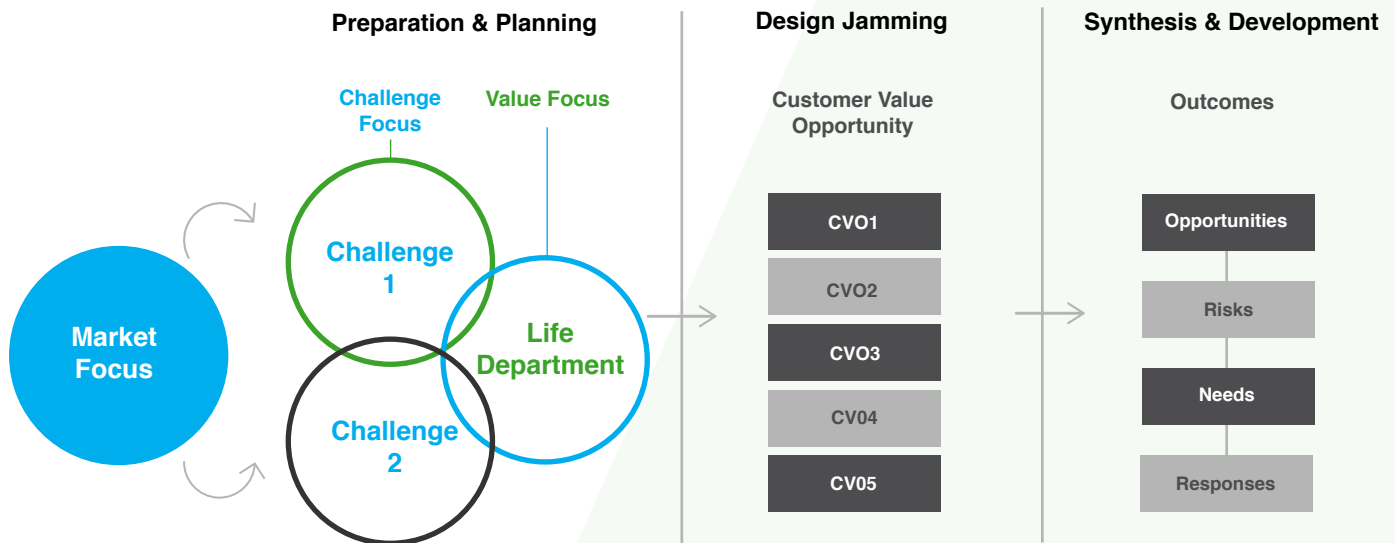
Governing Frameworks

Governing frameworks stipulate who will be liable if something goes wrong. They provide users and businesses with the assurance that someone will be held accountable.

e.g. Car insurance or the Association of British Travel Agents

A6.4 Applying the Directed Innovation Framework approach to personal data mobility

The steps involved in applying the Directed Innovation Framework can be illustrated as follows:



A6.4.1 Preparation and Planning

The Planning and Preparation stage centres on the defining the ‘field of play’ for the Collaborative Speculation to take place in the Design Jam, and subsequent synthesis and development. This is concentrated on defining the Challenge Focus and the Value Focus:

- The Challenge Focus defines the challenges to which the framework will be applied. Challenges should be clearly defined and represent a scope that can be encompassed by the Collaborative Speculation stages.
- The Value Focus defines the value opportunity areas that are to be explored in the Design Jam. Typically, value opportunities will be centred on the customer or service user, acting as a firm foundation for all exploration of value delivery – Customer Value Opportunities (CVOs).

A6.4.2 Design Jam

The Design Jam brings together multi-disciplinary teams in a series of high-energy collaborative workshops. These include people who would normally not work together to take on challenges that often no one organisation can tackle by themselves.

In a short space of time the Design Jam group explore, design, prototype, test and iterate new data-driven concepts with end users and stakeholders.

The first part of the Design Jam comprises subject-matter-expert presentations, designed to level-set understanding and orientation amongst the participants.

To further prime participants, a series of short exercises designed to help the group ‘tune-in’ to the Challenge Focus. These exercises helped everyone to better understand those concepts that lie behind the

challenges before exploring the risks and opportunities they might present.

The heart of the Design Jam is Scenario Mapping of the value opportunities defined in the Value Focus. The participants are split into teams for each of the CVOs. The first task for each team is to map the future scenario for the CVO they are assigned – completing a worksheet for each step including data requirements.

Three further steps are then carried out in the Design Jam to develop the future scenarios.

- **Challenge analysis**

The teams analyse their journey to identify how challenges may manifest in their future scenarios, paying particular attention to the Challenge Focus areas

By having groups share their analysis with other jam participants we collectively build-on the knowledge with perspectives from all stakeholders in the room.

- **Concept creation**

Having defined their future scenarios and interrogated the CVOs for challenges, participants co-create service solutions within their groups using the Intervention Stack as a prompt to consider all the different types of response they could utilise.

- **Design & prototyping**

Finally, participants are asked to bring their service concepts to life. They create sketches, mocked up designs and even created clickable prototypes which can be shared with other Design Jam participants to get critical feedback and to cross-pollinate ideas.

A6.4.3 Synthesis and development

In the third stage of the Directed Innovation Framework the output of the Design Jam is analysed to examine further the underlying challenges that had been addressed by the group. This identifies specific needs and issues that users might have when engaging with the service concepts.

Cluster analysis is used to uncover core themes within these needs. These themes represent a set of principles around which digital services can be designed that will help meet the Challenge Focus.

Following the Design Jam analysis, hypothetical services (Case Studies) are selected from the paper prototypes built in the Design Jam, to explore the risks and responses in greater detail. The services are selected to ensure that an effective range of circumstances related to the Challenge Focus can be explored.

Each of the hypothetical services are developed into 'clickable' digital prototypes, using the Intervention Stack to guide thinking on the most effective types of response to the challenges and risks, whilst maintaining customer value focus. The prototypes are then tested and iterated within the group and with users to further validate the concepts, design and structure.

A6.5 Outcomes from the Directed Innovation Framework

The Directed Innovation Framework enables rigorous exploration of the opportunities, challenges and risks in bringing innovative trusted digital services to market. Using the 'directed innovation' approach, the framework embraces agile thinking in concept development, whilst maintaining focus on real-world value delivery and risk mitigation. In this way it produces practical, validated outcomes that can be readily translated into new operational trusted digital services.

[APPENDIX 7: DESIGN-LED FRAMEWORK APPROACH](#)

Design for Personal Data Mobility

How can design thinking help us to identify and address the challenges of a data mobile future?

**Prepared for Ctrl-Shift Study: Practical research and Analysis on Personal Data Mobility, July 2018
for the Department for Digital, Culture, Media & Sport**

Prepared by
Normally & Ctrl-Shift

A design approach

Why is a design approach needed to prepare for data mobility?

When organisations are faced with decision making, they traditionally revert to analytical thinking. Analysis helps them forward plan, reduce risks and grow businesses and markets. However, there are challenges far too complex, wide-reaching and unknown to comprehend through analysis alone. Data mobility is one such challenge. It has the potential to alter how we do business, how we relate to each other and how we take responsibility for ourselves. If data mobility is developed under the right conditions, it will change our futures to such an extent that it would be meaningless to assess it from the perspective of today. Analysing the past, or situating ourselves in the present does not prepare us for the exploration and assessment of these kinds of complex and profound potential futures.

If we believe in the promise of data mobility, we need to make a collective investment in it. We need to become familiar with the unknown and find new ways of joining our skills and our knowledge. No single entity has the ability to comprehend, in its entirety, the many ways in which data mobility will affect us. To grapple with this challenge we need new ways of working which are faster, more open and less prescriptive. Collaborative speculation offers us just that.

Collaborative Speculation

What is Collaborative Speculation?

Collaborative Speculation is a 'design framework' – combining aspects of design thinking and speculative design – to imagine, interrogate and design for possible or probable futures. In this study, we engaged a Speculative Speculation approach to exploring the consequences of data mobility scenarios.

Collaborative Speculation builds on the central tenet of design thinking – an approach which was formed at Stanford University and IDEO – that problem solving is best achieved when it is human centred, collaborative and iterative. Design thinking has been used to co-design many things from mobile phones and medical devices to public services and transit systems. By bringing together different disciplines around one central entity – the people affected by design decisions – design thinking yields better user experiences, generates business value and minimises negative impact on wider society.

If *design thinking* is focused on problem solving then *speculative design* – which emerged from the work of Anthony Dunne and Fiona Raby in the late 1990's – is about 'problem finding'. Collaborative Speculation also draws on this practice to imagine data services not as they *are* but as they *might be* in a data mobile world we are yet to fully experience.

How did we apply Collaborative Speculation?

We chose to apply a Collaborative Speculation methodology to the data mobility challenge because it is a complex opportunity that cannot be addressed by one single organisation or discipline. Data mobility is also currently a 'concept' - something that occupies the future - and cannot be meaningfully assessed using tools that have been designed to analyse the present or the past.

Collaborative Speculation enables us to imagine probable and possible future products or services, and anticipate how challenges may manifest as a result of their existence. Once we have identified these future potential products and services, we can then analyse them in order to understand the risks they might bring - and how these risks may be addressed. This process of anticipation and speculation puts us in a more informed position to make the right decisions today.

Principles of Collaborative Speculation



Fig 1. Collaborative Speculation approach

1. Participant Diversity

There are many challenges that cannot be addressed by a single organisation or discipline. In these situations, it is necessary to find a way to bring multiple, diverse experiences, perspectives and expertise together to explore, address and respond to the complexity. For the Data Mobility exploration we brought together policy makers, engineers, entrepreneurs, designers, business leaders and third sector representatives.

2. Informed Audience

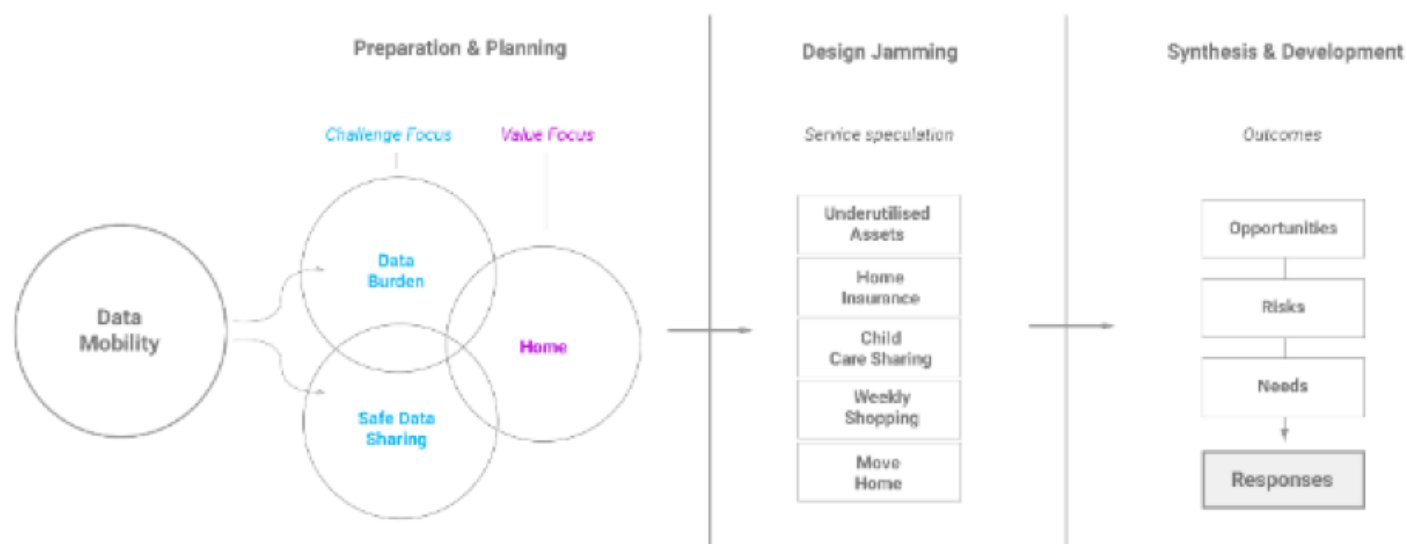
In order to enable true collaboration, it is important the participants are given a similar level of baseline understanding of the addressable challenge. We manage this by presenting three subject matter expert presentations at the beginning of the Design Jam.

3. Productive Environment

The environment in which participants collaborate is essential to the quality of the outcome. Productivity and the focus on 'making' are central to the success of a speculative collaboration. Design Jams are a tool we use at the centre of the collaboration effort. They take place over two days in an open plan workspace. Design Jams are structured and facilitated collaboration sessions that bring the diverse participants together with designers to explore the challenges, imagine opportunities and speculate on solutions by building and analysing future product and service prototypes.

Applying Collaborative Speculation to Data Mobility

We conducted this Collaborative Speculation engagement over a six-week period during May and June 2018. Data mobility has the potential to impact on how we manage our shopping, citizenship, our health, our careers, our finances, travel and our social lives. In the interest of progress, we elected to focus our efforts in this round of speculation on how we manage our homes. In order to fully anticipate and prepare for the impact of data mobility, we ought to repeat this process for each of the challenge areas we chose not to address. Repeating this process which would generate further insight, and identify and address many



more risks and opportunities.

Preparation and planning

In preparation for the Collaborative Speculation, we first set market objectives, select customer value opportunities and create a framework in which solutions can be organised and delivered.

We need to ensure our speculations drive towards the dynamics of successful market development. Following human centred design principles, we also ensure that ideas are developed around the real needs of customers. Finally, in recognition that success in data mobility is dependent on solutions that span product features to regulation, we had to develop a framework to help us investigate solutions across the range of possibilities.

Objectives - Market Development Conditions

Data mobility needs to be safe

Individuals don't know if it is safe to share data with an organisation or person, unless it is a tried and tested brand. Partly, this relates to the need for robust processes for two-way identity assurance.

Data mobility needs to be easy

Data management is a burden to the individual. While individuals say they want to exercise more control

over their data, very few want to invest more time and effort doing so, and data mobility could increase the effort needed.

Data mobility needs to be valuable

Individuals don't understand the value of their data and what they should/could get in return for it. This means they might not be willing to engage in ways that best advance their interests.

If we are to make data mobility valuable to individuals, and thus to business and wider society, then tackling these three challenges is critical.

Customer Value Opportunities

Ctrl-Shift have identified eight 'Life Departments' - collections of daily tasks that customers compartmentalise. These are shopping, citizenship, health, home, careers, finances, travel and our social lives. For this instance, we selected 'home' as the focal life department. Home was selected because it offered a wide variety of opportunities and is truly customer centric. Within this life department, Ctrl-Shift have uncovered 38 different customer value opportunities. Analysis of these customer value opportunities led to the selection of five starting points we elected to bring to the Design Jam participants to explore.

Home insurance claim

Scenario - A fire or flood has damaged or destroyed most of your house and its contents and you need to put in an insurance claim. You need to retrieve proof of ownership of the contents of your house and send to your insurer.

Under-utilised assets

Scenario - We all possess, have access to, or rights over many unused or under-utilised assets (equipment, spaces, facilities, skills). Identify assets that aren't being used but could be used by someone else, display their availability, connect them with potential users, and manage their use.

Move house

Scenario - You have lived in your current home for years. You have invested in your community, your children are settled in school and you have accrued many supplier relationships. You have to move 200 miles away for work. Choose where to live, organise moving, set up a new home, and establish your new life.

Weekly shopping

Scenario - Each member of the family has their own dietary requirements, activities and schedule. Different family members buy groceries and household necessities from a wide range of shops, sometimes planned and sometimes spontaneous, often duplicated. Identify what is needed, plan what meals to eat, and automate the purchase of all necessary items for your household.





Childcare share

Scenario - You share a nanny with another family. You have both agreed a basic schedule with the nanny, but it sometimes changes on short notice. The nanny incurs costs when out, e.g. for activities and food. Schedule and track the nanny's working hours with both families, manage logistics, salary payments and expenses.

Solution Framework

For the Data Mobility challenge, we devised an ‘Intervention Stack’ – a tool to prompt consideration of solutions at all levels of intervention. Often, when we offer solutions to technological challenges, we think they should either be solved by user experience design or by regulation. It is limiting to think in this dualistic manner and neither serves the public interest in isolation. The Intervention Stack highlights that solutions can, and should, exist across a range of mechanisms from small labels or discrete features to full services, industry standards, open infrastructure and governing frameworks. Whilst some challenges may be served by a single layer of the stack it’s likely that many will require the interplay of several mechanisms.

The ‘Intervention Stack’

Levels	Description
	<p>Labels Explanatory information that informs the user of the terms under which their data is being collected, stored and used. Labels do not affect the experience - they are merely informational.</p> <p><i>e.g. Food nutrition labels, clothes washing labels or road traffic signs.</i></p>
	<p>Features Service and product features are controls that allow the user to affect how their data is used - on their own terms. We expect to see new features and controls to help manage data burden and enable safe data sharing.</p> <p><i>e.g. ‘Share’ features are a standard in social products - but not in personal banking apps. Privacy controls are often possible at a ‘post’ and ‘setting level’</i></p>
	<p>Products & Services New services or products will emerge designed specifically to help people manage the data burden and ensure safe data sharing.</p> <p><i>e.g. Personal Information Management Services (PIMS), personal asset registers or information intermediaries (human and AI).</i></p>
	<p>Standards Standards do not need to be fully understood by end users - but knowing that products and services operate on them gives confidence in safety by design.</p> <p><i>e.g. Http is a standard that we understand the internet operates on - but we also know that https is an encrypted implementation of that standard.</i></p>



Infrastructure

Infrastructure provides that mechanism on which safe data sharing can operate. The question is - who will provide the infrastructure and will it ever be a layer that the end user interacts with?

e.g. Fibre optic broadband networks or the National Grid.



Governing Frameworks

Governing frameworks stipulate who will be liable if something goes wrong. They provide users and businesses with the assurance that someone will be held accountable.

e.g. Car insurance or the Association of British Travel Agents



The Design Jam getting kicked-off by Chris Downs, Managing Director of Normally

Design Jam

A core component of a Collaborative Speculation approach is the ‘Design Jam’ - a highly collaborative workshop in which people who would normally not work together take on challenges that no one organisation can tackle by themselves. The learnings and outputs of the Design Jam provides us with the foundation to speculate on different outcomes, understand their potential risks and identify potential ways to mitigate them.

It is important to have a mixture of voices in the room. For our design jam we invited participants from across the public and private sector as well as subject matter experts from academia and designers from leading creative organisations.

Guest Speakers

The group had varying familiarity with data mobility as a concept and didn’t necessarily understand the opportunities or challenges it presents. So we began the day with a series of talks which brought everyone up to speed with the topics we were going to explore.

First up Liz Brandt, CEO of Ctrl-Shift, shared a market analysis of data mobility. Then Jeremy Wilson, Vice Chairman of Barclays Corporate Bank, gave an inspiring talk on the role data has played in shaping society. Simon Gosling, Futurist at Unruly, then introduced us to the domestic opportunity space with insights on how the Internet of Things is set to change the home. Finally – Nicolas Oliver, CEO of People.io, shared his views on social attitudes to data sharing.

Tune-In Exercises

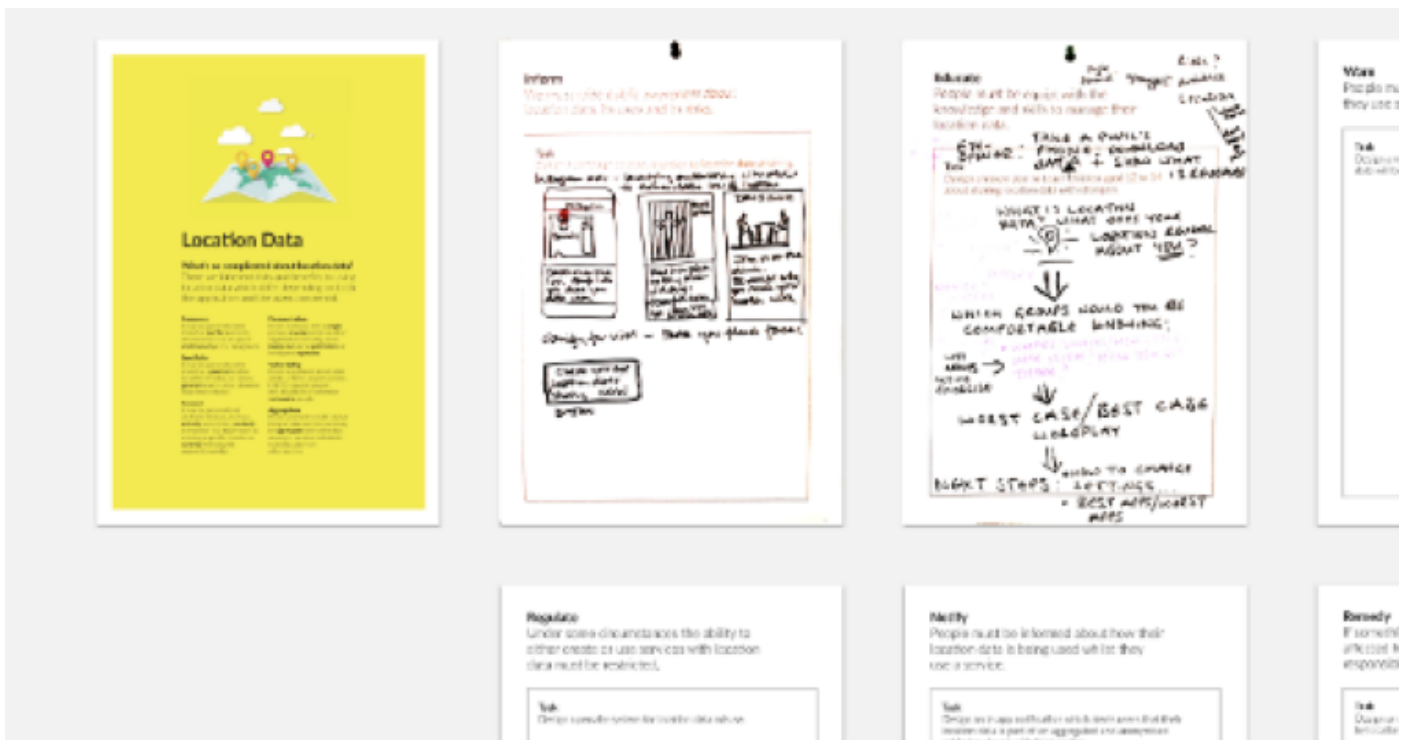
To further prime participants we delivered a series of short exercises designed for participants to ‘tune-in’ to the core challenges. If data mobility is perceived as unsafe, complicated and not very useful – what does that really mean? These exercises help everyone to better understand those concepts before exploring the risks and opportunities they might present.





Exercise 1: Worst Case Word Play

This exercise asks participants to explore ideas of risk and safety by using prompt cards to create worst case scenarios from a combination of assets, actions and bad actors.



Exercise 2: Manage Complexity

This exercise introduces the Stack and asks participants to explore how different mechanisms may be used to manage the complexities of location data.



Design Jam groups presenting their future scenarios back to other participants

Challenge Analysis

We then asked participants to analyse their journey to identify how challenges may manifest in their future scenarios paying particular attention to the focus areas – data mobility is perceived as unsafe, complicated and not very useful. By having groups share their analysis with other jam participants we collectively shared and built-on the knowledge from all stakeholders in the room.

Concept Creation

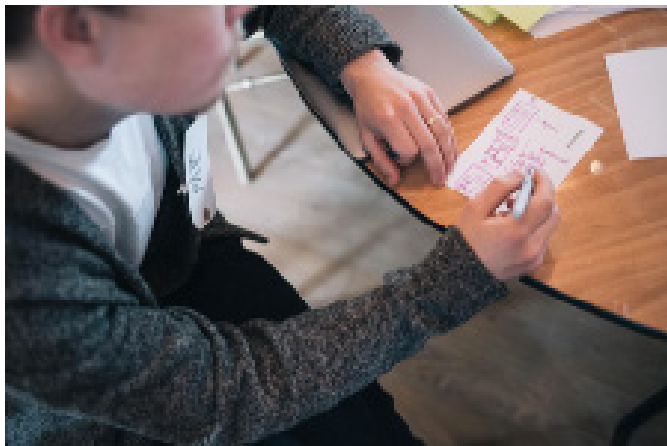
Having defined their future scenarios and interrogated the opportunities for challenges – we then asked participants to co-create solutions within their groups using the Stack as a prompt to consider all the different mechanisms they could utilise.

Design & Prototyping

Finally, we asked participants to bring their concepts to life. They created lots of sketches, mocked up designs and even created clickable prototypes which could be shared with other jam participants to get critical feedback and cross-pollinate ideas.



Sabine Gerdon, Strategy Adviser at DCMS, creating solutions with her group for the under-utilised asset opportunity



Pete Dalton, Designer at Normally, sketching ideas



Liz Brandt, CEO of Ctrl-Shift, generating ideas

Post-Jam Synthesis & Development

Following the two-day Design Jam, we analysed the material in order to understand the underlying data burden and safe data sharing problems that were being addressed by the group. We identified almost 40 separate needs users might have when engaging with data mobility enabled services.

A round of cluster analysis uncovered six themes within these needs. These themes represent a set of principles around which we believe we need to design data mobile services that will help ease the data burden and enable the safe sharing of data.

In order to ease the data burden and enable safe data sharing, we identified that services utilising data mobility need to respect **privacy**, be **visible**, **reliable**, **controllable**, **fair** and **liable**.

Case Studies

Following the design jam analysis, we developed three hypothetical services that, together, explore the data risks and responses in more detail. The three services represent three major opportunity areas in data mobility: resource sharing, automation and asset management.

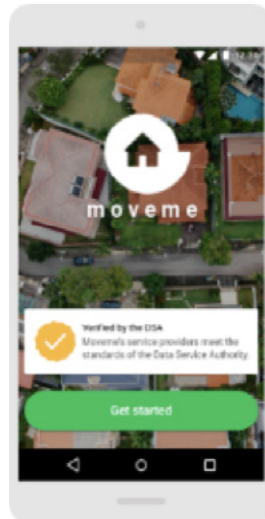
The services were designed to cover wide variety of circumstances that affect the safe sharing of data and impact on the data burden. For example, the fictitious childcare sharing service 'Circle' involved minors and a potentially vulnerable work force, whereas the fictitious estate agent 'Moveme' automated the critical process of purchasing a property and relocating a family. The third hypothetical service, asset management platform 'Ownr', was deliberately dealing with more mundane tasks so as to explore safety and burden when users are less invested in the service

Three fictitious services



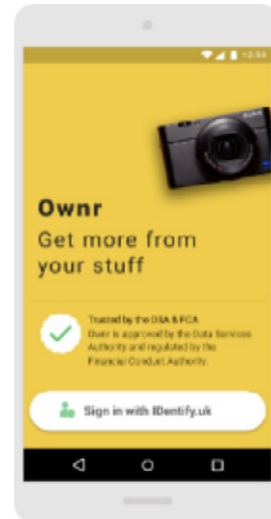
Circle

Circle is a fictitious service enabling several families to share care responsibilities between themselves and/or professional childcare providers. It uses data mobility to understand the groups changing commitments and care needs.



Moveme

Moveme is a fictitious estate agent which automates many aspects of the process of moving house. It uses data mobility to gain insights on the lifestyle needs and commitments of you and the people you live with.



Ownr

Ownr is a fictitious asset management service which helps people to better utilise the items they own. It uses data mobility to help users identify and evidence the assets they own, manage their liability, and to appropriately insure them.



Resource Sharing Circle – Childcare Sharing

Scenario

Data Mobility will enable new services in which people can easily share resources. It has the potential to reduce the hassle of coordinating availability amongst several parties, fairly distribute work amongst the group and ensure fair payment for services.

In this example, we are speculating on the idea of three families sharing childcare responsibility and services. In the context of safe data sharing and data burden, the themes we are exploring are **P2P**, **coordination** and **fail safe mechanisms**.

Risks

Six risks were explored ranging from bad actors to inappropriate terms and conditions. Responses were developed to tackle these risks in the context of Circle, the fictional care sharing service.

Risk 1: Bad Actors (Individuals)

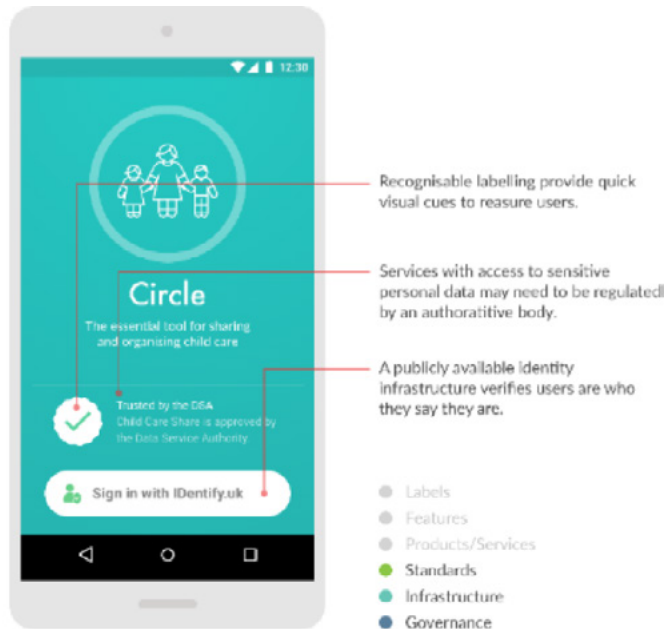
If data is accessed by bad actors then it may put service users at risk. In the case of Circle, the risk is heightened as some service ‘users’ are minors.

Need: Safety, Reliability

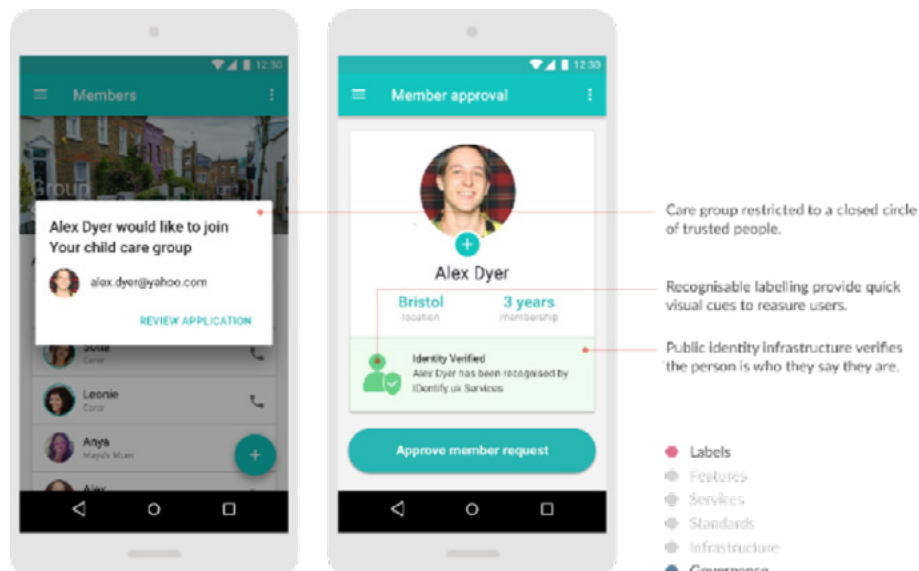
Response: Authentication & Verification

Example: Digital ID infrastructure & closed groups

Resource sharing services like Circle could restrict data sharing to a closed group of individuals, who have all had their identity verified. This verification could be conducted using infrastructure which is publicly available for use by other organisations or individuals.



Circle sign-in screen using a public identity service and displaying governing body approval labelling



Screens showing the safe authentication of new members to child care group via a public identity service

Risk 2: Power imbalance

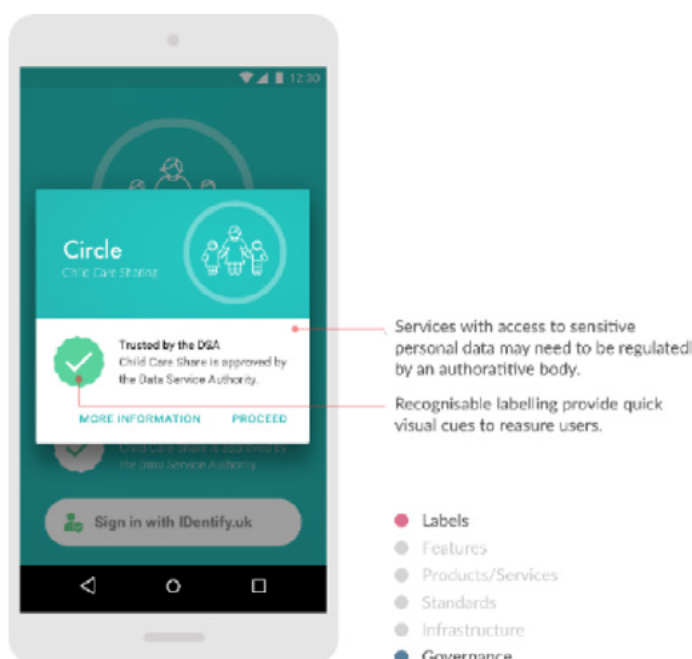
The dynamics of sharing may introduce a power imbalance that data mobility and automation risk amplifying. If data is unfairly processed, then it may disadvantage some users and create power imbalance within the care group.

Need: Fairness

Response: Regulation by Data Service Authority

Example: Fair data processing labelling

Services like Circle could be regulated by an approved authority – which may scrutinise the data systems, monitor business practices and/or license certain activities – and if approved this may be clearly signalled to users on a public registry or with a recognisable label.



Circle sign-in screen pop-up verifying authorisation of the service by a governing body

Risk 3: Loss of privacy towards other service users

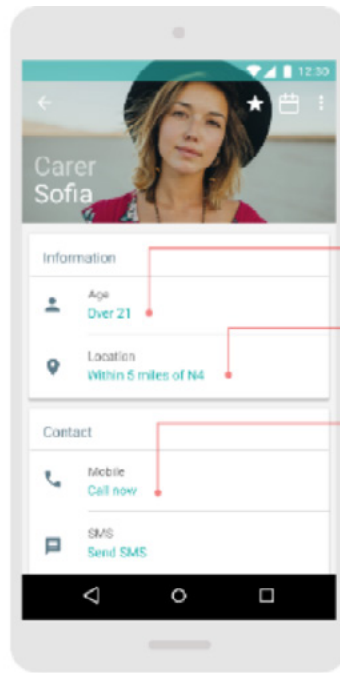
If data is accessed or merged with other data then it may reduce a users privacy. For example a group member may repeatedly request services from a carer to gain a picture of their schedule or to gauge their price sensitivity.

Need: Privacy

Response: Profile minimisation

Example: Obscuring of information

Resource sharing services could implement product features to preserve privacy such as obscuring details of a calendar, minimising data in user profiles or restricting the frequency with which requests can be made.

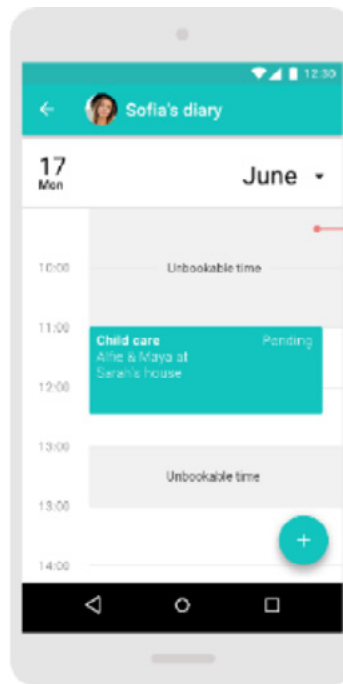


Verifying a user meets an age requirement maybe a sufficient alternative to sharing their actual age.

Sharing distance information maybe a sufficient alternative to revealing a user's location.

Integrated communication features may be required, where a user's privacy needs protecting.

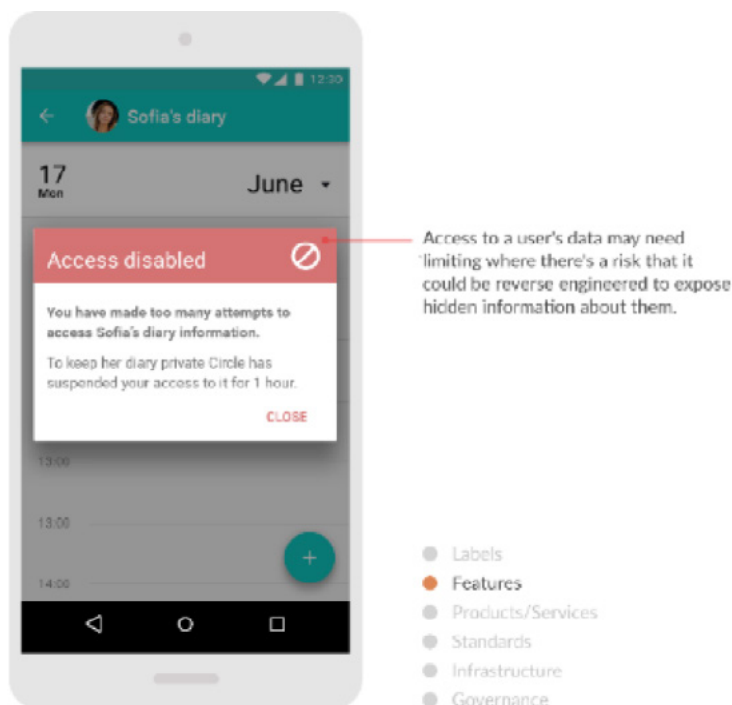
- Labels
- Features
- Products/Services
- Standards
- Infrastructure
- Governance



Sharing 'available' and 'unavailable' time periods in a calendar may be used to avoid revealing a user's actual schedule.

- Labels
- Features
- Products/Services
- Standards
- Infrastructure
- Governance

Screen showing examples of how sharing of personal details could be minimised



Circle denying access to a user's calendar data after too many requests, to prevent hidden information from being revealed

Risk 4: Lack of accountability

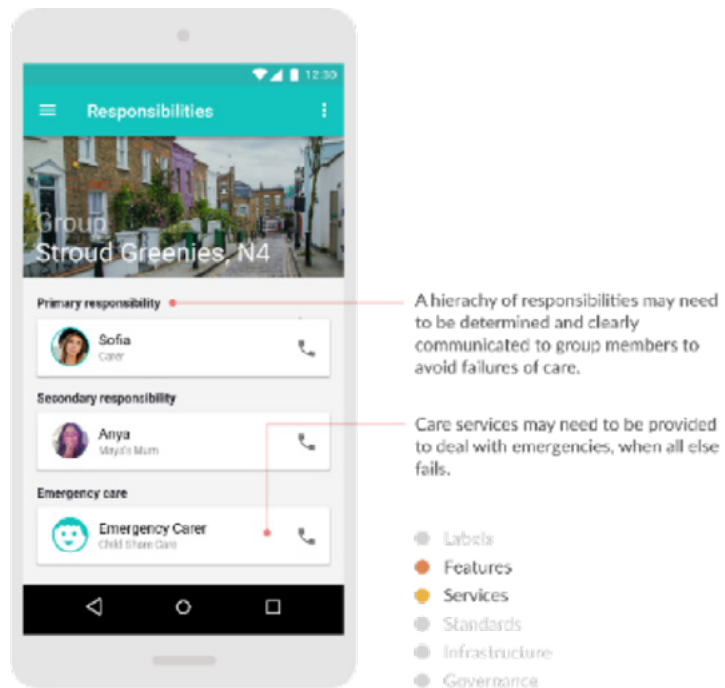
If users rely on the service to coordinate or deliver child care and it fails then their child may be left without the care they need. It could become unclear who is responsible – the parent/guardian, another care group member, a professional carer or the service provider – for the child's welfare at different times.

Need: Reliability

Response: Line of responsibility

Example: Child protection legislation, childcare regulations and register, care hierarchy feature & emergency carer service.

Legislation and regulations already exist, such as the Child Protection Legislation and the Childcare Regulations, which stipulate the rights and responsibilities of individuals and organisations towards the protection of children in their care. These may need adapted to cover new care scenarios such as those created by services like Circle. Services could also implement product features to avoid these failures such as clear communication of responsibilities to each user and provision of emergency care services for when all else fails.



Screen in Circle assigning responsibilities in the care group, in case of future problems or emergencies

Risk 5: Unreasonable or inappropriate service T&Cs

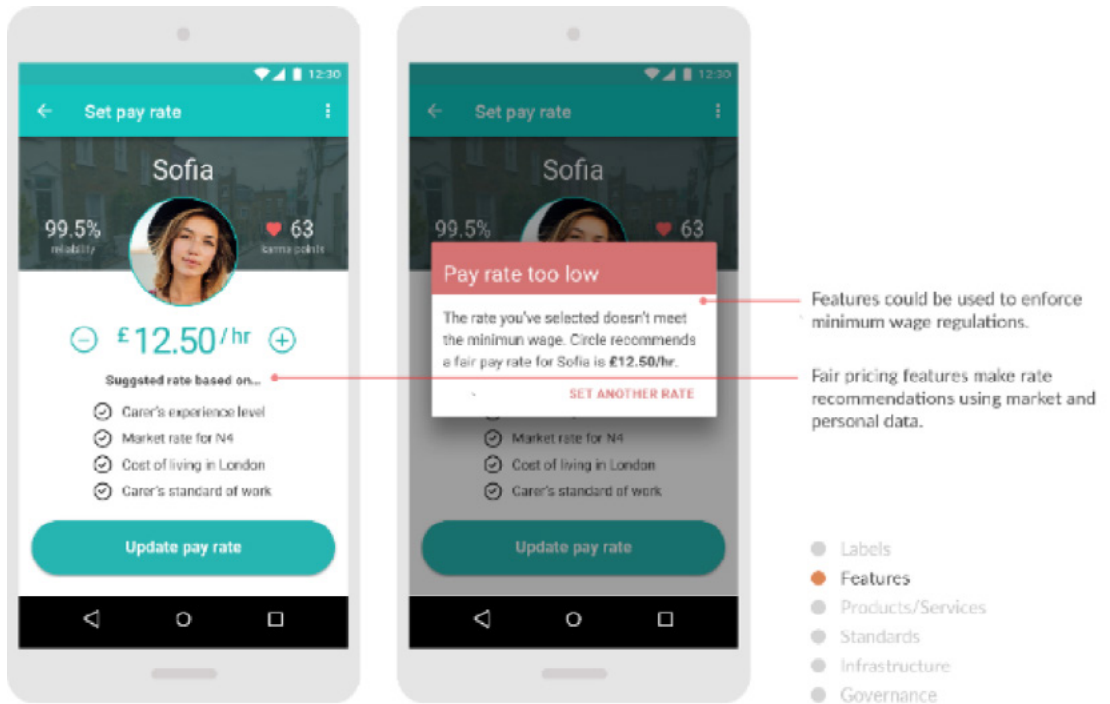
Where service providers are reliant on resource sharing services like Circle for their main source of income, they may be coerced into accepting unreasonable terms of work. For example, working too many hours or being underpaid for their work.

Need: Fairness

Response: Application of regulation & new service standards

Example: Minimum wage enforcement & fair pricing features

Resource services like Circle could be covered by existing employment regulations such as the minimum wage but there are already several examples of businesses within the 'gig economy' which manage to circumvent these regulations. Beyond regulation – services could implement fair pricing features themselves by analysing market and personal data.



Screens in Circle to review, set and regulate fees for care providers



Automation Moveme – Automated Estate Agency & Property Management

Scenario

Data mobility can enable an automation of processes that are difficult, wasteful or burdensome. In this example, we are imagining an automated estate agency which makes the process of moving house less painful. It uses data mobility to gain insights on the lifestyle needs and commitments of you and the people you live with. From this insight it can assist you to find a suitable property, secure a good deal, transfer utility services, arrange alterations, move your belongings, enrol in new schools or clubs and discover your new neighbourhood.

In the context of safe data sharing and data burden, the issues we are exploring are **transparency of decision making** and **restriction and control of automated decision making**.

Risks

Seven responses emerged when exploring the risks of automation with in the context of the Moveme service. Covering bad actors, conflict of interest, inaccurate inferences, loss of privacy, lack of access management, lack of agency and unintended consequences.

Risk 1: Bad actors (Third party providers)

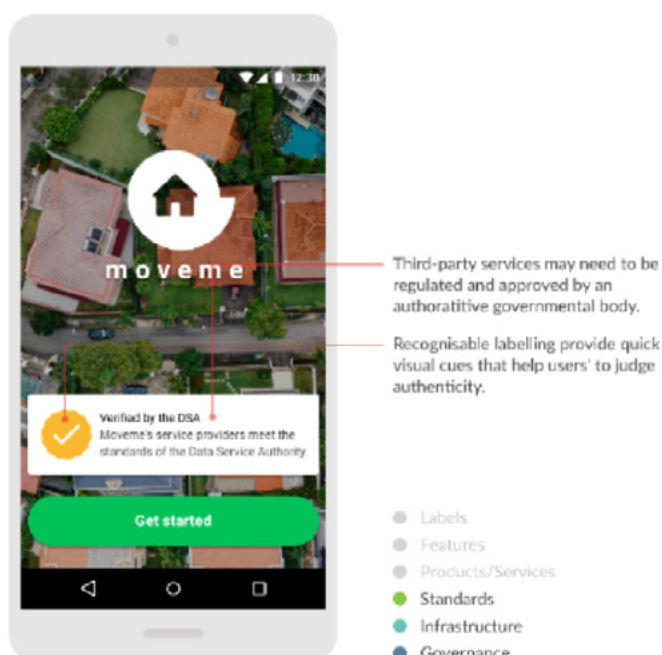
If services connect with rogue traders on behalf of their customers, then it may put their assets at risk.

Need: Safety

Response: Verification & Service standards

Example: Adherence to DSA service standards of third party providers

As part of its regulation by a Data Services Authority, services such as Moveme could be required to ensure that third party service providers which they engage with on a users behalf adhere to the DSA's service standards.



Screens in Circle to review, set and regulate fees for care providers

Risk 2: Conflict of interest

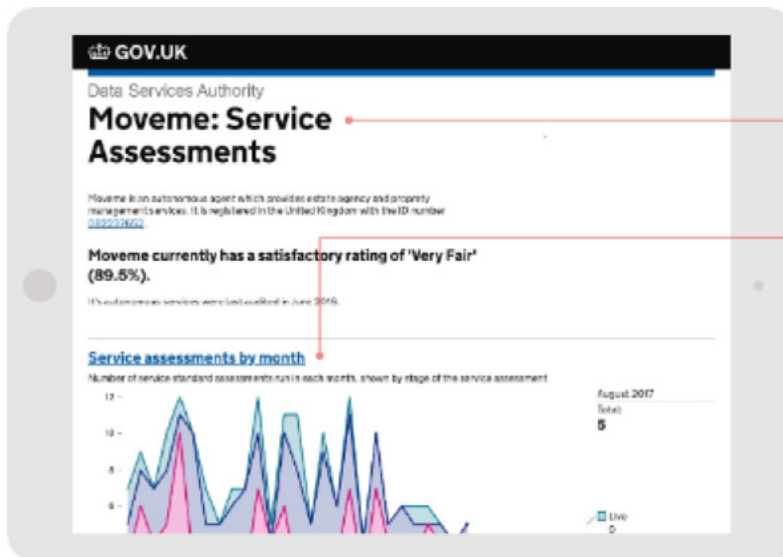
If Moveme conducts unfair data processing, such as processing data for both a buyer and seller, then it may affect a users abilities to negotiate or create other conflicts of interest.

Need: Visibility & Fairness

Response: Independent regulation

Example: Public service assessment by the DSA (Data Service Authority)

Automated services such as Moveme could be regulated by an independent authority (similar to one referenced for Circle) and if approved this may be clearly signalled to users on a public registry or with a recognisable label.



Where conflicts of interest could lead to unfair data processing, regulation by a new or existing independent body may be required.

Results of assessments by such an authority could be made openly available via a public registry.

- Labels
- Features
- Products/Services
- Standards
- Infrastructure
- Governance

Results of government data services assessments of the Moveme service, accessible on a public website

Risk 3: Inaccurate inferences

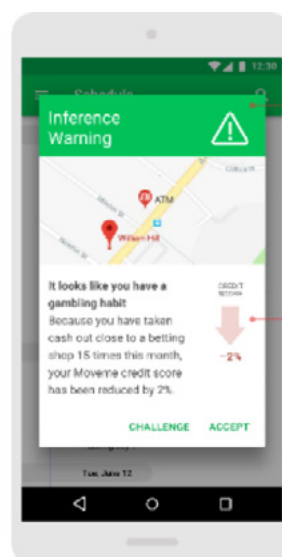
Services with access to users' data may use it to make inaccurate behavioural inferences, based on statistical probability rather than evidence. This might lead to unwelcome consequences, such as being denied access to services and facing unfair restrictions.

Need: Reliability

Response: Algorithmic transparency & regulation

Example: Algorithm warning labels

As part of regulation by the DSA mentioned earlier, services such as Moveme could be restricted from making statistical inferences in certain circumstances. If an inference is made then the user could also be notified, given the rationale for the inference and given the opportunity to challenge it.



Legislation may be needed to control how statistical inferences affect individuals using products and services.

When statistical inferences are made about an individual it may be necessary to notify them and offer the opportunity to challenge the inference.

- Labels
- Features
- Products/Services
- Standards
- Infrastructure
- Governance

Moveme notification informing a user that it has made a statistical inference based on their personal data

Risk 4: Loss of privacy to service providers or third parties

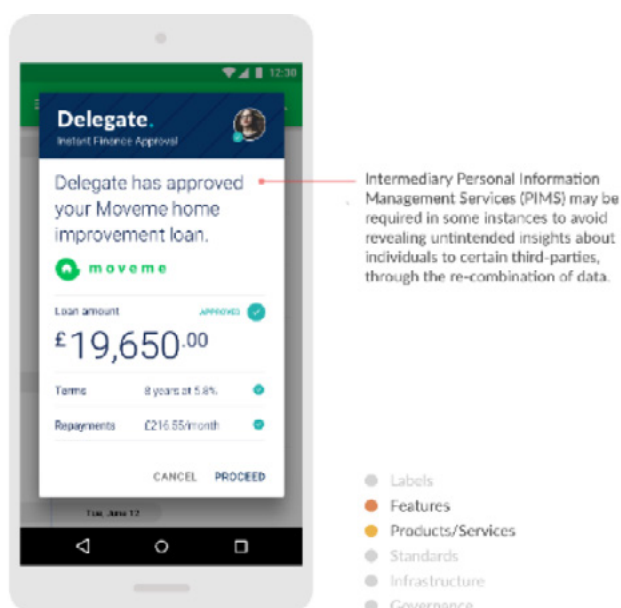
If automation services such as Moveme access several sources of data belonging to a single user then it may, by re-combining that data, gain unforeseen insight that goes beyond the privacy expectations of the user.

Need: Privacy

Response: Intermediary agents

Example: Finance approval intermediary

Users could serve some or all data to an automation service through an intermediary personal information management service (PIMS). For example a financial assessment may be conducted by querying a financial PIMS without necessarily sharing the raw data itself.



Third-party Personal Information Management Service (PIMS) providing a credit assessment services, called Delegate, meaning the user doesn't have to share their financial data with Moveme. Notification informing the user their 'Fast Track' loan has been approved using their identity data

Risk 5: Data is shared unknowingly

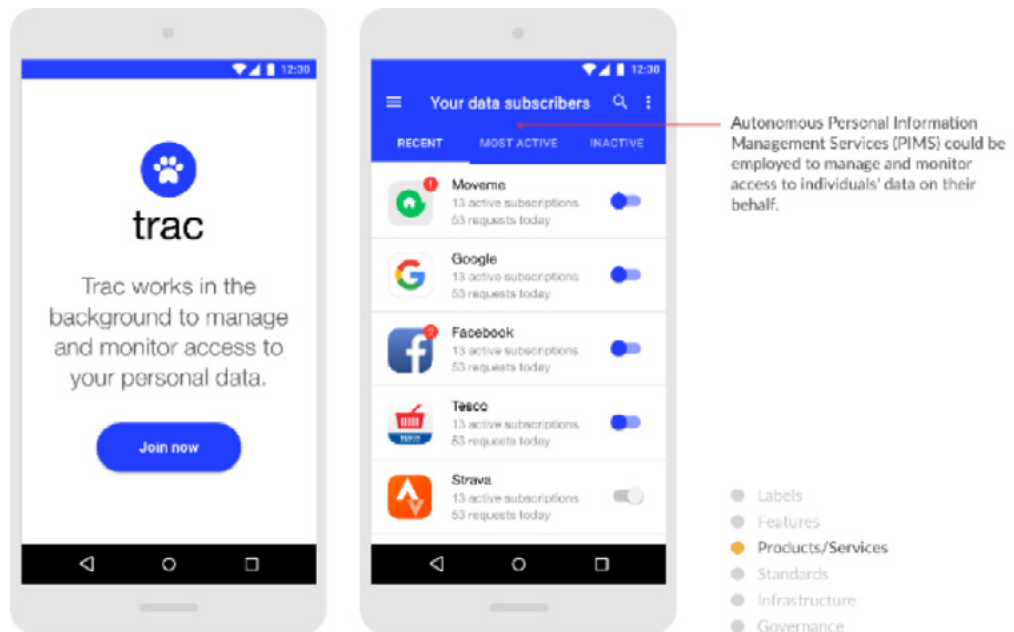
If automated services such as Moveme require access to several data sources for its users (finances, utilities, calendars etc) then keeping track of those access rights could become challenging, especially if users have provided access rights to many service providers.

Need: Control

Response: Intermediary agents

Example: Data access management services

An autonomous agent such as the 'trac' could be employed within a service to act on the user's behalf to detect and revoke data access rights which are no longer necessary or appropriate across multiple services that they use.



Sign in and dashboard screens for Trac, an identity data access management service

Risk 6: Loss of agency

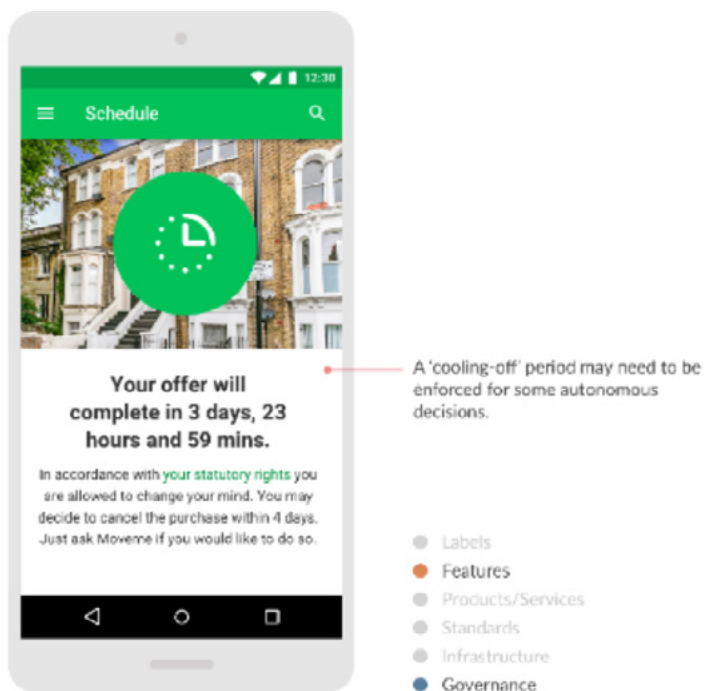
If automation services are acting autonomously then they may take critical decisions on the users behalf without consulting them or they may carry out processes so fast that they don't feel in control.

Need: Control

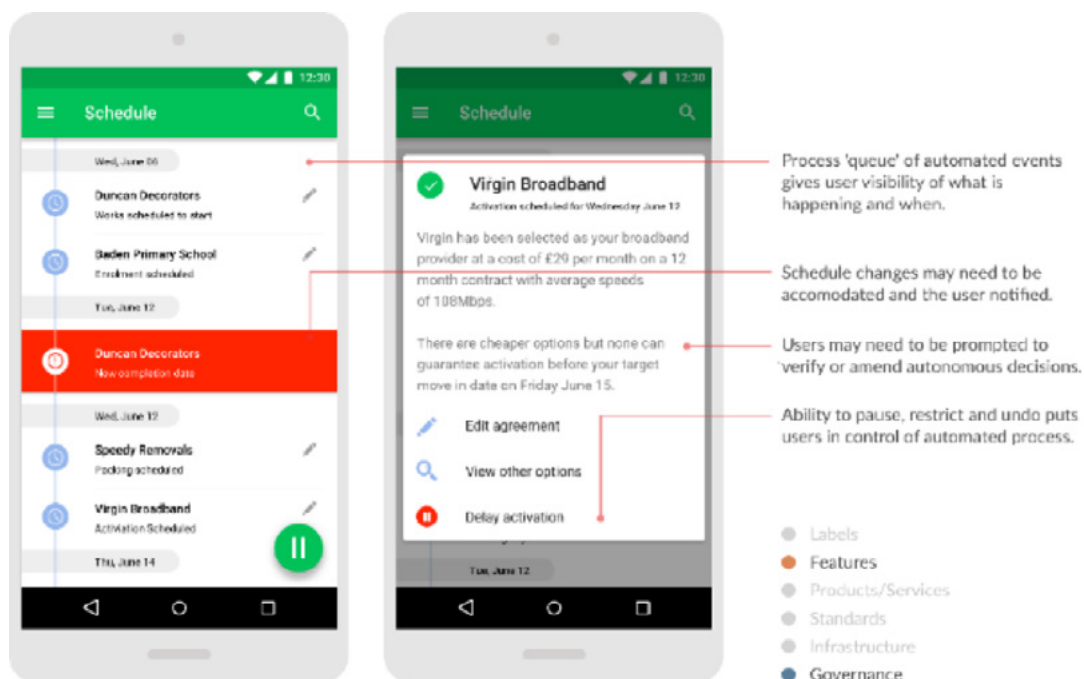
Response: Artificial friction

Example: Cooling off period

Automation services such as Moveme could be required to provide 'cooling-off' periods for some autonomous decisions similar to those stipulated by the Financial Services Regulation for products bought at a distance. They could also provide features within the product – such as a process queue with controls to restrict, pause or undo activities – which intentionally slow the process to a manageable pace.



Provides a details of your offers such as completion date and cooling off periods



A detailed schedule of steps, some that have been automated, with the ability to review and change them

Risk 7: Unintended consequences

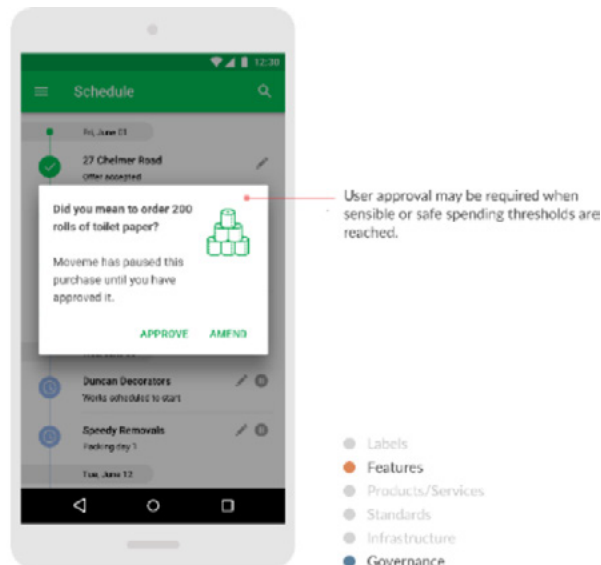
If services are acting autonomously then they may proceed with an unintended purchase due to a data error, or pay over the odds for something that can be resolved more affordably.

Need: Control

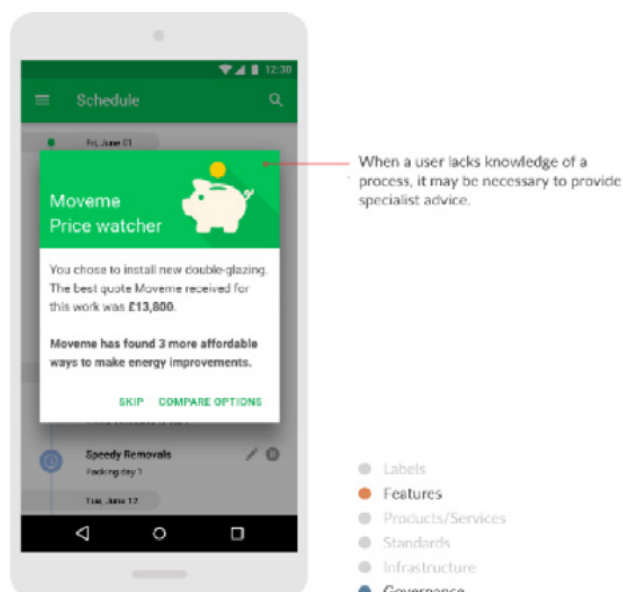
Response: Automation thresholds

Example: Outlier warning features

Automation services could implement product features which prompt for user approval when sensible or safe spending thresholds are reached. An intelligent agent with specialist knowledge could also be employed to seek out and suggest alternative approaches to certain problem areas.



Notification letting the user know of any thresholds or limits that have been exceeded



A notification informing a user of the details of a process along with additional information to educate the user



Managing Assets

Ownr – Personal Assets Management

Scenario

Data mobility may create opportunities for assets to be more easily identified, evidenced and utilised. In this example, we are speculating on the idea of an ‘asset register’ service, called Ownr, which helps owners to understand their asset’s value, insure them appropriately and lend, sell or store assets which they under-use.

Personal asset management services such as Ownr could help people find appropriate insurance for their needs and ease the process of claiming for and replacing items which are lost or damaged. They could also reduce the potential for insurance fraud and may make insurance pricing fairer.

The themes we are exploring are **data collection, asset valuation, liability and shared ownership.**

Risks

Six risks were explored ranging from discrimination to fraud. Responses were developed to tackle these risks in the context of Ownr, the fictional asset management service.

Risk 1: Discrimination

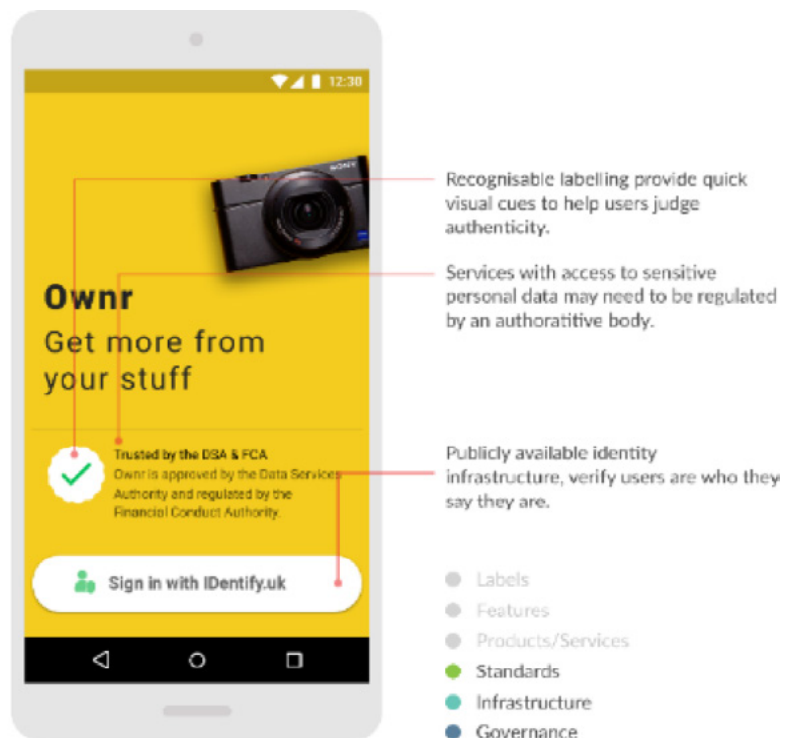
People who lack sufficient data or possess compromising data may find themselves unfairly treated by or excluded from services. In the case of Ownr, users may find the service denies them insurance.

Need: Fairness, Privacy

Response: Regulatory body for data fairness

Example: Data fairness label

Personal asset management services such as Ownr could be regulated by an approved authority, such as the Data Service Authority mentioned earlier for Circle and Moveme, to ensure that their data sharing practices follow an acceptable code of conduct. If approved, then this may be clearly signalled to users on a public registry or with a recognisable label. Ownr and/or the insurance providers could also be subject to other regulations such as those from the Prudential Regulatory Authority and the Financial Conduct Authority both of which may need to adapt their regulations in light of data mobility.



The sign in screen for Ownr informing the user its a trusted and approved service with Public Identity sign in

Risk 2: Lack of accountability

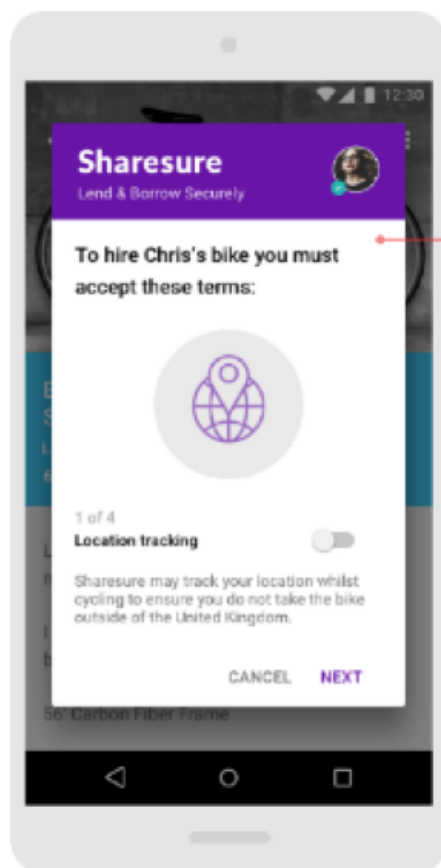
If an asset changes possession the liability for it may become unclear, for example if it is damaged, lost or stolen.

Need: Liability

Response: Liability intermediary

Example: Personal insurance policy

Transfer of liability may need to be managed through an intermediary personal information management service (PIMS) which allows lenders to set their own terms and allows borrowers to confirm they are meeting their criteria. It may be necessary to clearly state any terms of use and responsibilities assumed by the new possessor.



An intermediary Personal Information Management Service (PIMS) may need to be employed to manage transfer of liability when lending assets.

- Labels
- Features
- Products/Services
- Standards
- Infrastructure
- Governance

3.1 The asset borrowing journey informs the borrower of terms and conditions set by the lender

Risk 3: Lack of relevant data

If asset sharing services like Ownr need accurate data about your assets - including proof of ownership, location and condition – then collecting and maintaining that data may be challenging and time consuming.

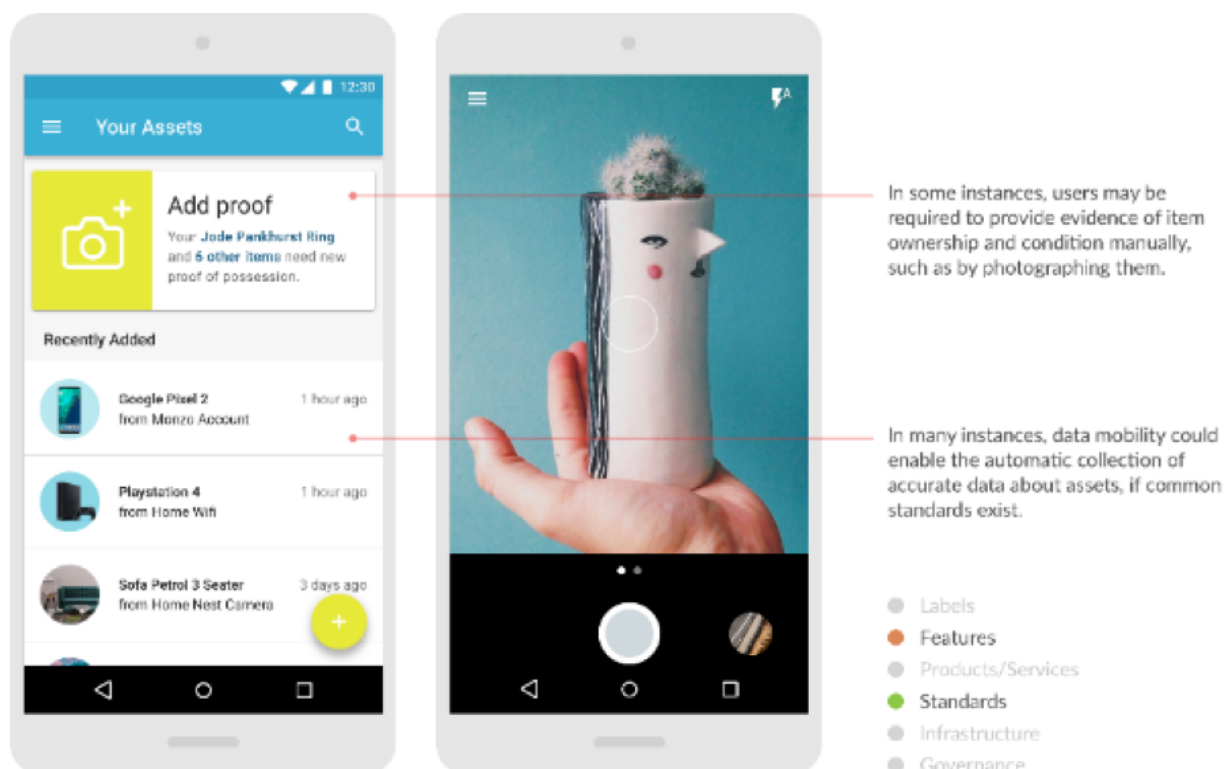
Need: Visibility, Reliability

Response: Attribution mechanisms

Example: Proofing ownership through multiple data points

Asset sharing services could use data mobility to automate the process of data collection and maintenance – gathering data from email receipts, bank statements and store accounts as well as data generated by some assets themselves by connecting to wifi or otherwise emitting data as part general use. Perhaps the rise in IoT devices within the home, such as connected speakers and cameras, may also generate new knowledge about the assets we possess.

Services could also implement product features which prompt users to bolster evidence for items which are lacking. This might be fulfilled by simply photographing an item with your phone.



A list of your assets and how the ownership has been verified, either manually or automated

Risk 4: Fraud

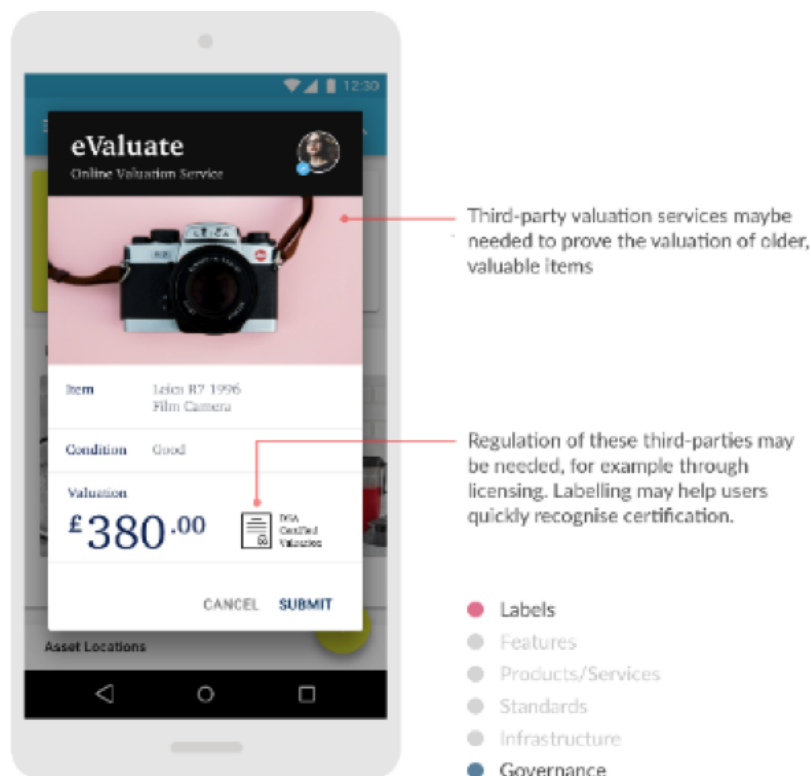
Physical assets may lack existing or reliable valuation data, leaving users and insurers open to fraud.

Need: Reliability, Liability

Response: Authentication & Verification

Example: Third party valuation service

Ownr could obtain data about such assets via third-party valuation services who would provide trusted valuations. Such services could be subject to regulation, such as those from the Prudential Regulatory Authority and the Financial Conduct Authority both of which may need to adapt their regulations in light of data mobility.



Asset detail page showing its valuation is accurate and has been made by a verified 3rd party

Risk 5: Inaccurate representation of ownership

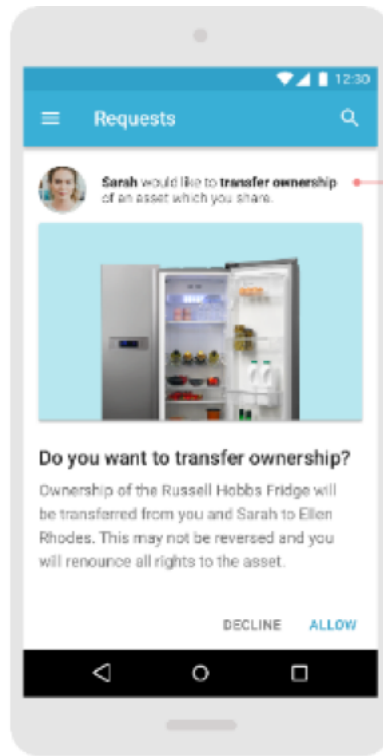
If services are used for assets with shared ownership, then the rights of each of those owners must be respected.

Need: Reliability, Liability

Response: Multi-owner permissions

Example: Group consent

Asset sharing services like Ownr could implement features which require group consent for data to be shared or changed about an asset. For example, if an asset is sold then to transfer ownership to another person's asset registry should require approval from all users.



When the ownership of a shared asset is transferred, approval may need to be obtained from multiple owners.

- Labels
- Features
- Products/Services
- Standards
- Infrastructure
- Governance

1.1 Changes in ownership of a shared asset required all parties to approve the transfer

APPENDIX 8: DESK RESEARCH - REPORTS REVIEWED

Open Banking

[Open Banking \(2017\) Open Banking Language Development, Prepared for Open Banking Implementation Entity. Ipsos MORI](#)

[Open Banking \(2018\) Open Banking, Guidelines for Read/Write Participants. Open Banking](#)

[Open Banking \(2018\) Enrolling onto the Open Banking Directory How to Guide. Open Banking](#)

[Open Banking \(2018\) Managing Your Access to the Open Banking Directory. Open Banking](#)

[Open Banking \(2018\) Viewing & Requesting Updates To Your Entity How to Guide. Open Banking](#)

[Open Banking \(2018\) Dispute Management System \(DMS\) For ASPSPs and TPPs, Code of Best Practice: Principles and Best Practice Standards. Open Banking](#)

[Waller S \(2018\) Launch Support. Open Banking](#)

[Open Banking \(2018\) Complaints and Dispute Resolution Procedure. Open Banking](#)

[Open Banking \(2018\) Participant Guide: Information security operations, A guide to implementing effective information security controls. Open Banking](#)

[Open Banking \(2017\) Participant Guide: Counter fraud operations, A guide to implementing effective counter fraud controls. Open Banking](#)

[Open Banking \(2018\) Counter fraud and the Open Banking Ecosystem. Open Banking](#)

[Reynolds F \(2017\) Open Banking, A Consumer Perspective. Open Banking](#)

Competition and Markets Authority

[Competition and Markets Authority \(2015\) UK Competition and Market Authority response to the European Commission's consultation on the regulatory environment for platforms, online intermediaries, data and cloud computing and the collaborative economy. Competition and Markets Authority](#)

[DotEcon and Analysys Mason \(2015\) The Commercial Use of Consumer Data. Competition and Markets Authority](#)

[Competition and Markets Authority \(2017\) Digital Comparison Tools Market Study. Competition and Markets Authority](#)

Information Commissioners Office

[Information Commissioners Office \(2015\) Data protection rights: What the public want and what the public want from Data Protection Authorities. Information Commissioners Office](#)

[ComRes \(2017\) information Commissioner's Office – Trust and Confidence in Data. Information Commissioners Office](#)

Consumers International

[Consumers International and The Federation of German Consumer Organisations \(2017\) Building a Digital World Consumers Can Trust. Consumers International and The Federation of German Consumer Organisations](#)

[Consumers International \(2017\) Testing Our Trust: Consumers and the Internet of Things. Consumers International](#)

[ANEC, BEUC, Consumers International and ICRT \(2017\) Securing Consumer Trust in the Internet of Things, Principles and Recommendations. 2017](#)

[Consumers International \(2016\) Connecting and Protecting in the Digital Age, The Internet of Things and Challenges for Consumer Protection. 2016](#)

Open Data Institute

[Open Data Institute \(2018\) Personal Data in Transport: Exploring a framework for the future. Open Data Institute](#)

[Open Data Institute \(2018\) How can Smart Contracts be useful for businesses? Open Data Institute](#)

[Open Data Institute \(2018\) Data portability and peer-to-peer accommodation four scenarios for the future \(report\). Open Data Institute](#)

[Hardinges J, Whitworth G \(2018\) Will GDPR and data portability support innovation? Open Data Institute](#)

[Open Data Institute \(2016\) Introducing the Open Banking Standard, Helping Customers, Banks and Regulators take banking into a truly 21st-century connected digital economy. Open Data Institute](#)

[Open Data Institute, Fingelton Associates \(2014\) Data Sharing and Open Data for Banks. HM Treasury and Cabinet Office](#)

[Open Data Institute, YouGov \(2018\) ODI survey reveals British consumer attitudes to sharing personal data. Open Data Institute & YouGov](#)

Open Data

[Cabinet Office \(2012\) Open Data White Paper, Unleashing the Potential. UK Government](#)

[Manyika J, Chui M, Farrell D, Van Kuiken S, Groves P, Doshi E \(2013\) Open data: Unlocking innovation and performance with liquid information. McKinsey Global Institute](#)

[Deloitte LLP \(2017\) Assessing the value of TfL's open data and digital partnerships. Deloitte LLP](#)

WEF

[Bain & Company, inc. & World Economic Forum \(2011\) Personal Data: The Emergence of a New Asset Class. World Economic Forum](#)

[A.T. Kearney & World Economic Forum \(2014\) Rethinking Personal Data: A New Lens for Strengthening Trust. World Economic Forum](#)

[World Economic Forum \(2018\) Digital Identity, On the Threshold of a Digital Identity Revolution. World Economic Forum](#)

[Accenture and World Economic Forum \(2015\) Industrial Internet of Things: Unleashing the Potential of Connected Products and Services. World Economic Forum](#)

DotEveryone

[Miller C, Coldicutt R and Kitcher H. \(2018\) People, Power and Technology: The 2018 Digital Understanding Report. Doteveryone.](#)

[Miller C, Coldicutt R and Kos A. \(2018\) People, Power and Technology: The 2018 Digital Attitudes Report. Doteveryone](#)

Which?

[Which? \(2018\) Control, Alt or Delete? The future of consumer data. Which?](#)

Ipsos MORI

[Ginnis S, Stamper P, Byrne A, Garrett C, Strong C \(2018\) Open Banking Data Sharing Dilemmas. Ipsos MORI Social Research Institute](#)

[Stamper P \(2017\) Open Banking Global Study, Wide Open? Ipsos MORI](#)

[Ipsos Mori \(2014\) Privacy and personal data. Joseph Rowntree Reform Trust](#)

Blogs/Articles

[Tennison J \(2017\) Data Portability. Jeni Tennison](#)

[Tennison J \(2018\) Doesn't open data make data monopolies more powerful? Jeni Tennison](#)

[Tennison J \(2018\) Data portability: the role governments should play. Open Data Institute](#)

[McVeigh K \(2018\) 'Uber for blood': how Rwandan delivery robots are saving lives. The Guardian](#)

[Austin E \(2018\) 'e-Estonia': A Case Study in Digital Governance. The Market Mogul](#)

[Finley K \(2017\) Tim Berners-Lee, Inventor of the web plots a radical overhaul of his creation. Wired](#)

TechUK

[techUK, UK Finance & Dentons UKMEA LLP \(2017\) No interruptions, Options for the future UK-EU data-sharing relationship. UK Finance](#)

[techUK \(2017\) techUK response to the European Commission's Building the European Data Economy Communication. techUK](#)

Ctrl-Shift Reports

[Ctrl Shift \(2014\) Personal Information Management Services: An analysis of an emerging market. Understanding the impacts on UK businesses and the economy. Ctrl-Shift](#)

[Ctrl-Shift \(2014\) Economics of Identity, The size and potential of the UK market for identity assurance. Ctrl-Shift & Open Identity Exchange](#)

[Ctrl-Shift \(2016\) A New Paradigm for Personal Data: Five Shifts to Drive Trust and Growth. Facebook](#)

[Ctrl-Shift \(2012\) Information Logistics: Key to Digital Value Creation. Ctrl-Shift](#)

[Ctrl-Shift \(2011\) The new personal data landscape. Ctrl-Shift](#)

[Ctrl-Shift \(2014\) Next Generation Intermediaries, The maturing market for decision support services. Ctrl-Shift](#)

[Ctrl-Shift \(2013\) The midata Innovation Opportunity, Learnings from the midata Innovation Lab. Department for Business, Innovation and Skills](#)

UK Government Papers

[Department for Business, Energy and Industrial Strategy \(2018\) Modernising Consumer Markets. Department for Business, Energy & Industrial Strategy](#)

[Hall Professor Dame Wendy, Pesenti J \(2018\) Growing the Artificial Intelligence Industry in the UK. Department of Digital, Culture, Media and Sport & Department for Business, Energy & Industrial Strategy](#)

[Department for Digital, Culture, Media and Sport \(2017\) UK Digital Strategy. Department for Digital, Culture, Media and Sport](#)

[Department for Digital, Culture, Media and Sport \(2018\) DCMS Sectors Economic Estimates 2016: Trade](#)

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APPENDIX 9: ENABLER'S LANDSCAPE

Organisation or Enabler name	Description	Type
Open Banking Directory for Enrolment	The Open Banking Directory is the key architectural component that enables Third Party Providers (TPPs) to enrol with Open Banking and deliver payment initiation and account information services using APIs created by Account Servicing Payment Service Providers (ASPSPs).	Initiative
Open Banking Guidelines for participants/3rd Party Support Part 1 Documentation Part 2 Documentation	Open Banking has provided 2 key guideline documents offering support to TPPs on gaining consent for delivering payment initiation and account information services.	Initiative
Open Banking Dispute and Complaint Process	The Open Banking Dispute Management System supports the exchange of information in relation to the management of payment initiation and account information service-related enquiries, complaints or disputes between ASPSPs and TPPs. It includes a Code of Best Practice incorporating principles and standards to be adhered to when following the process.	Initiative
Open Banking Implementation Entity (OBIE)	The OBIE is the entity that oversees the execution of Open Banking. It is governed by the CMA and funded by the UK's nine largest banks and building societies. Its role is to: Design the specifications for the Application Programme Interfaces (APIs) that banks and building societies use to securely provide Open Banking; support regulated third party providers and banks and building societies to use the Open Banking standards; create security and messaging standards; manage the Open Banking Directory which allows regulated participants like banks, building societies and TPPs to enrol in Open Banking; produce guidelines for participants in the Open Banking ecosystem; set out the process for managing disputes and complaints	Initiative
Open Banking Governance Process	Within Open Banking any change or amendment to documents are made by utilising the Open Banking governance process, which includes consultation with various different working groups.	Initiative

Organisation or Enabler name	Description	Type
midata and midatalab	<p>The midata programme, launched in 2011, was a BIS initiative that sought to help consumers access and use data collected about them by services providers. It involved twenty-six partner organisations - encompassing businesses, consumer groups, regulators and universities - working together to explore the potential opportunities from giving personal transaction data back to consumers.</p> <p>The midata programme introduced the idea that personal information, collated from many different sources, can be organised around the individual. And that in the process it would become the fuel to drive new information services that help consumers achieve their own goals and purposes. This idea was piloted in 2013 in the midata Innovation Lab.</p> <p>The Lab’s objective was to enable rapid learning about what the future might look like, so the UK could take the lead in safely innovating new services that would generate consumer benefits. There were seven key learnings for businesses.</p> <p>Firstly, joining up different sets of data from different companies and industry sectors does create new innovation opportunities. Secondly, if government-held public-sector data is added to the mix, additional innovation opportunities are generated. Thirdly, when seeking to engage consumers, new personal information services should focus on the value and not the data.</p> <p>Additionally, the new apps created a demand for data. Midata focused on the supply of data and the two sides – demand and supply - needed to be brought together. Furthermore, innovation labs like the midata lab provide businesses, developers, regulators and policy makers with an opportunity to accelerate innovation in a safe environment in a way that gets the best out of all parties.</p> <p>The final learning was that issues, such as consumer protection, are as much about engineering as policy or regulation, as it all depends on designing and inter-operating safe data sharing systems. Business, legal and technical enablers need to advance hand in hand as they are interdependent, and need to be managed in a way that reflects this.</p> <p>In parallel there were 8 key consumer learnings.</p> <p>First and foremost, for consumers convenience is all important. Secondly, consumers differ in their concerns and priorities. Customer segmentation applies as much to new information services as traditional products and so there is no one-size-fits-all solution.</p>	<p>Initiative</p>

Organisation or Enabler name	Description	Type
	<p>Additionally, trust was a key takeaway from the findings of the midata lab. Consumers make decisions about data sharing depending on their opinion of the company with this including the purpose of the service and the brand offering. Next, the clearer the benefit shown by new information services, the more willing people are to share data.</p> <p>The fifth learning was that switching was not the only use to which consumers wanted to put their data - improved lifestyle and time savings are just as important and in some cases more important than financial savings. Also empowering consumers with control is a benefit in its own right. Apps and services that give consumers choice and control are much more likely to be used than those that don't.</p> <p>The inclusion of personal data specifically held by the Government, for example NHS data, also added significant benefit when designing new apps and services. Finally, for consumers privacy and the misuse of data remains a key concern and needs to be addressed for the personal information market to flourish.</p> <p>The midata programme and lab influenced new legislation in Open Banking and data protection – the midata principles are echoed in consumer rights under GDPR – and provided learning to a number of international initiatives, including the Mesinfos project in France.</p>	
Centre for Data Ethics and Innovation (CDEI)	<p>A consultation paper for the CDEI was issued in June 2018.</p> <p>The envisaged role of the CDEI is that it will have an explicit and unique mandate to advise the government on the measures which are needed to ensure safe and ethical innovation in data and AI. It will convene, connect and build upon the best evidence, insights and practices available and translate these into direct, real-world actions that enhance the way in which data and AI are used.</p>	Initiative
Alan Turing Institute	<p>The Alan Turing Institute was created as the national institute for data science in 2015. In 2017 artificial intelligence was added to its remit.</p> <p>The institute undertakes research that tackles some of the biggest data-related challenges in science, society and economy including privacy, data ethics and transparency. It collaborates with universities, businesses and public and third sector organisations to apply this research to real-world problems, with lasting effects for science, the economy, and society. Its objective is to help make the UK the best place in the world for data science and AI research, collaboration and business.</p>	Initiative

Organisation or Enabler name	Description	Type
UK Regulators Network (UKRN)	<p>The UKRN was established in 2014 to provide the structure for regulators to consider common issues and policy projects with relevance across utility, financial and transport sectors.</p> <p>The UKRN facilitates events and discussions of topical issues with external audiences and in collaboration with partners. These topics have included consumer policy, investment, innovation, infrastructure and the role of independent regulation.</p>	Initiative
‘Smart Data’ Review	<p>As part of its Green Paper on Modernising Consumer Markets, the UK Government is launching a ‘Smart Data’ review into how best to ensure data portability is implemented in a way which supports consumers getting better deals in regulated markets.</p> <p>The review will seek to identify how competition can be used to stimulate innovation and better deals for consumers, including identifying the markets where data portability can have the most beneficial impact.</p>	Initiative
Government-regulator Consumer Forum	<p>Also in the Green Paper on Modernising Consumer Markets, the Government is establishing a new joint Government-regulator Consumer Forum, chaired by the Minister for Consumer Affairs. This will comprise senior representatives from across government and regulators, bringing in other experts, such as the CMA as appropriate to discuss overarching priorities for the regulated sectors.</p>	Initiative
Data Trusts	<p>From the most recent Government AI paper, there is a recommendation to develop Data Trusts. These trusts will facilitate the sharing of data between organisations holding data and organisations looking to use data to develop AI. The trusts would incorporate proven and trusted frameworks and agreements to ensure exchanges are secure and mutually beneficial.</p>	Initiative
FCA Regulatory Sandbox	<p>The FCA regulatory sandbox allows businesses to test innovative products, services, business models and delivery mechanisms with real consumers. The sandbox seeks to provide firms with the ability to test products and services in a controlled environment, reducing time-to-market and development costs and supporting the identification of appropriate consumer protection safeguards to build into new products and services.</p>	Initiative
ODI – Data Ethics Canvas	<p>The Data Ethics Canvas is designed to help identify potential ethical issues associated with a data project or activity. It promotes understanding and debate around the foundation, intention and potential impact of any piece of work, and helps identify the steps needed to act ethically.</p>	Initiative

Organisation or Enabler name	Description	Type
<p>ODI – R&D Initiatives</p> <p>Initiative 1</p> <p>Initiative 2</p> <p>Initiative 3</p>	<p>The ODI is undertaking a number of research initiatives.</p> <p>The first initiative focuses on broadening access to personal data while protecting privacy and creating a fair market. It aims to help organisations reduce the risks of re-identification when sharing or opening data by giving them tools and knowledge to recognise and mitigate those risks.</p> <p>Another project seeks to understand what makes people decide whether to share data and what causes them to build or lose trust. It will research the needs and thoughts of various groups of people including those who share data about themselves or that they've collected, data stewards that hold data that can be shared, and organisations that use data to create new services.</p> <p>New businesses and new technologies need easy and secure access to data to thrive. There are various options for making data available but businesses and public sector organisations find it difficult to know what's available and which options to choose for their particular business model. The third project will focus on business and organisational models that create safe and equitable markets, explore different options within selected sectors, and produce knowledge products aimed at both the public and private sector to help increase the use of data across multiple organisations.</p>	<p>Initiative</p>
<p>Green Button</p>	<p>The Green Button initiative, launched in 2012, gave Americans online access to their detailed electricity usage, facilitating virtual energy audits to identify inefficiencies and money opportunities for both residential and commercial customers.</p> <p>Consumers were able to securely download detailed energy usage data with a simple click of a literal “Green Button” on electricity utilities’ websites. Additionally, consumers could grant third party developers and service providers direct access to their Green Button data, e.g. to compare their usage with local government open data on energy usage patterns.</p> <p>The Green Button initiative was based on a common technical standard, the ESPI (Energy Services Provider Interface) and was developed in collaboration with the Smart Grid Interoperability Panel and the PAP10 working group. The ESPI standard described how to represent energy usage information in an XML format and how to enable the exchange of that information between utilities and third parties on behalf of consumers. Together these defined a flexible file format for Green Button based on ratified standards from NAESB (North American Energy Standards Board).</p> <p>By July 2015, more than 150 utilities and service providers had committed to providing over 60 million U.S. households access to their own Green Button energy data in a consumer- and computer-friendly format.</p>	<p>Initiative</p>

Organisation or Enabler name	Description	Type
Blue Button	<p>In 2010 the U.S. Department of Veteran Affairs (VA) launched the Blue Button initiative to give veterans the ability to access and download their medical records from their 'MyHealthVet' online portal. In 2013 the Blue Button service was expanded to include a standardised, machine-readable data format.</p> <p>With the Blue Button, a patient is provided with a highly visible, clickable button to download his or her medical records or other health information in digital form from a secure website offered by their doctors, insurers, pharmacies or other health-related service.</p> <p>The initiative has spread with many healthcare providers now providing access to health information online. More than 16,000 healthcare organisations and providers are now listed on the Blue Button Connector, a tool to help patients and consumers access their health records online. And an estimated 150 million Americans have accessed their health records online from health professionals, medical laboratories, retail pharmacy chains, and state immunization registries.</p> <p>Services developed on the back of the Blue Button initiative have included: appointment scheduling, medication reminders and remote monitoring; an app to help consumers manage congestive heart failure with hospital support via mobile and connected devices.</p>	Initiative
MesInfos / Rainbow Button	<p>MesInfos is a consortium of large French companies exploring the collection, use and sharing of personal data by and for individuals, under their complete control and designed to fulfil their own needs and aspirations (SelfData).</p> <p>A pilot was launched in 2016, the key learnings from which are: Getting from use cases to service prototypes is a challenge due to the difficulty of attracting established businesses or start-ups to an emerging market. Presenting data in a form and way that consumers found intelligible also proved a challenge for the platform (Cozy). Finally the pilot was carried out in parallel to GDPR implementation and lack of clarity as to the regulatory situation, particularly around data portability, proved a stumbling block for agreement between consortium members.</p> <p>To ensure MesInfos could proceed with its SelfData agenda, a second initiative – Rainbow Button - has been launched which is focusing exclusively on data portability.</p>	Initiative
Digi.me and Icelandic Data	<p>Digi.me is a PIMS business and it is involved in a living lab project in Iceland which aims to give users greater insight and control over their health and treatment, through having instant access to their own health information. Data includes prescriptions and medications, vaccinations, allergies and medical admissions.</p>	Initiative

Organisation or Enabler name	Description	Type
PIMS Services	Ctrl-Shift track the developing PIMS market and have over 500 identified, many of which are in the UK. PIMS falls into three main categories: Personal Data Management Services (see below), Life Management and Decision Support services. Of the 500 PIMS currently being monitored a large portion are PDMS or have PDMS functionality.	Services
PDMS Services	Part of PIMS but worthy of a separate mention are the services that help individuals to gather, manage and use their data. There are a number of pure Personal Data Management Services in market, however numerous Life Management and Decision Support service have developed PDMS type of services to overcome the need for the facility to enable the value to be developed in their consumer service.	Services
Data Pitch	<p>Data Pitch is a European initiative that is being delivered by a number of organisations including the University of Southampton and the ODI in the UK.</p> <p>It is bringing together established businesses and startups to meet today's challenges with data. It is centred around a competition with several tracks which describe challenges, and a virtual accelerator programme (6 months) to help startups and SMEs develop solutions to meet these challenges.</p> <p>Challenge areas are both sector specific (retail, tourism, smart manufacturing, health and wellness, etc.) or functional (data management, data analytics, empowering users online)</p>	Services
Digital Identity	<p>Digital identity delivers enhanced security, privacy and convenience for consumers by removing need for login names and passwords. Multiple different Digital Identity solutions are being proposed in both the public and private sector. The UK Verify project has multiple providers and private sector solution providers include Evernym and YOTI.</p> <p>Verify gained less traction than expected as the clunky customer experience resulted in lower sponsorship by government services than originally envisaged, meaning the rationale for consumers having a Verify account was diminished.</p>	Technology

Organisation or Enabler name	Description	Type
Nesta: DECODE	<p>DECODE is an EU-funded project involving a consortium of 14 organisations across Europe. DECODE is creating tools that put individuals in control of their personal data. DECODE is running four European pilots – held in Amsterdam and Barcelona between 2017 and 2019 – to test the wider social value that comes with individuals being given the power to take control of their personal data and given the means to share their data differently. These pilots enable: Citizen-generated data to be aggregated and shown in a dashboard that gives citizens the option to control the use of that information, including to inform policy proposals. Helping local participants setup and use sensors to gather and analyse local data (e.g. noise levels) that can be used to influence city-level decisions. Testing a sustainable solution for short-let accommodation called FairBnB which reinvests profits back into local initiatives as an alternative to Airbnb (which disrupts by pushing up rents). Leveraging an existing digital co-operative platform to test a more privacy-preserving local social network with granular controls so that residents can decide what information they share.</p>	Technology
Solid	<p>Solid (derived from “social linked data”) is a proposed set of conventions and tools for building decentralized applications using linked data principles, currently under development at MIT. Solid aims to change the way web applications work today, resulting in true data ownership by individuals and improved privacy.</p> <p>Solid offers users: the freedom to choose where their data resides and who is allowed to access it by decoupling content from the application itself; the ability to avoid vendor lock-in through seamless switching of apps and personal data storage servers, without losing any data or social connections; innovation with developers creating new apps or improving current apps by reusing existing data that was created by other apps.</p>	Technology
Open Banking Security Standards	<p>Open Banking has published the security standards that should be used for data transfers - the International Standard for Information Security (ISO27001).</p>	Standards
Specifications for Open Banking APIs	<p>Open Banking has published Open Data API specifications. These specifications allow API providers (e.g. banks, building societies and ATM providers) to develop API endpoints which can then be accessed by API users (e.g. TPPs) to build mobile and web applications for banking customers. These specifications allow providers to supply up to date, standardised, information about the latest available products and services so that, for example, a comparison website can more easily and accurately gather information, and thereby develop better services for end customers.</p>	Standards

Organisation or Enabler name	Description	Type
Open Data Institute (ODI) – Open Data Certificate	The ODI has created Open Data Certificates which use a questionnaire-style assessment to recognise well-published open data with one of four badges. Each badge shows that the data has been published in a sustainable and reusable way – with each level indicating the available support and adherence to current best-practices.	Standards
ODI Research - Making It Easier to Create Open Standards for Data	This ODI research project is gathering evidence about how data standards are currently created and maintained; exploring the needs of data standards creators; and encouraging standards bodies to move to open standards.	Standards
Data Interoperability Standards Consortium (DISC)	DISC's mission is to create a data environment where systems can be successfully designed, built, and grown on common expectations of data. This enables increased interoperability, data ownership, and advancements in analytics. DISC's first efforts concern industry stewardship and governance of xAPI. While xAPI is the first specification this group will work on, the intent is much wider.	Standards
US DoD data model for	The US Department of Defence has created a data model to support system-to-system semantic communication in complex safety-critical flight management systems and unmanned aerial vehicle control and made the model publicly available.	Standards
Factern	Factern is creating an open standard protocol for metadata to semantically describe data in a common way. This will enable ported data to be correctly interpreted, thereby enabling interoperability.	Standards
IEE Standards Association 7012: Standards for Machine Readable Personal Privacy Terms	The purpose of this project is to provide a standard that allows individuals the means to proffer their own terms respecting personal privacy, in ways that can be read, acknowledged and agreed to by machines operated by others in the networked world.	Standards
Kantara	Kantara Initiative provides real-world innovation and development of specifications and conformity assessment programs for the digital identity and personal data ecosystems	Standards

Organisation or Enabler name	Description	Type
Kantara - Identities of Things Discussion Group	<p>With the Internet of Things (IoT), there are many proprietary solutions or niche standards that have not been mapped to each other nor inter-operate. There is currently no overall framework how to recognize and manage identities across different solutions. The Kantara Identities of Things discussion group is starting to look at the evolution of an overarching Identity Framework for the IoT.</p> <p>Participants to the Discussion group are from companies such as Cisco, Intel Corporation, Deutsche Telekom AG, ForgeRock, Dell, Experian and Oracle.</p>	Standards
X-Road	<p>X-Road, is the data exchange layer for information systems in Estonia allowing the nation's various public and private sector e-service databases to link up and function in harmony. X-Road employs a versatile security solution, using multilevel authorization with a high-level log processing system and encrypted and time-stamped data traffic.</p> <p>Public and private sector enterprises can connect their information system with the X-Road, enabling them to save resources, since a secure data exchange layer exists with all other X-Road members. Indirectly X-Road also enables citizens and officials to operate via different portals and applications (e.g. document management systems, institutional information systems, etc.) in a more flexible and efficient manner.</p> <p>The X-Road to date has also been implemented in countries such as Finland, Azerbaijan, Namibia and the Faroe Islands.</p>	Standards
British Standards Institute (BSI)	<p>The BSI produces technical standards on a wide range of products and services - information security, quality management and energy management to name a few.</p> <p>The BSI have developed the BS 10012 Personal Information Management System, a best practice framework for a personal information management system that is aligned with the principles of GDPR. It outlines the core requirements organisations need to consider when collecting, storing, processing, retaining or disposing of personal records relating to individuals.</p> <p>The BSI works with business experts, government bodies, trade associations and consumers groups to capture best practices and structure the knowledge needed for organisations to succeed.</p> <p>It also provides certification to companies worldwide who implement management systems standards in addition to training courses that cover the implementation and auditing requirements of national and international management systems standards.</p>	Standards

Organisation or Enabler name	Description	Type
BSI IoT Community	<p>The BSI IoT community is currently creating a trusted framework to shape, share, embed and support innovation with the safe and reliable use of IoT applications, data and devices. This will allow ‘smart’ devices and applications to be assessed against the UK Government’s new IoT proposed code of practice.</p> <p>The objective of the BSI IoT community is to help accelerate adoption of IoT by increasing trust and confidence between market participants. Which is why the community is heavily investing in the capability to provide independent verification of security and interoperability for connected devices.</p> <p>The BSI IoT Community now incorporates the Hypercat Alliance.</p>	Standards
NEXTLEAP	<p>NEXTLEAP combines expertise from across different disciplines across Europe in computer science, protocol verification and philosophy to develop a set of comprehensive answers to questions surrounding privacy and society.</p> <p>NEXTLEAP is pursuing three main objectives. Firstly, the creation of a fundamental rights-preserving decentralised internet architecture. Secondly a fundamental re-think of the ethical and philosophical foundations of the internet. Lastly a modular specification of decentralised proposed implemented as open-source software modules.</p> <p>To date, NEXTLEAP has created 13 deliverables ranging from an initial design of a federated identity system that protects the user’s social graph to developing initial prototypes of identity and a simulation-based evaluation showing the scalability of NEXTLEAP federated identity protocols in terms of properties like decentralisation, privacy, security, or anonymity.</p>	Standards
TechUK	<p>TechUK is a membership organisation with over 950 members. TechUK works with its members to identify and advance innovation in key markets and help them manage the associated business risks.</p> <p>TechUK has established an Interoperability Charter for data sharing in health and care and is supporting the establishment of INTERopen.</p>	Standards
INCITS	<p>The International Committee for Information Technology Standards is the central US forum dedicated to creating technology standards for the next generation of innovation.</p> <p>INCITS promotes the effective use of information and communication technology by developing standards that balance the interests of all stakeholders and increase the global competitiveness of its member organisations. Its areas of focus range from the IoT through Data Storage and Cloud Computing.</p>	Standards

Organisation or Enabler name	Description	Type
India Stack	India Stack is a project that's creating a unified software platform to bring India's population into the digital age. India Stack is a set of API's that allows governments, businesses, start-ups and developers to utilise a digital infrastructure to help create new digital services for India.	Standards
Berkeley University Privacy Patterns	Berkeley University have a specific project that is focused on the development of 'privacy patterns' that is, design solutions to common privacy problems - a way to translate "privacy-by-design" into practical advice for software engineering. The goal of the project is to document common practices and standardise terminology.	Standards
EBU PEACH	<p>The European Broadcasting Union is currently working with its members to give them a set of powerful tools to deliver relevant content to audiences across Europe.</p> <p>Broadcasters are faced with competition from multinational online-giants and are looking for ways to efficiently increase both reach and relevance. In response, the EBU developed PEACH (Personalisation for EACH), a working group applying InnerSource practices to co-develop the required solutions.</p> <p>The team is in charge of currently developing three digital products - a recommendation service providing data acquisition, storage, algorithm computation and processing; a single sign-on service that provides the user account management and authentication on multiple platforms and devices; finally a data scientist platform that empowers analysts to explore data sets, quickly prototype recommendation algorithms, deploy them and then measure their overall impact. All PEACH products are flexible and customisable to allow any member to join in on the project.</p>	Standards
DotEveryone	<p>DotEveryone is a think tank which champions responsible technology for the good of everyone in society. It explores how technology is changing society, undertaking research (Digital Attitudes and Digital Understanding) and building proofs of concepts to show how technology could be better for all.</p> <p>Recent research highlights: a lack of consumer awareness about what personal data is collected, how it is collected and how free services make money; that consumers who do want to find out what data is collected and how it is used struggle to do so; that many feel uncomfortable about profiling and targeted advertising.</p>	Research

Organisation or Enabler name	Description	Type
Consumers International	<p>Consumers International brings together over 200 member organisations in more than 100 countries to empower and champion the rights of consumers everywhere. It is the voice of consumers in international policy-making forums and the global marketplace to ensure they are treated safely, fairly and honestly.</p> <p>Current campaign focusing on the privacy and security risks posed by internet of things and recent publications include: Building a Digital World Consumers Can Trust; Testing our Trust: Consumers and the Internet of Things; Securing our Trust in the Internet of Things.</p>	Research
Ipsos Mori	<p>IPSOS Mori have undertaken a number of piece of market research to investigate the consumer impact of Open Banking. Recent reports include: Open Banking – Are Consumers Ready? and Open Banking Data Sharing Dilemmas.</p>	Research
Which?	<p>Which? Is the UK's largest independent consumer body in the UK with more than 1.5 million members. Its policy team identifies where consumers are experiencing problems and advocates for policy solutions.</p> <p>The policy team has published a series of reports on consumer data – the key findings of which are that consumers: lack knowledge of how much data is collected and how their data is traded in the data ecosystem; feel it is unfair when they understand and want more control but feel disempowered and that a power imbalance exists; have limited understanding of data profiling and decisions based on inferred data makes them uncomfortable; rationally disengage from T&Cs as reading them costs more in time than any benefit gained.</p>	Research

APPENDIX 10: GLOSSARY

Term	Description
Application Programming Interface (API)	A set of functions and procedures that allow the creation of applications which access the features or data of an operating system, application, or other service
Asymmetric Information	Where some market participants are disadvantaged by having less access to data and related tools
Barriers to Entry	Impeding businesses' entry into market
Big Data	Big Data is extremely large data sets that may be analysed computationally to reveal patterns, trends and associations, especially relating to human behaviour and interactions
Business Model	A plan for the successful operation of a business, identifying sources of revenue, the intended customer base, products and details of financing
Business Risk, Fraud, Liability and Brand	Without new governance frameworks and liability models there is a very real possibility of increased liability and fraud and alongside that Brand and reputation damage.
Businesses not recognising or understanding the value	The incumbent businesses hold the largest amounts of personal data. As many incumbents, who hold the largest amounts of personal data, do not recognise or understand the value of data mobility this creates a significant and early barrier to activating the market.
Co-ordination Failures	Market participants failure to co-ordinate on issues such as standards and new collaborative business models
Consolidated Stakeholder Challenges	The challenges grouped logically together by each stakeholder
Consumer Enabling Tools	Personal Data Management Services
Consumer Know How and Understanding	Consumers have a lack of know-how and understanding of the digital market and about their data, it's uses and how they can use it. This makes the consumers vulnerable to abuse and lacking in the skills to access the value.
Consumer Value Tools	Decision support & life management
Core Issues from Consolidated Stakeholder Challenges	The Core Issues for data mobility derived from the challenges that occur across all stakeholders
Customer Relationship Management (CRM)	Customer relationship management is an approach to manage a company's interaction with current and potential customers
Data Controller	A data controller determines the purposes and means of processing personal data
Data Mobility Enabling Tools	Enabling services (e.g. digital ID), infrastructure (e.g. liability management), standards and protocols (interoperability)

Term	Description
Data Processor	A processor is responsible for processing personal data on behalf of a controller
Data silos	A separate database or set of data files that are not part of an organisation's enterprise-wide data administration
Digital Charter	The Digital Charter, created by the DCMS is a rolling programme of work to agree norms and rules for the online world and put them into practice
Ecosystem	A business ecosystem is the network of organisations, including suppliers, distributors, customers, competitors, government agencies, etc. involved in the delivery of a specific product or service through both competition and cooperation
Enablers Average	Level of existing enablers or jigsaw puzzle pieces for the consolidated stakeholder challenges
Externalities	These prevent optimal investment in effort and resources in Data Mobility
Fundamental Market Risks	Data Portability, Fraud, Spam, Liability Models
Government/Regulator Skills Gap	Well-functioning markets require strong regulation and legislation. In a fast moving developing market, such as Data Mobility, regulators and government need a level of knowledge and skills and adaptiveness to ensure the market successfully develops.
Impact	Level of impact on Data Mobility
Incumbent	Incumbent businesses
Individual	The consumer or individual person
Inflexion Point	An inflexion point is an event that results in a significant change in the progress of a company, industry sector, economy or geopolitical situation and can be considered a turning point after which a dramatic change, with either positive or negative results, is expected to result
Information Logistics	The ability to get exactly the right information to and from the right people at the right time in the right format
Internet of Things	The interconnection via the internet, of computing devices embedded in everyday objects, enabling them to send and receive data
Interoperability	The technical capabilities enabling the secure, easy and rapid exchange of data
Lack of Consumer Data Services (PIMS)	Consumer Data Services enable the individual to gather, manage and share their personal data and to use the data to help make decisions and manage their lives better: such as decision support (e.g. choose a flight) and life management (e.g. find and buy a house). We call them Personal Information Management Services (PIMS)

Term	Description
Lack of Data Mobility Enabling Tools	There are core Data Mobility Enabling Tools that enable the market to work effectively, these currently are either not available or only partially available - in one sector or partially developed / not scalable. E.g. Interoperability or new data sharing Liability Models
Market	The market overall or the market sector
New Innovators	Current or new businesses innovating with personal data
Open Banking	<p>Open Banking is an initiative led by the Competition and Markets Authority to create more competition in the banking industry and to encourage better services and more innovation in the customer's banking experience.</p> <p>It has been achieved through the use of open API's that enable trusted third party developers to build applications and services around 9 of the biggest banks in the U.K.</p>
Open Data	Open data is data that can be freely used, shared and built-on by anyone, anywhere, for any purpose
Peer to Peer Platforms	A platform whereby two individuals interact directly with each other, without intermediation by a third party
Personal Information Management Services	Personal Information Management Services (PIMS) provide individuals and households with tools and technologies that enable them to use their personal data in ways to directly help them to make more informed decisions and manage their affairs better.
Platform	A platform is a business model that creates value by facilitating exchanges between two or more interdependent groups, usually consumers and procedures
Positive Externalities	A positive externality is a benefit that is enjoyed by a third party as a result of an economic transaction
Price Discrimination	The action of selling the same product at different prices to different buyers, in order to maximise sales and profits
Product	A product is anything that can be offered to a market that might satisfy a want or need
Supply Chain	A supply chain is a network between a company and its suppliers to produce and distribute a specific product, and the supply chain represents the steps it takes to get the product or service to the customer
Third Parties	Third parties means a supplier or service provider who is not directly controlled by either the seller (first party) or the customer/buyer (second party) in a business transaction
Time frame	Number of years to fix the Core Issues



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