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HIDDEN IN PLAIN SIGHT

The Surprising Economics of Personal Data

November 2022

An era-defining, economy-wide, carbon-reducing, wellbeing-promoting breakthrough in service productivity, quality and innovation is now within our grasp.

But to see it, we have to know where to look.

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Introduction

New personal data infrastructure means it is now possible for:

- **Governments** to radically reduce the costs of providing public services, reduce pressures on public spending and open up new, innovative service industries that provide new jobs and expand the tax base
- **Service providers** to radically reduce the costs of providing their services while improving their quality
- **Individuals** to reduce the time, effort and hassle they expend in trying to access and use services.
- **Society** to benefit from reduced social exclusion, reduced imbalances of power, greater levels of trust and a sense of fairness.

Everybody knows that, economically speaking, personal data is immensely valuable. Firms are making billions of dollars, pounds and euros out of it. Everybody also knows that the ways in which personal data is currently collected and used has created immense privacy issues, abuses and unfairnesses.

But what few people have realised (yet) is that **new citizen-empowering ways of collecting, storing, sharing and using personal data have the potential to transform the workings of our economy, cutting the costs of service provision by 30%, 50% or more** (depending on circumstances), while improving service quality and opening up new vistas of innovation.

This White Paper explains:

- how these economic and social opportunities have been created and why they are so large.
- How, until now, debate about personal data has been framed in such a way as to create a mental prison, blocking people's ability to see these opportunities, which have remained 'hidden in plain sight'.

A breakthrough on both fronts is now both possible and necessary.

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New personal data infrastructure, built by Mydex CIC over the past 15 years, can:

- Radically reduce the costs of providing public services thereby easing pressure on public spending budgets and the cost of living
- Improve citizens' quality of life in practical day-to-day ways
- Open up new vistas of wellbeing-promoting innovation based on new-to-the-world person-centric data assets, thereby expanding the tax base
- Create significant new export opportunities.
- Ease the transition to a zero-carbon economy
- Help address deep seated social problems, especially around social exclusion
- Help redress the imbalances of power and reward that currently blight today's data-driven economy
- Rebuild trust in how our data economy works

Unlike other resources, data doesn't get 'used up' when it is used. This means the same data can be used by many different people for many different purposes. But this potential is being blocked by **a design flaw at the heart of the current system**, which revolves around separate, siloed organisation-centred databases where the only data user is the organisation and where data usage is restricted to the priorities of that organisation.

To unleash personal data's full potential, it needs to be shared. **A new, different approach to the sharing of personal data breaks the logjam** by putting citizens at the heart of the process. Organisations deposit copies of details they hold about people in their personal data stores. Individuals can then share this data with other service providers (and other people) as and when needed.

If shared data takes the form of 'verified attributes', services receiving this data can rely on it when onboarding users, when configuring services to meet their needs and when delivering these services. This ability to rely on pre-verified data rather than having to mint it from scratch or check its provenance and accuracy enables organisations to strip friction, effort, risk and cost out of data driven processes.

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It also makes it much easier and simpler for citizens to apply for, access and use the services they need to manage their lives better.

The economic consequences are seismic. These savings apply at a vast scale affecting every step of every service including banking, insurance, health and social care, education, retail, transport, leisure, media and entertainment. Services now account for 80% of all economic activity.

The closest economic parallel to this is the productivity revolution ushered in by Henry Ford's moving assembly lines for the production of automobiles. Verified attributes are the standardised parts of service provision and personal data stores are the assembly lines. Ford reduced the costs of making a car by over 90%. Similar productivity breakthroughs in service provision are being made possible by the portability of verified attributes.

This White Paper has two messages:

1) **The full social and economic potential of personal data will never be realised without independent personal data infrastructure that empowers citizens with their own data**. This is the only way to lift the structural, architectural and operational shackles that are blocking the realisation of its potential (see Table 1 below).

2) So far, the framing of the debate about personal data - including why it is valuable, how its value is best realised and the issues that need addressing along the way - has led us up the garden path. Faulty mental models have resulted in misallocation of resources, unnecessary damage and missed opportunities on a vast scale. **The biggest obstacle blocking society's ability to realise the full personal, social and economic potential is the mental models it has used to understand it.**

The privacy-protecting, data sharing infrastructure that Mydex CIC has built over the last 15 years enables personal data's value to be realised. But it does so in ways prevailing mindsets do not expect. **To see this potential you have to know what you are looking for.** That is the purpose of this Paper.

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Table 1 summarises the economic benefits explored by this Paper.

Economic opportunities created by personal data store infrastructure		
Problem caused by organisation-centric database	**System-wide economic effects (public *and* private sectors)**	**Opportunities created by personal data store-based data sharing**
Already-existing data cannot be re-used.	System-wide duplication of effort as multiple data points recreated or recollected many times.	Elimination of duplicated effort resulting in lower costs, fewer delays and increased productivity.
Access to pre-verified data restricted.	Processes interrupted causing delays. Extra work to fill data holes needed. Dependence on unreliable data causes risk and error.	System-wide reductions in frustration, friction, error risk and cost, creating productivity and capacity improvements.
Hand-overs between services either blocked or made difficult and expensive.	High quality 'joined-up' services difficult and expensive to deliver. Citizens forced to tell same story many times. Poor outcomes as things fall between stools.	Seamless, joined-up, integrated service provision enabled at much lower cost, with improved outcomes and citizen experience.
Individuals' data dispersed across multiple different organisational data silos.	Single integrated data view of individual impossible to create, restricting insights and ability to deliver joined-up services.	Citizens can aggregate their own data under their control. New services made possible, helping individuals use their data for personal purposes, to manage their lives better and to manage dealings with suppliers.
		Permissioned sharing of this data enables efficient, research, insights and joined-up services.

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Economic opportunities created by personal data store infrastructure		
Problem caused by organisation-centric database	**System-wide economic effects (public *and* private sectors)**	**Opportunities created by personal data store-based data sharing**
Every organisation has a partial view of each individual. Organisations seeking to reach and connect with new customers lack reliable data to do so.	Go-to-market processes based on guesswork and/or irrelevant communications. Data gathering to reduce waste results in invasions of privacy.	Individuals able to present anonymised profiles of themselves. Organisations able to reach and connect at low cost in privacy-protecting way.
Poor quality data and data logistics has knock-on effects on physical operations.	Duplication of effort and error in physical operations, reducing productivity and quality.	Improved data logistics boosts operational efficiencies reducing carbon footprint.
Organisations' attempt to amass personal data to overcome above issues generates data-protection and privacy issues	Trust barriers undermine workings of the system. Consent management of processes generates costs and further barriers.	Consent management processes are highly automated. Trade-off between privacy and innovation lifted.
Citizens unable to collect or use their own data for their own purposes.	Citizens excluded from full benefits of their own data. Innovation of citizen-centric services restricted. Access to services restricted.	Citizens included in the workings of the system and able to directly realise the value and benefits of their data

Table 1: How personal data infrastructure unleashes multiple breakthrough opportunities for productivity and innovation.

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PART ONE

Why is data economically valuable?

Part One Summary

Production - and the productivity of this production - make prosperity possible. Citizens in advanced industrial nations now live much longer, healthier and richer lives than before, thanks to a production and productivity revolution that transformed both what could be produced and the efficiency with which it could be produced. **Now a new production and productivity revolution is being made possible, driven by better access to and use of personal data.**

Physical products are made by combining the right material components in the right ways. Services are delivered by combining the right activities in the right ways. Information - data - is used to organise and orchestrate these combinations. **Data logistics - having the right data available at the right time - makes efficient, effective service delivery possible.**

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Our society urgently needs new personal data logistics infrastructure to realise its productive potential. Because data does not get 'used up' when used, and because the same data can be used by many different people for many different purposes, its full value can only be realised if it is shared. Sharing data in the right way means **its value can be multiplied many times over**, with many parties using it to add value in many different ways - **while the costs of duplicated effort are eliminated.**

But current organisation-centric ways of collecting and using data, where separate organisations keep their data under lock and key in separate databases, renders this impossible. This is **a design flaw that places a structural, architectural roadblock at the heart of our economy.** By enabling the right data to be made available at the right time, Mydex CIC's personal data logistics infrastructure lifts this roadblock, unleashing all the benefits listed in Table 1.

The new citizen-empowering data logistics infrastructure delivers positive, universal, pervasive economic impacts on **every step of every service in all sectors,** public, private and third.

This includes Identifying who the individual is when they apply for a service, onboarding them, deciding on eligibility, configuring the service to needs and circumstances, planning, organising and coordinating the service's delivery, associated administration and record-keeping, and resulting customer service.

Sectors include most public administration (in both central and local government), financial services banking, insurance, health and social care, education, retail, transport, leisure, media and entertainment.

Billions of £, $ and € worth of efficiency savings are now waiting to be unleashed while new avenues of innovation and non-carbon emitting economic growth are opened up.

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Why productivity matters

Production and productivity make prosperity possible. They are what makes nations wealthy.

Adam Smith realised this long ago when he started his famous book *The Wealth of Nations* not by talking about markets, but by talking about a factory: a pin factory where the planned use of machinery and a division labour meant a group of workers working together could produce thousands more pins than if they were all trying to complete the task separately.

It was advances like this - dramatic tenfold or hundred-fold leaps in productivity - that lifted societies out of poverty and made current levels of prosperity possible. But in recent years, productivity has stagnated and living standards have begun to fall. One reason for this is the productivity breakthroughs that were once achieved in the production of material things have not yet been achieved in the delivery of services, which now account for 80% of all modern economic activity.

Human welfare and prosperity advances when productivity leaps forward. Now a society-changing productivity leap is possible. It uses new ways of collecting, storing, sharing and using personal data to transform the economics of service provision.

Data's role in production and productivity

What makes data so valuable? The answer - reliability and surprise - is rarely discussed. But it lies at the heart of all economic activities, which are based on two core, universal, functions: making decisions and implementing them.

Data drives economic benefits by enabling people and organisations to make better decisions and to Improve the planning, organisation and delivery of the resulting activities (decision *implementation*). It does this via its two key benefits of reliability and surprise.

- **Reliability** If you don't know a piece of information is correct, you cannot act on it without risking error and damage. To minimise or avoid this risk, you have to stop what you are doing and invest time, money and effort checking or recreating the data. Reliable data lies at the heart of *all* efficient, effective service provision because people and organisations can act on it without extra effort, risk, cost or delay.

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- **Surprise** happens when a new piece of information tells you something new. Constant access to new, surprising information means you can keep what you do in line with changing needs and circumstances. Without this, services get out of sync with what's needed, and incurring costs that are not fit for purpose and which therefore represent waste.

Every physical product and every service is made up of a combination of materials, energy inputs and human labour (both skills and time). But it is efficient use of data that brings these elements together efficiently and effectively. **Like the musical score and conductor in an orchestra, data is the orchestrator of wealth creation** (as long as it is reliable and/or surprising).

Some services, such as medical diagnoses, are very information intensive. Others, such as supermarket supply chains (that use thousands of lorries to transport millions of items to stores and homes every day), are materials intensive. But in both cases, they are data-driven, depending on the availability of the right reliable data at the right time. A supermarket cannot distribute its goods to the right places at the right times if it doesn't know which items are needed in which stores, when.

Successful service delivery is all about operational logistics - delivering the right service to the right person at the right time. But **operational logistics depend on a higher-order capability of *information logistics*: of getting the right data to and from the right places at the right time.**

Today, **in a data enriched world, economic value is pivoting increasingly around the ability to enhance the information logistics side of things: improving the planning, matching, connecting, organising, coordination and administration that *all* services depend on.**

This is true of *every step* of every service, but especially so in services that deal with individuals. No matter what the service is, if it is dealing with an individual, certain key steps become unavoidable. They include:

- Identifying who the individual is when they seek to access a service
- Onboarding them to the service, collecting the right details about them
- Deciding whether they are eligible to receive a particular service and/or matching their particular needs and circumstances to what the service provider can offer.

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- Planning and organising the service's delivery, including assembling the information and physical components needed to deliver the service (e.g. knowing where to send an item, when).
- Actually delivering this service: core operations.
- Being able to identify individuals when they return at a later stage.
- Undertaking all associated administration and record-keeping.
- Resulting customer service e.g. processes for handling a problem if something goes wrong.

All these steps are data-based and data-driven with different data points being needed at different steps along the way.

In this sense, the data that lies 'inside' every service is like the physical components that constitute a physical product. To make a product like a kettle you need the right components, such as a container for the water and a heating element, put together in the right way. If one of the components is missing or faulty, or if they are not put together in the right way, the product is not fit for purpose, and the time, energy and materials that went into its making are wasted.

The same is true for data driven services. To deliver a parcel you need to know what time to deliver it, when and where. If one of these bits of information is missing or faulty, or if they are not brought together at the right time, the service is not fit for purpose and the time, energy and materials that go into its delivery will be wasted.

Efficient production and delivery of both physical products and services depend on the same underlying logic of logistics: being able to assemble exactly the *right* components together in the right places at the right times. **These logistics capabilities are key to productivity** - enabling the efficient use of resources while stripping out the duplicated and unnecessary effort, delays, frustrations and friction, risks and errors that multiply if the right components are *not* brought together in the right ways at the right times.

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A structural logjam at the heart of the system

Thanks to technological breakthroughs, society's ability to generate, store and distribute data has grown by more than a million-fold over the half century - by far the biggest capability leap in history. But now this enormous technological potential has hit an institutional barrier: the organisation-centric database.

Today's approach to data collection and use revolves around organisations collecting, holding and using the data they need for their own purposes in their own proprietary data silo, which no-one else can access. **This One User, One Use (OUOU) data model forms a deeply embedded, structural and architectural barrier to the data sharing that's needed for data's many potential uses to be realised. It is a design flaw at the heart of the system,** that both restricts potential uses of data and systematically excludes citizens from participating in the workings of the data economy. (It turns citizens into organisations' 'data subjects', which is how European data protection regulation laws refer to them).

Managing the shift from a One User, One Use (OUOU) data system to a **MUMU (Many Users, Many Uses)** system is now a central imperative of economic strategy. The question is, how?

Many people think the answer is obvious. Extrapolating from the assumptions upon which the current status quo is built, they believe there is a simple solution to the challenge of increased data sharing: 'simply enable and/or require organisations to share data about individuals with each other!'.

Nothing could be further from the truth. As such a system of organisation-to-organisation data sharing scales, it generates an insurmountable, unavoidable data security, interoperability, governance, trust and cost catastrophe that generates multiple risks and costs while blocking multiple opportunities.

The risks and costs include:

- **Data security**, as each organisation has to open its systems up to other organisations, thereby also opening up multiple vectors for cyber attack
- **Interoperability**, as each organisation has to become expert not only in its own software, formats and systems but in every other organisations systems too

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- **Governance**, as each time an organisation is asked to share data with another organisation it has to ask and check questions like 'has the individual really requested this transfer?; can we prove the individual has consented?; are we sure the data is being shared with a *bona fide* organisation?'
- **Trust** as individuals' data gets dispersed across an increasing number of organisations and they lose track of who has access to what data for what purposes.
- **Cost**, as organisations have to invest time, money and resources addressing all these issues.

The blocked opportunities include:

- tackling the extreme and damaging concentrations of power and wealth that come with concentrating data in a small number of organisations' hands
- tackling citizen exclusion, the ways in which the current system excludes individuals from participating in the workings of the data economy
- the many so-far unexplored opportunities for innovation that arise when individuals are able to collect and use their own data for their own personal and domestic purposes.

Another way forward is needed.

Why is personal data different?

Earlier, we talked about how the data components that lie at the heart of service delivery are similar to the physical components that go into the production of a physical product. But data components are not the same as a physical component in some crucial ways.

- Unlike physical objects, huge amounts of data can be moved large distances in the blink of an eye.
- Unlike other traditional materials, data is a human-made resource. It is not extracted from the planet but is endlessly *created* and re-created by humans in the things that they do. (This becomes important when we consider data's contribution to the creation of a net-zero carbon economy: see below).
- Unlike physical items, data doesn't get 'used up' when it is used. The same piece of data can be used by many different parties for many different purposes on many different occasions.

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To unleash data's full potential, it therefore needs to be made available to different parties, to do different things, at different times. This MUMU (Many Users, Many Uses) internal logic of data puts it at loggerheads with the way our current data system is organised.

With personal data the differences grow even bigger. **By definition, personal data relates to a person. It cannot therefore, ever be separated from issues relating to human rights and to relationships** - relationships between the people who the data relates to and those using the data.

This shatters purely economic/contractual perspectives on data that attempt to treat it as just another commodity to be traded in markets for money and profit.

It is why companies that collect and use personal data do not own it, legally speaking. Companies may hold this data and treat it *as if* they owned it. But they do not. Executives in these companies may *want* to own it, They may even *feel* they own it. But it is not theirs to do what they like with.

The fact that **personal data is not a tradeable commodity** - that it brings with it issues relating to human rights and relationships - creates a legal and institutional challenge. Many organisations try to put personal data into a purely contractual box. If an individual signs a contract giving an organisation the right to treat data as a tradeable commodity then, they hope, the problem is solved. But it is not, especially at a system level.

At a system level, attempts to treat personal data as 'just another commodity' create an endless, energy sapping, cost creating, trust undermining 'either/or' battle between privacy protection versus organisations' use of personal data for innovation and growth.

For personal data's economic potential to be unleashed this logjam has to be broken. We need infrastructure that enables safe, easy, privacy-protecting data sharing. And this infrastructure needs an institutional framework that builds recognition of human rights and relationships into the way it works.

Personal data stores do this, turning an 'either/or' into an 'and', with organisations populating individuals' personal data stores with their data, not as part of some contractual negotiation, but as part of a mutually beneficial service relationship.

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What personal data stores do

Building on this institutional foundation, personal data stores transform the economics of data use by undertaking three functions. They act as:

- A 'bucket' where individuals can safely and easily store structured data about themselves independently of organisations that collect data about them.
- A 'gate' or tap by which individuals can regulate what data flows into and out of their bucket, for example by giving consent for data to be deposited in their PDS by an organisation or shared with that organisation.
- A connecting 'pipe' that provides a means of delivering and collecting data from organisations that the individual has data sharing relationships with.

Technically and operationally, these different functions require different sets of considerations, infrastructure and skills. But for the purposes of this Paper, when we use the term 'personal data store' we mean a service, such as that provided by Mydex CIC, that combines all three functions. Appendix One provides a brief overview of how Mydex CIC's personal data logistics infrastructure works.

Economically speaking, personal data stores become pivotally important when they enable certain key activities by individuals. These include the ability to:

- obtain verified copies of data about themselves - data that has been 'minted' or checked by responsible organisations that have used this data for their own purposes.
- add other data that only they know - for example about their plans, goals and preferences and the contexts in which they are operating
- aggregate this data into one place under the individual's control (rather than it being dispersed across many different organisations).
- safely and easily share chosen bundles of this data with service providers, under the individual's control.
- publish anonymised profiles of themselves, making these profiles available to inspection by service providers for the purposes of matching their services to individuals' needs and circumstances.

Separately and together, **these are transformational innovations in the collection, handling and use of personal data that will act as the engine of the next economic breakthrough.**

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Where the savings come from

At first glance, many people can not see how or why empowering citizens with their data should trigger an economic revolution. This is especially the case if they frame issues relating to personal data solely in terms of issues like privacy, data protection and human rights.

These are critical issues. As we have just seen, because personal data always relates to a living human being, any viable way forward has to address them in a way that protects and advances citizen rights. But it also needs to deliver practical economic benefits. Here ‘s how.

Friction, effort, risk and cost everywhere

Current service provision is blighted by multiple levels of institutionalised waste. By ‘institutionalised’, we mean that the waste is so deeply embedded into how things currently work that nobody stops to question them, or is even aware that they represent waste. They are just how things work. Business as usual.

Indeed, very often people believe that the time and effort they invest in dealing with the problems created by this institutionalised waste actually adds value. After all, isn’t addressing a problem a way of adding value? The answer is “No”. **If the problem is avoidable in the first place, then any effort invested in fixing this problem is an** *additional* **form of waste that** *compounds* **the problem.**

To see the extent of the institutionalised waste embedded into our current system, consider a typical local or central government service such as provision of a benefit.

Most of those eligible for this benefit won’t know it even exists, so service providers have to invest time and effort advertising and promoting it. On hearing about the service, the individual now has a small mountain to climb. They need to:

- find out how to access the service. This includes discovering who to go to, what forms they need filling in, using what information.
- get hold of this information (about their circumstances, income etc), use it to populate the form and send it in: more time and effort.
- prove that the information they have provided is valid and correct (that they are not a fraudster).

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Often the barriers to completing the process become so high for individuals that they drop out, failing to complete the form or failing to provide adequate evidence that their claims are valid. Result: low levels of service take and high costs of service provision.

On receiving the form, the service provider then has to:

- add the information to its systems (perhaps manually)
- check whether the claims made by the individual are indeed true. This may involve paying a third party information provider such as a credit reference agency.
- make a decision as to whether the individual is indeed eligible for the service in question
- undertake the process of actually delivering it.

At many points along this journey, the service provider may need to refer back to the individual, or to another party, to fill an information gap or check a data point. The resulting process may take months to complete, involving many hours of effort by both the individual and staff.

Figure 1 maps just a portion of the administrative steps that, until very recently, individuals and service providers (Government and energy companies) needed to go through to provide an individual with a warm home discount. It can take months to complete the process at a cost for service providers of between £150 and £200 per application. That ignores time, stress and money spent by individuals. (No wonder the Government is changing the process.)

The bottom part of Figure 1 shows an alternative process which uses a new ingredient within the process: a cryptographically secure token by which the Department of Work and Pensions confirms that an individual has been deemed eligible for universal credit. This is called a 'verified attribute' or credential. If, on applying for their warm home discount, the individual can present a verified attribute that confirms they are eligible for universal credit, **virtually all of the costs can be eliminated. The resulting cost reductions can be as high as 90%.**

The more verified attributes that individuals can store in their personal data stores and present to service providers when needed, the **more costs are stripped out of the workings of the system.**

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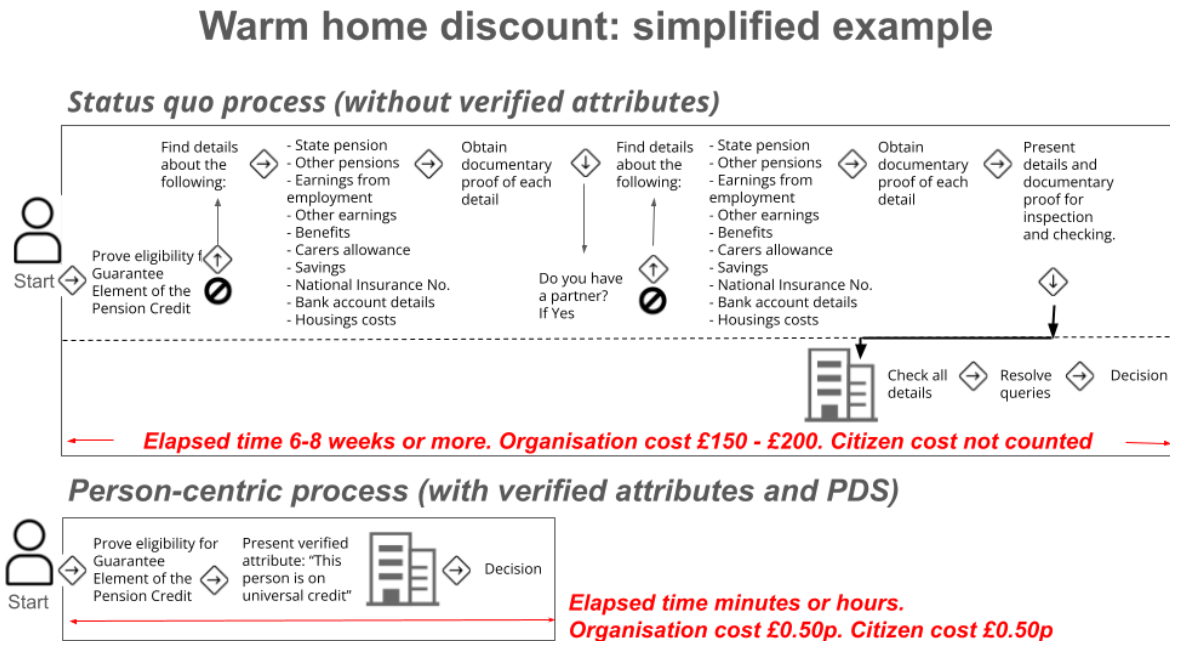

Figure 1: How verified attributes can streamline a previously complex process

Recent (2013) research into central government transactions by the UK Government Digital Service (GDS) illustrates the scale of this opportunity. GDS identified 1.54 billion transactions dealing with individuals a year, covering 772 services. The administrative costs of these transactions was estimated at £6.7bn.

For example, there were:

- 1.8 million applications for job seekers allowance with each application costing £71 to process, creating total costs of £219 million.
- 870,000 applications for employment and support allowances. These cost £223 per application to process, creating total costs of £194m.

GDS's commentary on these processes highlight the friction, effort, risk and cost that is endemic within them. On employment and support allowances, it says

> "New claims involve several interactions with the applicant and third parties,such as medical professionals, to, for example, arrange and undertake medicals, assemble evidence to validate identity and eligibility in line with benefit regulations and fraud avoidance strategies, issue NI numbers if the applicant does not have one, and deal with any appeals against the decisions made."

Maintaining a service can be as expensive as dealing with a new one. The GDS comment on job seekers' allowance says:

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> "Maintaining claims involves many interactions, including contacts about changes of circumstances or compliance checks that could affect eligibility, the investigation of potential fraud and error, and appeals against decisions made. It also includes the making of payments and any queries about non-receipt."

The figures cited by GDS are also a dramatic under-estimate given that:

- GDS could only obtain cost data on one-fifth of transactions: the real figure could be *five times higher*.
- GDS figures ignore all costs incurred by citizens when making applications.

Form-filling sits at the heart of the problem. Both Government and citizens (especially those in most need) are being overwhelmed by forms. Currently, nearly 8,500 forms are published on the government website Gov.UK. GDS admits that many of them are "either very difficult or impossible to fill out for users", especially those with certain disabilities. Over 400 new forms have been added in the last year.

By enabling the easy, safe, efficient sharing of verified attributes **the new personal data logistics infrastructure helps eliminate these forms, representing a way to tackle mountains of institutionalised waste**, dramatically boosting productivity as it does so.

Henry Ford's productivity revolution updated

While this particular infrastructure is new, the economic principles it applies are well established, tried and tested. **The same economic principles transformed the workings of western economies in the 20th century with the invention of mass production.**

With his moving assembly line, Henry Ford revolutionised the production of motor cars, reducing the cost of car production by over 90%. His breakthrough spread very quickly to the manufacture of virtually every other physical item, transforming society and creating the modern 'consumer economy' as it did so.

Ford's breakthrough came by eliminating the institutionalised waste embedded within traditional processes of craft production. In the craft approach each item is made individually and is therefore unique and different (even if only slightly). When it comes to making a complex machine such as a motor car, this meant each item had to be reworked to fit snugly into the assembled product. *Most of the cost of*

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making the machine went into a) the costs of this re-work and b) the costs of movement: getting the right parts to the right places.

Henry Ford's standardised parts (designed so they didn't need re-working when being assembled) and his moving assembly lines (which ensured that the right part was ready to be added at the right time to the right machine) stripped out the many layers of cost that were previously embedded into business as usual. It was this that let Ford multiply the number of cars that could be made in a day by a factor of ten.

The personal data logistics made possible by personal data stores **apply exactly the same principles to the collection and use of personal data**. It does this by enabling individuals to collect copies of data generated about them by organisations, to hold this data safely in their personal data store, and to forward this data to other service providers as and when needed.

- 'Verified attributes' (details about individuals that have been generated or checked by a responsible organisation) are the information age equivalents of Henry Ford's standardised parts. They can simply 'snap' in to a production process. Individuals' ability to bring rich bundles of pre-verified, reliable data with them to services means that providers no longer have to generate, collect or check this data. This eliminates the re-work that currently takes place at a vast scale when each organisation separately processes data.
- The personal data store acts as a moving assembly line, enabling the right data to move to and from the right person or organisation at the right times. As just-in-time data distribution hubs, personal data stores respond to demand so that the right data points can be combined to meet any need.

Together, these are the essential ingredients of a far reaching economic revolution with profound consequences.

A matter of system design

Ford's initial productivity revolution was delivered by one firm using one, single vast production facility - the famous River Rouge site. The data revolution differs to Ford's revolution in this respect. It cannot be achieved by any one separate service provider acting alone, no matter how big or powerful. This is because it is generated by a new layer of infrastructure that connects organisations within a data sharing network.

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This infrastructure operates independently of each organisation, *outside* of each organisations' boundaries and in the interstices *between* organisations, where each organisation becomes a node in the network.

The blockages caused by the organisation-centric nature of today's system are not the 'fault' of these organisations. Such blockages are natural and inevitable by-products of the system's design - its siloed nature. By the same token, it's not possible for any one, particular organisation to solve this problem on its own, just as it's not possible for a car stuck in a traffic jam to resolve the jam.

By empowering individuals with their own data, and enabling them to safely and easily share their data with any and all service providers, new personal data store infrastructure **changes the structure of the system itself.**

The scale of the opportunity

Just how big is the resulting opportunity?

The GDS figures above provide a glimpse of its scale. But in reality, they only scratch the surface. That's because the productivity breakthrough made possible by the personal data store applies to every core step of every service, from identifying individuals to planning and delivering the uniquely configured services that fit their particular needs.

These potential benefits apply across every major service sector in the public, private and third sectors including financial services (banking, insurance, etc) health and social care, education, public administration (in both central and local government), charities and the third sector, retail, transport, leisure, media and entertainment.

They also apply to every individual and every household using these services. And, because data orchestrates the physical aspects of service delivery, **these productivity savings extend far beyond the costs of data processing itself to the physical processes organised by this data**. It thus reaches into every part of the economy, just like energy, which goes into every product and activity.

As millions of people are currently discovering, when the cost of energy goes up it doesn't only impact energy bills, it affects the prices of everything else.

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With personal data **our society has the opportunity to slash the costs not only of data processing itself, but of every service that depends on data for its delivery.**

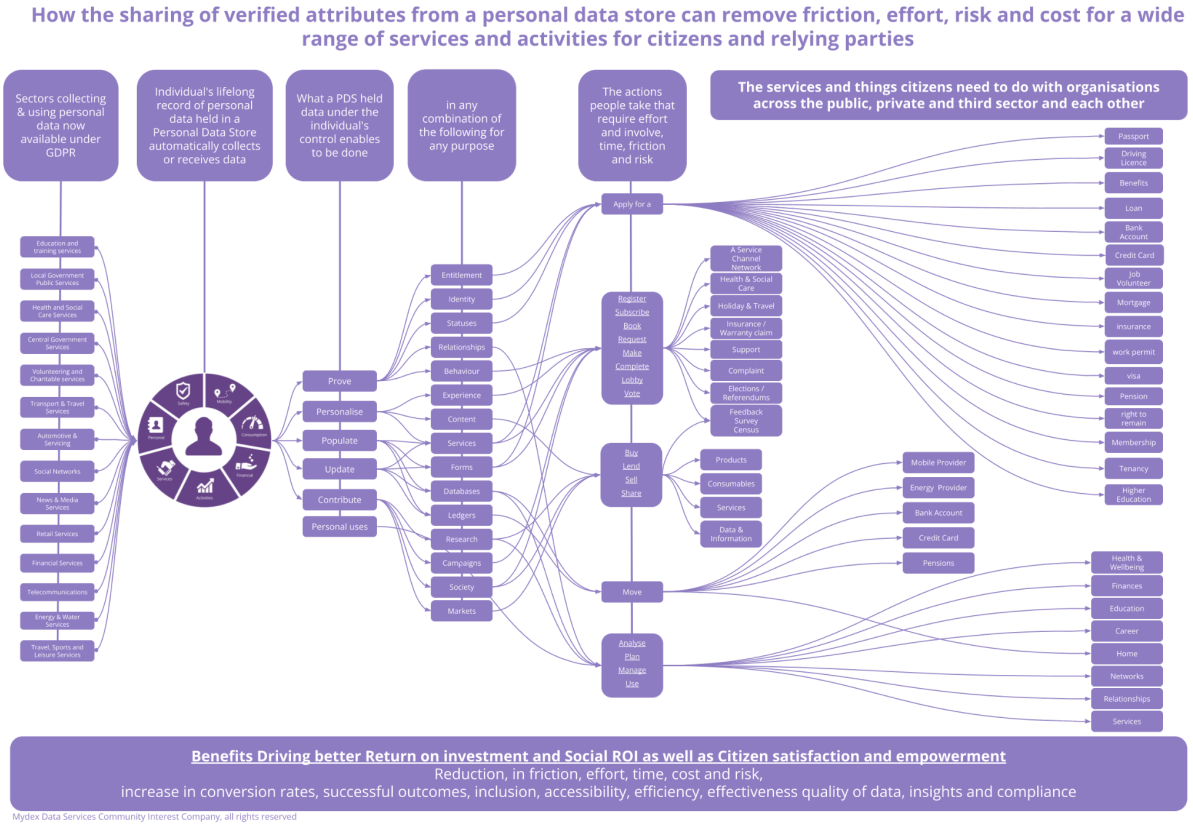

Figure 2 Mapping the potential uses of personal data logistics infrastructure

Figure 2 sums up the scale and reach of the opportunity, showing the industry sectors affected along with the corporate and personal activities affected, the purposes pursued and the aspects of individuals' lives affected. Henry Ford's productivity revolution that transformed the making of things. With the personal data store, **this productivity revolution can be extended to services**. **The personal data store takes the 20th century productivity revolution into the parts that the industrial age failed to reach.**

PART TWO

Where the opportunities lie

Part Two Summary

New citizen empowering personal data logistics infrastructure is ready to enable an era-defining, economy-wide, carbon-reducing, wellbeing-promoting breakthrough in service productivity, quality and innovation.

This breakthrough is already being felt, and will increasingly be felt, in seven vast economic spheres, each of which are impossible to reach within today's organisation-centric data system. They are:

1. **Dramatic reductions in the operational costs of service provision**. Most of these savings arise from services' ability to use pre-verified data to eliminate duplication of effort, automate processes and reduce errors, delays and guesswork. Result: better quality services at much lower cost.
2. **Producing truly joined up, integrated services at much lower cost**. Data sharing capabilities bring down barriers between separate organisations' data silos enabling seamless integration of activities.

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3. **Dramatic reductions in service providers' finding and connecting costs** - the costs they incur when seeking to find and reach the right people for the particular services that they have to offer.
4. **A personal and household productivity revolution** with individuals experiencing greatly reduced time, effort and hassle when trying to access and use services. (This is key to tackling social exclusion).
5. **New avenues of low-carbon job-creating innovation**, using new-to-the-world personal data assets that come from aggregating data about individuals in one place under their control.
6. **Accelerating and enriching the journey to a zero-carbon economy**: using a human-made renewable resource (data) to digitise physical previously physical processes such as paper forms, to reduce carbon-emitting waste from service delivery processes, and to develop new 'carbon concierge' services that help households reduce their carbon footprint.
7. **Turbocharging research** by greatly reducing the cost of accessing much richer data, via the personal data store's ability to combine data from many different sources.

These breakthroughs are made possible via three core capabilities that the organisation-centric database blocks:

- The safe, easy, efficient sharing of the right data, to and from people and organisations at the right times
- Enabling individuals to become the point of integration of their own data. Instead of their data being dispersed across hundreds of different, separate organisational silos, this data can be brought together to create a full picture of an individual. This complete 'single view' of the individual is key to improving the relevance of each and every service, and acts as a springboard of new research-driven insights and service innovation.
- Enabling individuals to collect and use their own data for their own personal and domestic uses which is, in itself, a further springboard for new avenues of innovation.

We expand on each of these breakthroughs below.

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1 Revolutionising the productivity of service provision

In today's world forms are ubiquitous. To access a service, a form has to be filled in. And each time a form is filled in, time, money and effort are wasted - because most of the time filling in forms is no longer necessary.

Forms impose costs every step of the way. Time and effort finding the data required. Time and effort entering the information. Time and effort on the other side gathering the data, storing it, processing it. Time and effort spent checking to see if the data that has been entered is correct. Delays caused by the need to check. Costs incurred by the checking process. Time and effort spent dealing with gaps in the information. Time and effort spent dealing with errors. Time and effort spent inputting into records. And so on.

The GDS figures cited above show just how high these costs are: running into billions of pounds. Table 2 highlights the main areas of waste generated by failures to access the right, reliable data at the right time - failures that are the norm in current systems.

Costs generated by poor data logistics
Data logistics = "The right data at the right place at the right time"

Problem	Details	Effects
'Right data'		
Wrong data	Leads to wrong actions. Resources spent and wasted doing the wrong things. More resources spent fixing the mistake.	Delay Wasted effort
Data not complete	Task cannot be completed. Extra effort needed to find and access the missing data	Delay Extra effort
Data not complete	Organisation resorts to guesswork (often disguised to seem sophisticated e.g. 'propensity modelling'), and acts on guesses instead of facts	Wasted effort

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Costs generated by poor data logistics Data logistics = "The right data at the right place at the right time"		
Data not reliable	Effort imposed on individuals, asked to prove data is reliable. Time, effort and money spent checking data with third parties	Delay Extra effort
'Right time'		
Wrong time	Effort spent handling/processing data when not needed. Data as inventory: time and effort spent searching for and accessing data stored for when it might be needed	Wasted effort
Data not available	Task cannot be completed. Time and effort spent chasing for missing data.	Delay Wasted effort
'Right place'		
Data not available at the right place	Data held in separate silos forces duplication of effort, as the same data needs to be regenerated or recollected. Extra time and effort spent looking for and accessing data that is already held by other parties.	Delay Wasted effort

Table 2: Examples of unnecessary costs and waste generated by poor data logistics

When individuals are able to bring pre-verified data with them to service relationships all of the above sources of wasted time, effort and cost can be eliminated. Processes that once took weeks can now take minutes. Better services can be delivered at much lower cost.

Not all these benefits may be realised immediately. Completing a process in minutes requires that *all* data be pre-verified in advance. It will take time to get to that state. [1]

[1] Table 2 focuses on just one data point. But in data-driven services, data points work like Russian dolls - with one data point nested inside another, inside another, and so on. Take the example of an individual claiming a warm home discount. To do so, they need to prove some 'simple' facts about themselves: either that they get the Guarantee Element of the Pension Credit benefit, or that they are on a low income. Each one of these is a single data point in the warm home discount eligibility-checking process.

However, arriving at this single data point requires the presentation and proof of many other data points. For example, to get the Guarantee Element of the Pension Credit, the applicant has to provide evidence of their state pension, any other pensions, earnings from employment and self-employment, other benefits such as Carers' Allowance, savings and investments (which break down into multiple other data points), National Insurance number, bank account details, and details of any housing costs (such as a mortgage,

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The other side of the coin is that as each new data point gets pre-verified and held in an individual's personal data store it cuts another slice of costs out, building momentum as the data gets richer.

Cost savings will vary depending on the nature of the process, how many data points are needed to complete it, how many of these data points have been pre-verified, and how many knock-on actions depend on the process. But **the potential cost savings rise to as high as 90%.**

2 Creating truly joined up services

The organisation-centric database is designed to keep data inside the organisation, safe and sound, to be used by the organisation for its own purposes. It is designed *not* to share data. This means that, in effect, it is designed to *stop* the data sharing that is needed for seamless integration of services between different silos.

But peoples' lives are not divided into organisation-centric silos. To get useful financial advice for example, the financial advisor will need to access data from many different service providers. These may include savings, debts, investments and pensions, physical assets owned (like a home), income from employment benefits and pensions, the individual's life circumstances (whether they are living alone, are in care or acting as a carer, have dependents), and so on.

Most of the costs of providing financial advice go into accessing the data, not in the actual advice itself.

Joined up service delivery requires similar cross-silo integration.

- In health and social care, patients are routinely frustrated and sometimes enraged a) by the fact they have to tell the same basic story many times over to different specialist service providers and b) that the services then provided are fragmented and not joined up.
- In transport, different systems operate without reference to each other, leaving travellers struggling to make efficient connections.

interest payments or service charges). And, if the person has a partner, the same details need to be applied for that partner - which takes the total number of data points that might be needed to 20 or more.

It will take time for the new personal data logistics infrastructure to reach this degree of comprehensiveness.

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- Bringing together data about daily activity, exercise and diet is key to staying fit and healthy and avoiding obesity.
- Combining data about educational qualifications, work experiences and personal goals is essential to effective career planning.

Such **person-centric services are either very expensive or impossible to build within an organisation-centric data architecture**. Take consent - a universal element of all data-driven service provision. Under the current architecture, each individual has to deal with each organisation separately and individually.

The costs this imposes on individuals are eye-wateringly huge. If an individual wants to manage consents with every organisation that has collected data about them, within the current set-up they have to:

- Remember every single organisation they have ever shared data with
- Separately navigate their way to each organisation's system/app/website and log in (remembering their passwords as they do so)
- Navigate their way to each organisation's 'my account' service
- Find out (if they can) what data the organisation holds about them and what purposes this data is being used for
- Read and understand each organisation's privacy policy and terms and conditions
- Work out how to seek changes if desired
- Navigate their way to the appropriate section of the system/app/website to make these changes (which may be very difficult to do)
- Fill in the appropriate forms
- Follow up if necessary

The costs this imposes are so high that most people avoid them ... by not bothering. This lack of action is then taken as 'evidence' that 'there is no demand' for individuals to exercise such control; that they 'don't care' about privacy, and so on. (see Evidence traps below).

This is not only true with consent. With individuals' data dispersed across multiple organisations each operating to their own agendas, and with multiple technical, strategic and other barriers to data sharing, delivering integrated services is so expensive and difficult that it hardly ever happens. And when it does, the usual outcome is both poor quality experiences and outcomes for users.

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Personal data stores lift the above hurdles and barriers by either eliminating them or automating them. They automatically store every consent and permission in one place, in the individual's consent management dashboard, along with a consent receipt detailing what data is being shared for what purposes. They enable individuals to see and manage them all, from this one place by pressing a button (to revoke consent, for example).

By putting the individual at the heart of the process, personal data store-based data sharing infrastructure means data can flow to where it needs to go when it needs to, safely and at low cost. Result: high quality experiences and outcomes *plus* reduced costs of service provision.

In doing so, they also conjure new services such as 'consent management' into existence, apparently out of thin air. In reality however, demand for such services has always existed but was suppressed by excessively high costs, just as demand for 'search' was suppressed until Google found a way of making it quick, simple and easy. At this point, the personal and household productivity benefits unleashed by personal data stores start creating entirely new sectors of the economy.

3 Transforming 'matching and connecting'

To survive, prosper and fulfil their functions, service providers need to find, connect with and deal with those people who are most suited to their services. This is true whether it's a private sector firm seeking to sell a product through marketing and advertising or a public or third sector service trying to find and serve the people who most need their services.

The other side of the coin is that individuals and households need to find, connect with and deal with service providers best fitted for the services they want and need.

Both sides often incur heavy costs doing this. Indeed, **often the costs and inefficiencies are so high that the connections are never made**: firms fail to sell their products because they can't find and reach the right customers. Public and third sector service providers fail to reach the people who most need what they have to offer. Individuals and households fail to find the products and services that best suit their needs. The poor data logistics embedded into the design of our current system means that, when it comes to 'matching' and 'connecting', all parties experience high costs for less-than-satisfactory outcomes.

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Because this issue is dispersed, intangible and institutionalised most people underestimate just how big it is. The McKinsey Institute has estimated that 50% of all economic activity now revolves around 'interaction costs', defined as "the searching, coordinating and monitoring that people and firms do when they exchange goods, services or ideas". This estimate excludes the costs of 'non-interactive' information processing. Economists John Wallis and Douglass North estimate that 45% of all US economic activity is now absorbed by 'transaction costs', defined similarly to McKinsey's interaction costs.

Over the past decade, most of the big digital platforms, including Facebook and Google in marketing and advertising, Amazon, Uber, AirBnb and elsewhere, have based their success on the ability to reduce the matching and connecting costs experienced by buyers and sellers. But **the person-centric data revolution takes this opportunity to another level.**

By enabling individuals to publish anonymised profiles of themselves, service providers can search these profiles for the characteristics of the people that best fit what they have to offer, and to reach out to these individuals - all in a way that protects their data and identity. Individuals don't have to go searching. The right offers come to them, and they only share data if and when they want to engage.

A hundred years ago, 75% of all economic costs were devoted to 'making' with just 25% devoted to matching and connecting. As 'making' became far more efficient (thanks to the productivity revolution described above), and as matching and connecting became ever more complex, the relative costs shifted to today's 50/50 split.

With new citizen-empowering data logistics infrastructure, it is now possible to take the relative weights of 'making' and 'matching and connecting' back to where we were 100 years ago, to refocus resources on the production of goods and services of value. This is a truly seismic shift.

4 Improving personal and household productivity

There are two sides to every service: the service provider and the service user. Points 1, 2 and 3 above only look at half the picture - the service provider's side of the story. But all the benefits described above pertain as much to citizens and households as they do service providers, thereby **doubling the impact**.

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To access any service we, as individuals, have to fit into every different service provider's different ways of undertaking the above tasks. In doing so, we have to find, present and prove details about ourselves so that the service provider can move from one step of the process to the next. Which means that, for every step of every service, the costs of delivering / accessing and using the service are duplicated on the citizen's side of the process.

Modern accounting systems do not measure these costs because they lie beyond organisations' boundaries. So they are usually ignored. This is a big mistake. Personal and household costs may not be measured, but household costs and benefits are the dark matter of markets and industries, shaping them, directing their evolution.

Henry Ford's productivity revolution is a good example. It made dozens of new household products available and affordable - not only motor cars but washing machines, fridges, vacuum cleaners, kettles, radios, TVs, microwaves, computers and so on. These products transformed household productivity. The washing machine saved (mostly) women seven hours of labour a week. Central heating removed six hours a week shovelling coal and dust. Fridges helped people reduce time spent shopping along with food waste.

In doing so, the product and productivity revolution transformed peoples' lives and created new industries - and millions of new jobs as it did so.

The mass production revolution took the machine out of the factory and made it available as a tool, in the hands of individuals and households as well as producers. The personal data revolution is doing the same for personal data: taking data out of the organisation and domesticating and democratising it, turning it into a tool in the hands of individuals and households, enabling them to transform their own lives and productivity.

When the dark matter of personal and household 'convenience' and productivity shift, society and the economy shift with it. With personal data, a new shift is underway.

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5 Opening up new dimensions of innovation

Under the architecture of today's data system, individuals' data is dispersed across the hundreds of separate, different organisations that collect data about them, With each organisation jealousy guarding the data it has collected, the data can never be brought together to create a rich, rounded picture of that individual (without creating horrendous privacy problems).

This is a fundamental design flaw that eats away, day after day, at the heart of the system, making it *structurally* impossible for anyone to create a complete, holistic data picture of the individual. And if they try to, they create huge privacy invasions.

Personal data stores lift this constraint. **By enabling individuals to aggregate data about themselves safely and privately in their personal data store, they can now build a rich, rounded data picture of their lives.**

By making individuals the natural points of integration of data about themselves, personal data stores create a new-to-the-world person-centric data asset that has been the dream of corporate innovators for decades - the mythical 'single view' of the customer. Mythical, that is, until now.

This citizen-empowering data asset, puts individuals at the heart of all data-driven activities and acts as a sort of stem cell for all future service provision. Sharing this richer, more complete data sits at the heart of all the breakthroughs described above. But it also goes one step further, opening up new, previously impossible dimensions of innovation and economic development: tools and services designed to enable and empower people in their lives, to help them make better decisions and manage their lives better, including managing their dealings with services.

Building on the personal data-enabled revolution in service productivity, the ability to join-up previously separated service elements at low cost, to transform the costs of matching and connecting along with personal and household productivity breakthroughs, the new citizen-empowering person-centric, 'single view' personal data asset makes something else possible - the creation of entirely new industry sectors.

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Citizens are often disparagingly called 'consumers', as if their only role (aside from also being 'workers') is to passively consume the outputs that organisations present to them. Both terms 'consumer' and 'worker' define human beings in terms of their relationship to an organisation. They are expressions of today's dominant organisation-centric ideology, showing how deeply embedded and all-pervading organisation-centric assumptions are.

But **human beings are not only 'consumers' and 'workers'. They are the purpose of all economic activity** - which is to sustainably improve and enrich human lives. **Economically speaking, citizens are not only 'consumer' and 'workers' they are the most important *producers* of all - the creators and makers of human lives.**

New person-centric 'single view' data assets enable a transformation of the 'making' of human lives by informing decision-making and implementation across everything people have to deal with: their homes, health, skills, knowledge and employment, financial affairs, hobbies and interests, mobility, and lots more.

The consumer goods revolution domesticated and democratised the machine, making it a tool for individuals. The personal data store-enabled information services revolution domesticates and democratises personal data, turning it into a tool in the hands of individuals and households. This will create entirely new services and industries that help individuals and households make their lives better.

6 Enabling the shift to zero carbon

Data is a human-made infinitely renewable resource. It is not extracted from the earth. but generated by humans in the activities they undertake. Building on this, the personal data revolution aids the shift to a zero-carbon economy at many levels.

First, it helps digitise physical and paper processes (like sending paper by post or travelling to an office to present a paper document). In doing so, it directly helps cut the carbon costs of administrative activities.

Second, as explained above, ***improved* data logistics is the key to improved physical logistics - eliminating unnecessary carbon-emitting activities by better, more accurate planning and coordination.** A parcel that is sent to the wrong place because of a data error produces carbon emissions entirely unnecessarily. Improved data logistics act as the tip of the iceberg for more efficient, less-carbon emitting physical activities.

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Third, **the data revolution is shifting the epicentre of economic activity from how to use sources of energy to transform and move material things, to how to make better decisions and implement these decisions more efficiently and effectively.** This is a seismic shift in focus that is essential for a net zero economy.

Finally, personal data stores will help deliver mass scale citizen behaviour change via 'carbon concierge' services: services that help each individual understand the unique carbon footprint of the things they buy and do, and to identify ways to eliminate or substitute high-carbon activities for low or negative carbon activities.

But **personal data stores have an even deeper contribution to make**. Many visions of the net-zero, carbon reducing economy are surprisingly conservative and myopic. They do not look beyond reducing total energy consumption and replacing fossil fuels renewable sources of energy.

A future net-zero economy could be an impoverished economy that produces less and consumes less. Or it could be a prosperous one where people have good jobs in new low and non-carbon emitting industries.

Personal data logistics does not itself provide a renewable energy source, but it is a natural partner to the renewables industry, helping it to address the parts of the changes in energy supply alone it cannot reach: the epoch-defining, economy-wide, carbon-reducing, wellbeing-promoting breakthrough in service productivity, quality and innovation that we need so desperately.

7. Turbocharging research

Personal data logistics can also turbocharge data-driven research. According to the National Audit Office 60-80% of researchers' time is spent cleaning and merging data: **the biggest obstacle to doing more, better research is the costs of accessing and processing the data it needs.**

Currently, many crazy schemes are being mooted to help address this issue by Governments and academics - most of them involving the need to ride roughshod over individuals' rights to privacy and data protection. But the more individuals can aggregate data about themselves from multiple sources, the more they can bring this data with them, not only to service relationships but to researchers too.

The data logistics functions of the personal data store, along with its processes for anonymised matching and connecting, creates opportunities for researchers to slash the costs of acquiring their data while improving its quality and richness.

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PART THREE

Hidden in Plain Sight - Why?

Part Three Summary

While the economic opportunities opened up by the personal data store are both immense and immediate, most policy makers, politicians, investors, grant makers, business decision-makers, think tanks, commentators have so far failed to see them. **The opportunities have been 'hidden in plain sight' because people have not known where to look or what to look for.**

Instead, prevailing mental models of data have induced most people to look in other directions: directions that deepen and extend existing organisation-centric ways of doing things. The three most common mental models are:

- **The 'privacy/innovation' trade-off,** which assumes that there always has been and always will be a trade off between organisations' ability to collect the data they need to innovate and the protection of individuals' data and privacy. **Both sides of the argument - privacy campaigners and would-be innovators - agree on the fundamental premise of the trade-off, which has been rendered false by the personal data store. Now it is possible to unleash innovation while *enhancing* privacy.**

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- **The corporate data monetisation agenda** assumes that the value of personal data lies in organisations being able to make money from it, either directly by selling or renting it, or indirectly by using it to inform innovation. But as this Paper has shown, the biggest opportunities lie elsewhere entirely - in sharing data to take costs out of the system, without any money ever changing hands. **The big opportunity in personal data lies in productivity, not monetisation**.
- **A financial/economic view of the world** frames all economic activities in terms of firms producing products to sell in markets to make money and profits. But **the opportunities identified in this Paper are first and foremost operation, not financial**: in *sharing* data to improve *processes* for *both* individuals and service providers to reduce costs.

Together these three mental models have (so far) rendered the biggest economic opportunity for generations invisible. Their attention-diverting effect has been reinforced by three additional 'evidence' traps.

- When making policies, policy-makers naturally want to emulate the most obvious examples of success. So they have looked to dominant digital platforms like **Google and Facebook, which are just the steam engines of the data age.** These firms demonstrate - spectacularly - that far-reaching change is possible. But they don't represent the future.
- When making policies, policy-makers also seek evidence that there is a demand for a particular change to take place. But **when demand is suffocated by structural barriers and prohibitive costs, evidence of demand is also suffocated.** This has happened many times before, in the early days of computers, mobile phones and SMS messaging for example.
- Quite rightly, policy makers seek to make policies on the basis of evidence backed by metrics which measure costs versus benefits. But sometimes **the metrics they rely on miss what really matters** - as happened with carbon emissions whose costs and effects were ignored for decades. The same is true of personal data, where the costs and benefits are best measured in terms of time and effort rather than money, and via processes which cut across silos - where the costs of activities get buried in aggregate money numbers, or ignored because they lie outside of organisations' boundaries.

Sometimes, when something new happens, to see its significance you have to know where to look. That is what this White Paper does: show where to look.

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The gorilla in our midst

If the opportunities mapped by this White Paper are so big, why isn't everyone chasing after them? Why are they (currently) being ignored?

The psychological phenomenon of selective attention explains how such things happen. To see selective attention at work, take a look at this video. It is footage of a famous psychology experiment where people are asked to count the number of times the people in white shirts pass the basketball. They get so involved in counting the passes of the ball that they don't even notice when a person dressed up as a gorilla walks right through the middle.

Personal data logistics is the gorilla in our midst. Its economic opportunities have not been noticed because policy makers, politicians, investors, entrepreneurs and commentators (including academics, think tanks and the media) have been busy counting balls in a different game. They have focused their attention elsewhere.

Three mental models that render the opportunity invisible

Three interlinked mental models about data and value have conspired to render the personal data opportunity invisible in plain sight.

The privacy vs growth trade-off

The first of these mental models is the assumed trade off between privacy and data protection versus innovation and growth.

Two great opposing camps - of privacy campaigners and (supposed) proponents of innovation and growth - have coalesced around this assumed trade off, which goes something like this.

> "Data is needed to create the insights that drive improved and innovative services. The more data there is to analyse, the better the insights will be. Organisations are the bodies that collect and use personal data in this way, so the more personal data they can collect, the better it will be for innovation and the growth that comes from innovation.

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> "However, the more data these organisations collect, the more they get to know about individuals and their lives. This creates risks of abuse and generates privacy concerns.
>
> "Therefore, the central challenge going forward is how to manage this trade-off and find the right balance between these two unavoidably conflicting demands."

This trade-off mentality is almost universal, forming the foundation of the UK Government's National Data Strategy for example. It is entirely misconceived.

Personal data stores enable vast amounts of rich data about individuals to be amassed, but because this data remains under the control of the individual, independently and separately to organisations collecting data, it presents no threat to privacy (as long as security issues are addressed comprehensively). Innovators can access this data if they can demonstrate honesty, integrity and value that will convince the individual to give consent for their data's use. **The personal data store enables both innovation and privacy to advance together, hand in hand.**

The supposed trade-off between privacy and innovation currently represents an insurmountable barrier to realising the full social and economic benefits of personal data. But **that's what all great breakthroughs do - lift previously insurmountable barriers to improvement.** And that is what the new personal data logistics infrastructure does.

The financial/economic lens

The corporate monetisation lens is itself part of a bigger mental model about how modern economies work. This mental model goes something like this:

> "Economic value is produced by firms producing products which they sell in competitive markets for money, in order to generate a profit."

Building on this theory, countless different research and innovation exercises have focused on questions such as 'what is the 'value' of personal data?' (meaning 'how to put a price on it?), and 'how to create a market for personal data?'. **Because they are based on flawed premises, these initiatives are doomed to fail.**

Worse than that, however, the vision they create blocks peoples' ability to see where the real opportunities lie. Organised as it is around certain foundational concepts - firms, products, markets, money, profits - this supposed 'economic' does not see

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things that don't fit these concepts, including the real economic potential of personal data.

This potential revolves around:

- multiple stakeholders within healthy ecosystem (not just firms with customers)
- better processes (not just better products)
- the organisation and administration of these processes (not just markets)
- cost savings (not just money revenues)
- shared benefits from service relationships (not just corporate profits measured in money terms)
- positive social and economic externalities (not just private profits)

Personal data doesn't respect the assumptions of today's mainstream economic theories. It blows them apart, taking us to places that they do not reach.

Appendix Two: 'Why economics misses the economic potential of personal data' expands on this theme.

The corporate monetisation lens

A closely related, opportunity-stifling mental model is that of corporate monetisation. This narrative goes something like this.

> "By definition, it is by firms seeking to make profits that value-creating economy-growing economic activities take place. Firms make profits by selling things at a margin. Therefore, the way to unlock the value of personal data is to help firms earn a margin on data, either directly renting or selling data they have collected, or selling services (such as advertising targeting) that are based on this data."

Once this mental model has been adopted, it naturally generates its own agenda: how to put a price on data; how to build markets for data, how to enable organisations to access ever more data; and (returning to the first mental model) how to manage the resulting conflict between citizen desires for privacy and data protection and the requirements of innovation and growth.

But as above, this agenda misses the economic point of personal data logistics entirely.

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Data and 'insight'

The data insight theory is closely related to the corporate monetisation agenda. It goes like this:

> "Organisations (especially profit-oriented private sector firms) create economic value by analysing the data they collect to generate insights, which they use to innovate new products and services. This drives economic growth. Bigger sets of data generate bigger insights - and therefore bigger innovations. Therefore, everything should be done to help corporate researchers get their hands on as much data as possible."

There is an element of truth in this argument. The 'surprise' aspect of data means that it can indeed provide us with insights we've never had before. But it is a very small element of truth used to promote risky and often-harmful agendas .

- Most of the 'insights' organisations need to do their jobs well do not require the creation of vast agglomerations of data. When services ask people to fill in a form to access a service, they are gathering 'surprises' - new information which changes and determines decisions and actions. **Only a very small proportion of the 'insights' that drive everyday operational efficiencies and innovation are generated by Big Data.**
- **No matter how great the insights that researchers might glean from data, for them to have any economic value they need to be acted on. And Big Data does not actually act on anything**. When it comes to actually providing services based on new insights we need fit-for-purpose data logistics infrastructure, without which the services won't be provided.
- As we've seen, without the right infrastructure the costs of assembling and using personal data for research purposes are currently prohibitively high. **To work efficiently, Big Data needs the new infrastructure we talk about in this Paper**. Big Data and data logistics are not an 'either/or' but an 'and'. But most discussion about Big Data proceeds on the assumption that it is the only game in town.
- The more BIg Data operators collect data about identifiable individuals the more their operations turn into intrusive surveillance and privacy invasion on a vast, industrial scale.

The real reason why the supposed benefits of Big Data insights are being pushed so hard is because they support a corporate agenda: one which justifies and promotes the ever great concentration of data power in a small

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number of large corporations' hands. **It is public relations spin for what is now being called the surveillance capitalism and the surveillance state.**

The model introduced in this White Paper is very different. It goes like this:

> "Providing efficient high quality services to individuals requires efficient data logistics: the ability to get the right data to and from the right people at the right times. Current data structures, where data is locked inside different organisations' separate databases block this opportunity.
>
> "By enabling individuals to collect copies of data that organisations hold about them in their personal data stores, and by enabling them to bring this data with them to service relationships, personal data stores can cut costs and improve outcomes for both citizens and service providers in a way that enhances individuals' privacy and access. In addition, by enabling data about an individual to be aggregated in their personal data store, the same infrastructure creates a new-to-the-world person-centric data asset that will drive future innovation and growth".

Figure 3 summarises the key differences between these two mental models.

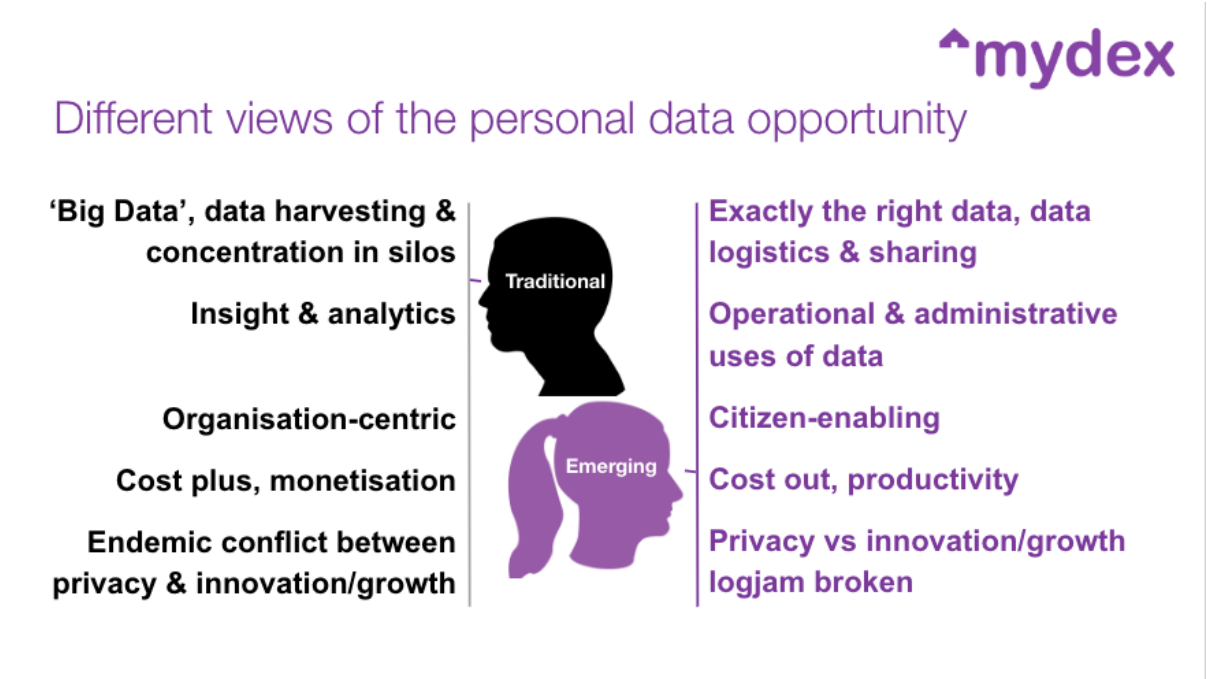

Figure 3: What you see depends on what you are looking for. Different perspectives on personal data opportunities generate different issues and priorities.

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Instead of focusing on organisations' collection and use of ever more data, the citizen-empowering person-centric approach focuses on enabling citizen and organisational access to exactly the right data at the right time.

It's in the nature of selective attention that if you look only to the left (as the person with the traditional mindset in Figure 3 is doing), it is not possible to see what is happening to the right. That is how the debate about personal data has unfolded over the last decades: looking only to the left, never to the right.

Implications for investment

The above discussion has far-reaching implications for investment: **if investors are operating under the markets/profits mindset just discussed, they will not focus on the real economic opportunities opened up by personal data**. This is compounded by the fact that investors are focused on 'returns' which are determined by the proportion of the value that the organisation they invest in can deliver back to them - by the amount of value that they can capture for themselves.

With data - especially personal data - this creates a big problem, highlighted by a 2018 UK Treasury paper the Economic Value of Data. This paper noted that:

> "Data can generate positive externalities. This means that while data can reveal new findings and insights if it is aggregated, linked and analysed, the benefits might not be directly foreseeable and may not always accrue to the data creator or controller. As a result, valuable data may be under-exploited or under-shared."

This is precisely the investment problem now faced in personal data: that traditional **investors are not prepared to invest in capabilities and infrastructure that will bring huge beneficial 'results outside' - benefits that they cannot capture in the form of financial returns for themselves.**

This is not a new phenomenon. Back in the early 20th century the American economist **Thorstein Veblen, wrote about such refusals to invest in economically beneficial opportunities calling it *sabotage*:** "the deliberate, although entirely legal, practice of peaceful restriction, delay, withdrawal, or obstruction used to secure some special advantage or preference".

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This is a profound institutional challenge created by the personal data logistics revolution: **the need for new types of investment that focus not on financial return to investors, but to economic benefits that can be shared and realised across the entire economy.**

The result is **a structural logjam, with traditional sources of investment refusing to invest in something that could transform the workings of the entire economy**. Many initiatives, including 'social investment' and national investment banks have been set up to address this problem. But they routinely fall into exactly the same trap.

This in turn, compounds what has become an 'evidence' logjam. If investors refuse to invest in an opportunity, the opportunity cannot be realised. Without this opportunity being realised, 'evidence' that it is an opportunity is not created … which 'proves' there is no point in investing in it. This vicious circle is one of the evidence traps currently rendering the personal data opportunity invisible to many peoples.

'Evidence' traps

Emulating success

Faced with new and confusing technologies and developments, economic actors naturally look to examples where it seems to be working: where there is the greatest evidence of success. The logic of this focus is perfectly understandable: "if these companies have managed to work out the 'secrets of success' perhaps we can identify what these secrets are, so we can replicate, apply and extend them".That being the case, people have looked to platforms like Google and Facebook. But in this case, the natural instinct is flawed.

Back in the early 1920s, the steam locomotive the Flying Scotsman was the subject of worldwide awe, astonishment and admiration. Its immense power enabled it to take passengers all the way from Kings Cross to Edinburgh, non-stop, in less than seven and a half hours, shaving more than three hours off the previous fastest journey time. It was living proof of the power of steam. It was 'evidence'.

But, despite the awe and spectacle it created, the steam-powered Flying Scotsman wasn't ushering in the future. It would soon be replaced by the electric locomotive.

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Platforms like Google and Facebook are the steam engines of the information age. Despite their unquestionable achievements, they do not represent the future. They represent a dead-end. They are limited in the data they can collect (how many people would share their health or financial data with Google or Facebook?). They are limited in the additional value they can add, and they are limited in the trust they can build. They are already plateauing.

Just as steam engines were replaced by better, more efficient alternatives, so data harvesting, data hoarding, data-monetising platforms will be replaced by personal data store-enabled services that offer greater efficiency, richer data and higher levels of trust.

The 'evidence' that conventional wisdom relies upon today is not a reliable pointer to the future.

Non-barking dogs

In a famous story, the fictional sleuth Sherlock Holmes solves a mystery by noticing something that didn't happen. A dog that didn't bark.

It is very hard for humans to notice things that are not happening. Their senses and minds are wired only to notice things that happen. **Before something new exists, there is nothing happening for humans to notice. There is no 'evidence' of its power or potential.** This is the case with all big economic transformations, including the moving assembly line and electricity national grids. They remained non-barking dogs until some pioneers began to wake them up.

As we've seen with investment, vicious circles are created in this way: not enough 'evidence' means no investment, which in turn means not enough 'evidence'. The resulting paralysis could go on forever, unless some way is found to get the dogs barking.

Metrics

The first working computer, ENIAC, was a clunky affair. More than half of its power usage went into either heating or cooling its vacuum tubes. 17% of the time spent working on it was spent on set-up, 41% on trouble-shooting and fixing problems, with only 5% of the time actually using it to do calculations. About two hours a week.

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But at least those working on it had this information. Yes, they had detailed financial records on total costs and amounts paid to each individual working on the project. But this financial information didn't give them any idea as to *how* to make their computer work better.

Money measures treat production and everything needed to improve productivity as a black box whose inner workings are impenetrable. So-called 'cost saving' exercises that are conducted in purely financial terms look at line items on spreadsheets without asking or knowing how the real costs of getting stuff done could be brought down. Money numbers do not tell us what the engineers knew about ENIAC: power usage on heating and cooling, set-up time, troubleshooting time, and so on.

Instead, money-based measures of cost add another level of obfuscation by being department based. Instead of following a process from its very beginning (say, a patient, from presenting themselves to a doctor to their final cure), costs are broken down into separate specialist siloed administrative units. These departmental budgets bundle dozens or hundreds of different activities together (with each process treated like a black box) so that, if one of them manages to cut its costs by 50%, it might show up in a departmental cost saving of 0.05% - buried within the hundred other tasks the department is overseeing. As such it becomes easy to dismiss. The true potential of a 50% productivity improvement is lost from view.

Such metrics myopia - treating money as the only reality that matters while ignoring the actual operational costs of time, energy and materials in day-to-day processes - is a perfect way of *not* seeing the potential of breakthrough productivity improvements, even when they are staring the decision-maker straight in the face.

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Conclusion

This Paper identifies immense personal, social and economic opportunities that could be opened up by the introduction of new citizen-empowering personal data logistics infrastructure, especially when it enables easy, safe sharing of verified attributes (details about individuals) that have already been checked by responsible organisations. Enabling this data sharing can:

- unleash a productivity breakthrough (especially in information-intensive public services)
- improve services outcomes such as quality and timeliness
- trigger an explosion of innovation in previously untouched territories (especially the spaces in between today's existing data silos).

In doing so, it also:

- Rectifies imbalances of power and reward that follow from the excessive concentration of personal data in a few large corporations' hands
- Rebuilds societal trust in how personal data is collected and used
- Advances progress towards a zero-emission circular economy

For this opportunity to be seized, it first has to be seen and, as this Paper explains, current conventional wisdoms about personal data make it difficult for policy makers to do so.

The strangeness of the new

Such oversights and blindspots are common when it comes to new technologies. In the early days of virtually every transformational innovation, people have struggled to comprehend its potential and implications. For example:

- In the early days of the motor car, most bets were on steam cars or electric cars. The internal combustion engine was a third also-ran.
- Radio was first touted as a one-to-one medium, to communicate with ships at sea.
- The telephone was touted as a mass medium with early users listening to music concerts via their phones.

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- The first commercial use for electricity was for electric chairs (not a good advertisement to subsequent users!).
- The pioneers of early aviation ruled out passenger flight as an opportunity. Aeroplanes were for post, they said. Passengers would never risk flying.
- The Internet was first developed as a means of connecting remote terminals to large, expensive mainframe computers, so that users could share time on the big centralised machine.

Today, by placing personal data issues into a 'privacy and data protection' box, seeing it only in financial terms, or getting fixated on 'insights' people are failing to see the immense opportunities it presents for productivity, service quality and rich innovation.

A once in generation opportunity

Governments are now being offered the ability to make breakthrough improvements in productivity: to radically reduce the cost of providing public services while, at the same time, developing assets that will feed society-wide innovation and growth for decades to come.

The infrastructure enabling this breakthrough has already been built, by Mydex CIC, over the past 15 years. Roll-out of this infrastructure does not require huge, high-risk investment in a state-run 'green field' IT monolith that will take decades to implement and billions of £, $ and €. Quite the opposite, it can be implemented in an incremental way, in a succession of low-risk, low-cost initiatives that bring immediate benefits.

As an additional layer of connecting infrastructure, it does not require organisations to overhaul their internal systems - it simply requires them to connect. The design principles for the resulting ecosystem have already been worked through and laid out in a separate White Paper.

Governments, institutions and organisations are being handed the opportunity for cost-saving transformation on a plate. The opportunity is there, now, ready and waiting to be seized. All we need to do now is to see it.

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Appendix 1: How Mydex personal data logistics infrastructure works

Figures 4 and 5 show how the new infrastructure works. Organisations deposit points of data that they have generated, collected and checked about individuals in their personal data store. Each such personal data store is individually encrypted with only the individual holding that key. This means instead of creating a new centralised database the new infrastructure is dispersing control over this personal data directly to the individuals whose data it is.

Economically speaking, the most important data points that organisations deposit are 'verified attributes' - information about an individual (such as whether they have passed an exam or eligible to access a service) that has been thoroughly checked and confirmed by a responsible organisation. These verified attributes are cryptographcially secure, which means they cannot be tampered with.

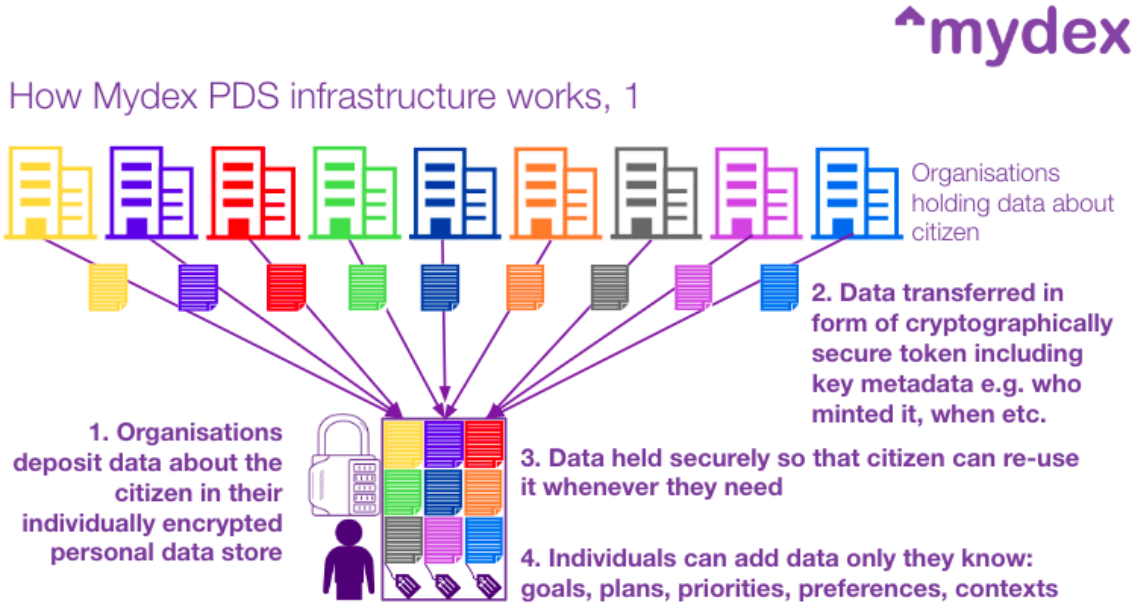

Figure 4: Step One of the Mydex personal data logistics process

Once the data is deposited in the individual's personal data store it is held there, safe and secure, ready to be used by that individual whenever they need it. Individuals can also add other information about themselves. Especially valuable is information that only they know, such as their personal goals, changing priorities and preferences, and the contexts in which they are making decisions.

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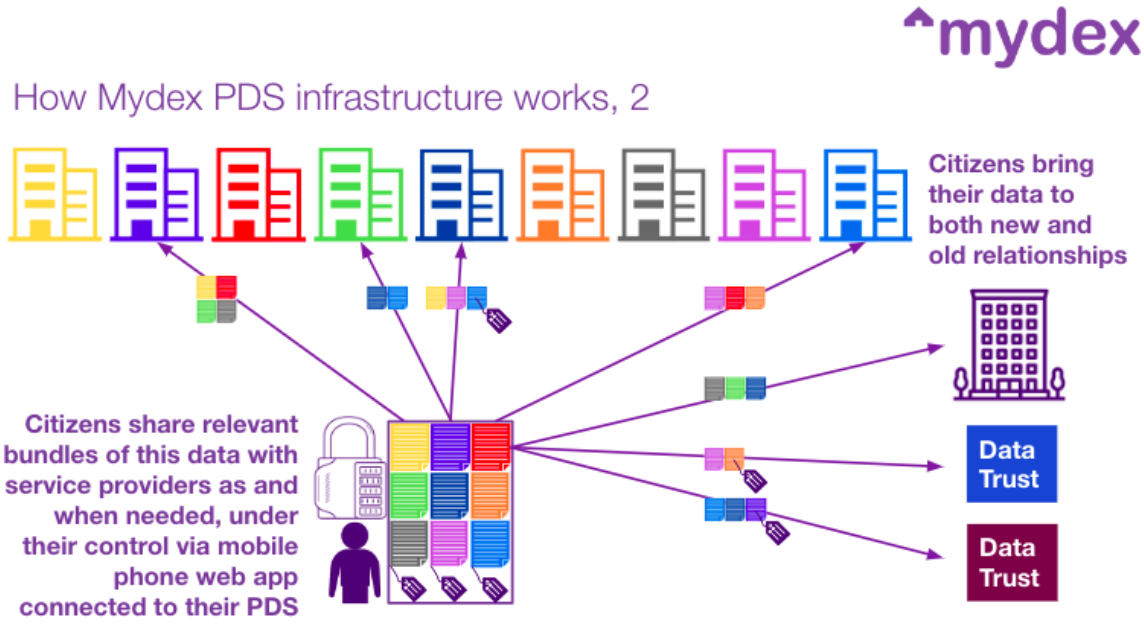

Figure 5: Step Two of the Mydex personal data logistics process

When the individual starts dealing with a new service, either from the same organisation or from an entirely new one, that service will ask for the bundle of data that is needed for the delivery of that specific service.

With data already deposited in the individual's personal data store, the individual can immediately send it, at the stroke of a key, press of a button or touch of a screen. And if it takes the form of a secure verified attribute, the organisation receiving this data can confidently use it, without having to regenerate it, recollect it or check it. Data held in individuals' personal data stores is kept up to date via API links with the organisations that hold the original data.

This means that individuals can bring ready-to-use data with them to *all* their service relationships. It is this that eliminates layer upon layer of friction, effort, risk and costs from the workings of the data economy as a whole.

Over time, the more data that is deposited in the individual's personal data store, the richer and more rounded it becomes - creating the best possible up-to-date, accurate picture of that person and their life. The richer this data set, the more uses it has, and the greater its ability to cut costs when shared - always under the control of the individual whose data it is.

Legally enforceable data sharing agreements ensure that individuals' data is safe by default, with organisations having to sign legally binding agreements to respect individuals privacy and data when they sign up to connect to the platform.

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Appendix 2: Why 'economics' misses the economic potential of personal data

Modern economic theory is not a theory of value creation or production. It is a theory of *price* as was neatly summed up by one its great pioneers. Lionel Robbins. This is what he wrote in his 1930s "*Essay on the Nature and Significance of Economic Science*" .

> "Whatever Economics is concerned with, it is *not* concerned with the causes of material welfare as such [*his emphasis*]. The services of an opera singer are wealth but economics deals [only] with the pricing of these services."

Robbins was building on the work of his predecessor Alfred Marshall who defined economics as the study of 'economic goods' where 'economics goods' are:

> "those things, external to a man, which (i) belong to him, and do not belong equally to his neighbours, and therefore are distinctly his; and which (ii) are directly capable of a money measure."

But personal data fits none of these requirements.

- It is not 'external to a man'. It is intimately connected to the person (which is why, with personal data, human rights and economics can never be neatly separated)
- It does not 'belong to him' while not belonging equally to others. It is shared, by its very nature. The data held in an individual's bank account for example is both the individual's and the bank's (in their own ways).
- It is not always 'directly capable of a money measure'. Sometimes it is, if sold in a market. But as we've seen, this vision of data's value misses almost all of its potential value. In none of the opportunities described above is data traded for or measured by money.

In this context, a theory of economics focused on 'the pricing of services' becomes more or less irrelevant. Personal data is taking us to places that mainstream economic theories do not reach. To realise its potential we have to look beyond the Product, Firm, Market, Money and Profit assumptions it is organised around.

This challenge to current economic assumptions goes deep.

Product

Personal data is *not* a commodity that can be bought and sold like any other. For a start, it pertains to a *person* who isn't a commodity to be bought and sold like any other.

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By definition, personal data relates to a person. It cannot therefore, ever be separated from issues relating to human rights and to considerations of the relationships between people using the data. The only way to make personal data a commodity to be bought and sold in markets like any other commodity, to make people a commodity - to make them slaves in other words.

While the markets/profits mindset focuses on 'products' that can be sold in markets for money, what the new personal data ecosystem requires is *capabilities* that build recognition of human rights and management of relationships into how data is handled. This is the citizen-empowering *infrastructure* we talk about in this Paper.

Firm

The markets/profits mindset places almost exclusive emphasis on the profit-seeking, shareholder-value-maximising private enterprise that seeks to make and sell products for a profit. But profit-seeking firms are just one of many potential users of personal data, and they represent just one of many ways to bring human beings together to coordinate their activities and efforts for mutual benefit.

People - individuals, citizens - are also potential uses of personal data. But the organisation-centric mindset renders them invisible as *users* of data. Other organisations in the public and third sectors are also users of personal data.

The trustworthy collection, sharing and use of personal data doesn't just require firms. It requires *institutions* that set and enforce the rules that build and maintain trust.

Markets

Despite what many people believe, markets are not the engine of wealth creation. Markets can only sell things that have already been made. As Adam Smith showed with his pin factory, *production* is, always has been, and always will be the engine of wealth creation. Prosperity is made possible by the ability to produce goods and services that are valuable: by *production* and the *productivity* of that production. That is what this White Paper is focused on.

A second, related myth is that markets are where value is created because this is where people make money. This, too, is nonsense. Firms like Apple and Samsung may compete in a market to sell mobile phones. But the value of these phones is not created by 'the market'. It is created inside these organisations via the detailed processes of planning, organisation, coordination and administration that enable them to make these phones in the first place. A market may be a place where a firm captures the financial value of what it has produced, but it is not where or how this place value is created in the first place.

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The personal data revolution we talk about in this Paper is about wealth creation, not exchanging wealth that has already been created in markets. The processes of actually creating wealth involve planning, organisation, coordination and administration. The personal data logistics infrastructure discussed in this Paper helps make these processes more efficient and effective than was previously possible.

Money

In the systems of data sharing we talk about above, no money changes hands for the data and no price is put on the data being shared. Data is shared as part of service relationships. The focus is on what the data can be used for, and how to access and use it as efficiently and effectively as possible. Realising this value does not require a price to be put in the data, because it is not being sold in a market. It does, however, require a deep understanding of what the data can actually be used for.

Large money savings arise from better ways of sharing and using personal data. But these savings arise as a by-product of better processes, not by selling data for money. To achieve them, we have to create the right processes, not create the right 'markets'.

That is why, when we talk about 'cost' in this Paper we do not mean money costs but real world costs:

- **Time** spent**:** minutes and hours that represent a portion of a human being's life that they will never get back.
- **Energy** Is measured in kilowatts and calories (and, crucially, carbon emissions).
- **Material** costs representing physical things taken from the earth that cannot be replaced once they are taken.

As explained in Metrics above, it is only by understanding real world costs - where they come from, how to eliminate them from day to day operations - that real world productivity improvements can be made.

Profit

According to the markets/profits mindset the goal and purpose of economic activity is to make a profit by selling a product at a margin, which brings in more money than costs. But no 'profits' are made in our model, because nothing is being sold for money. Instead, huge economic *value* is generated by cutting costs and improving quality.

This raises a knock-on question: are profits 'good' or 'bad'? The markets/profits mindset says profits are 'good' because how much profit an enterprise makes is *the* measure of its economic success. This, too, is nonsense.

'Profit' is a measure of how much money a stakeholder can lay claim to. But this has nothing to do with how much value is being created.

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If an insurance company acts as a front for a mafia protection racket while another helps customers prevent and cover the damage of fires, the fact that the mafia front is more profitable does not make it more economically valuable than the company that provides a genuine service. The great management theorist Peter Drucker once said:

> "Results in an organisation are always on the outside … The result of a hospital is a cured patient who can go back home. The results of the school or university are graduates who put to work what they have learned in their own life and work. The results of an army … are deterring a war or winning it."

You could go on. The results of a car producer is the improved mobility of the people who use its cars. The results of a grocery chain is customers' easy access to the food they need.

The real results or economic contribution of any enterprise is therefore how efficient and effective it is at achieving benefits which are *external to itself* (which, invariably, are not measured in money but in outcomes). This is about *purposes* achieved efficiently and effectively, not profit. It is these (real) results (rather than profits) that this Paper has focused on.

Table 3 below summarises the main difference between the markets/profits mindset and the perspective of this White Paper: what is needed to unleash the full potential personal data. Far from being *the* way to achieve innovation and growth, when applied to personal data the markets/profits is just another mental block - where the real opportunities deflate and die.

The markets/profits mindset as a mental block	
What it sees	**What it fails to address**
Product	Capabilities, infrastructure
Firm	People, organisations, institutions
Markets, monetary exchange	Production, administration, sharing
Money, margin	Use value, efficiency
Profit, margins	Productivity, reductions in Friction, Effort, Risk and Cost (FERC), Trust, Relationships

Table 3: Personal data blows the assumptions of mainstream economics apart

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So far in this discussion we have talked a lot about cost but we haven't mentioned money. There is a good reason for this. For the purposes of this Paper when we use words like 'economic', 'productivity' and 'cost' we are talking about the real world operations and activities which have their own metrics, *not money*.

- **Time** is measured in minutes and hours that represent a portion of a human being's life that they will never get back.
- **Energy** Is measured in kilowatts and calories (and, crucially, carbon emissions).
- **Material** costs represent physical things taken from the earth that cannot be replaced once they are taken.

Productivity advances when less time, energy and materials are used to produce the same or better outcomes. When (and if) these time, energy and materials costs are paid for using money, the *result* is financial savings. But this result only happens if what we do in the real world of time, energy and materials has changed for the better. **Financial savings made by 'making cuts' or fiddling with budgets may result in less being done with less. But without changing how work gets done they can** *never***, in themselves, enable *more* to be done with less.** In this Paper we are focused on the how of productivity improvement, knowing that this is the only way to achieve positive financial results.

The currency of productivity is life - what happens in the real world of time, energy and materials. By improving lives we can save money. But attempts to 'save money' without working out how to improve lives achieves very little.

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