

Making Personal Data Portability More Effective in the Digital Economy: Is there a Need for Personal Information Management Systems and the Blockchain?“

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Focused on portability of **personal data** in **online markets**

1. The EU legal framework on data portability (in brief)
2. Data Transfer Project
3. Economic aspects of data portability
4. Data Portability and the blockchain?

Data Portability means **one-way** data transfer from one data controller to another data controller on the **explicit request** of the data subject

The EU legal framework on data portability in brief

	Personal data	Non-personal data
Horizontal	<ul style="list-style-type: none">• GDPR (2016)• Competition law	<ul style="list-style-type: none">• DCD (2019) in B2C• FFDR (2018) in B2B• Competition law
Sector-Specific	<ul style="list-style-type: none">• Financial: PSD2 (2015) & UK Open Banking (2016)• Automotive: Motor Vehicle Regulation (2018)• Energy: Electricity Directive (2019)	

Scope and Limits of Data Portability under Art. 20 GDPR

Scope of data covered

- *Volunteered Data*
Data actively and knowingly provided by the data subject such as name, age, email address, likes;
- *Observed Data*
Data provided by the data subject by virtue of the use of the service or the device, such as search history, traffic and localisation data, the heartbeat tracked by a wearable device → limits are not very clear
- Not(!) *Inferred Data*

Some limitations

- Data processing must be based on consent and be carried out by automated means
- No specific data format required („common, machine-readable“)
- Up to one month to comply with request (without undue delay)
- Legal uncertainty when rights of others are affected (e.g. tagged photos)
- Data minimisation vs. data portability

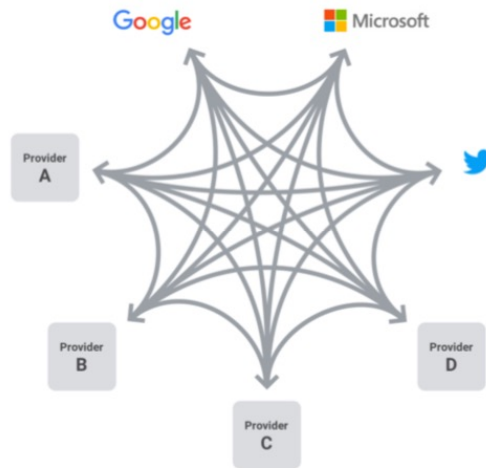
Agenda



1. The EU legal framework on data portability
- 2. Data Transfer Project**
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4. Data portabilty and the lockchain?

Krämer, Senellart & de Streef (2020), CERRE Policy Report

Open source software project to facilitate data portability with marquee developers



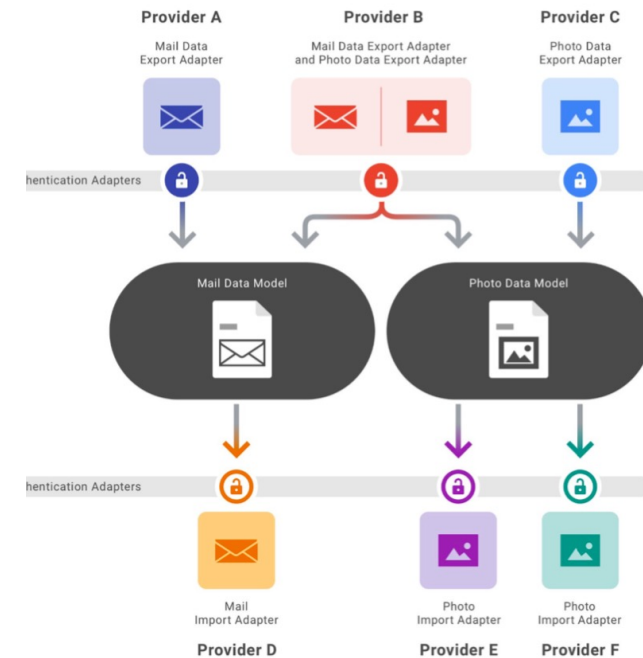
Without the DTP

Each provider has to build and maintain Adapters for every other provider's proprietary APIs and, potentially, data formats



With the DTP

Each provider only has to build and maintain an API that supports the DTP Data Models, which are based on standard formats where available



<https://datatransferproject.dev/>

DTP is still in its infancy, with Google being the main contributor. Overall very little progress has been made, given the supporting firms



DTP (GAFM)

- 44k of lines of code
- hundreds of forks

Tensorflow (Google)

- 2.5 million lines of code
- 80k forks

PyTorch (Facebook)

- 1 million lines of code
- 10k forks

Institution	Proportion of changes (commits)	Proportion of changes (source code lines)
Google	83,21 %	80,96 %
Facebook	10,05 %	3,26 %
Others	6,74 %	15,78 %

Very limited amount of import/export adapters available at DTP



master data-transfer-project / extensions / data-transfer / Go to file

seehamrun	Handle empty album names in the Smugmug Importer. (#981)	✓ 9614d54 8 days ago	History
..			
portability-data-transfer-backblaze	Switching gradle release publishing to maven central (#980)		last month
portability-data-transfer-deezer	Switching gradle release publishing to maven central (#980)		last month
portability-data-transfer-facebook	Switching gradle release publishing to maven central (#980)		last month
portability-data-transfer-flickr	Update FlickrPhotosImporter to use temp store as needed (#988)		8 days ago
portability-data-transfer-google	Switching gradle release publishing to maven central (#980)		last month
portability-data-transfer-imgur	Switching gradle release publishing to maven central (#980)		last month
portability-data-transfer-instagram	Switching gradle release publishing to maven central (#980)		last month
portability-data-transfer-koofr	Switching gradle release publishing to maven central (#980)		last month
portability-data-transfer-mastodon	Switching gradle release publishing to maven central (#980)		last month
portability-data-transfer-microsoft	Switching gradle release publishing to maven central (#980)		last month
portability-data-transfer-offline-demo	Switching gradle release publishing to maven central (#980)		last month
portability-data-transfer-rememberthemilk	Switching gradle release publishing to maven central (#980)		last month
portability-data-transfer-smugmug	Handle empty album names in the Smugmug Importer. (#981)		8 days ago
portability-data-transfer-solid	Switching gradle release publishing to maven central (#980)		last month
portability-data-transfer-spotify	Switching gradle release publishing to maven central (#980)		last month
portability-data-transfer-twitter	Switching gradle release publishing to maven central (#980)		last month

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Data use is non-rival, but data collection and data value generation are contested



- Data can be used without depleting it (non-rivalry)
- But data is excludable
- But data collection is contested
 - Although Lambrecht and Tucker (2015), Tucker (2019): Data is ubiquitous; everyone can collect it
 - Englehardt and Narayanan (2016), Ghostery (2017) : 70% of the websites employ Alphabet/Google trackers, and 30% employ Facebook trackers
 - Third party tracking made more difficult by Google and others due to recent “privacy concerns” (e.g., disabling browser cookies)
- But data value is contested
 - In the limit, only exclusive data has value to the data seller (Gu et al., 2019; Ichihashi, 2019)
 - Data sharing can lead to fierce competition and destroy investment incentives

Lambrecht, A. and Tucker, C.. Can Big Data Protect a Firm from Competition? (Dec. 18, 2015). Available at SSRN: <http://dx.doi.org/10.2139/ssrn.2705530>

Tucker, C. (2019). Digital data, platforms and the usual [antitrust] suspects: Network effects, switching costs, essential facility. *Review of Industrial Organization*, 54(4), 683-694.

Englehardt, S., & Narayanan, A. (2016, October). Online tracking: A 1-million-site measurement and analysis. In *Proceedings of the 2016 ACM SIGSAC conference on computer and communications security* (pp. 1388-1401).

Ghostery (2017): <https://www.ghostery.com/study/> and Macbeth, S. (2017). Tracking the Trackers: Analyzing the Global Tracking Landscape with GhostRank. Available at: [https://www.ghostery.com/wp-](https://www.ghostery.com/wp-content/themes/ghostery/images/campaigns/tracker-study/Ghostery_Study_-_Tracking_the_Trackers.pdf)

[content/themes/ghostery/images/campaigns/tracker-study/Ghostery_Study_-_Tracking_the_Trackers.pdf](https://www.ghostery.com/wp-content/themes/ghostery/images/campaigns/tracker-study/Ghostery_Study_-_Tracking_the_Trackers.pdf)

Financial Times (2020). ‘Cookie apocalypse’ forces profound changes in online advertising. Available at: <https://www.ft.com/content/169079b2-3ba1-11ea-b84f-a62c46f39bc2>

Ichihashi, S. (2019). Non-Competing Data Intermediaries (Jun. 29, 2019). Available at SSRN: <http://dx.doi.org/10.2139/ssrn.3310410>

Gu, Y., L. Madio, and C. Reggiani (2019). Data brokers co-opetition (Feb. 13, 2019). Available at SSRN <http://dx.doi.org/10.2139/ssrn.3308384>.

The economic literature on data portability is scant and there is a lack of empirical papers



Several game-theoretical papers exist, but empirical papers are scant

- Classic papers on switching costs and converters (Klemperer 1987; Caminal & Matutes, 1990; Farrell & Saloner, 1992)
- Wohlfarth (2019): Consumers surplus can be higher or lower (when entrant service is indeed better), but total surplus always increases with data portability
- Krämer & Stüdlein (2019): Incumbent discloses more data under portability; some consumers are worse off
- Lam & Liu (2020): Data portability can raise entry barriers, because consumers give more data to incumbent under portability
- Hidaji (2020): Data portability can reduce profitability and demand of entrants; consumers can be worse off

Some general themes

- With data portability consumers reveal more data to incumbent, because they do not feel locked in.
- Horizontal nature of regulation can benefit incumbents
- Incumbents react strategically to advent of data portability

Wohlfarth, M. (2019). Data Portability on the Internet. *Business & Information Systems Engineering*, 61(5), 551-574.

Krämer, J., & Stüdlein, N. (2019). Data portability, data disclosure and data-induced switching costs: Some unintended consequences of the General Data Protection Regulation. *Economics Letters*, 181, 99-103.

Lam, W. M. W., & Liu, X. (2020). Does data portability facilitate entry?. *International Journal of Industrial Organization*, 69, 102564.

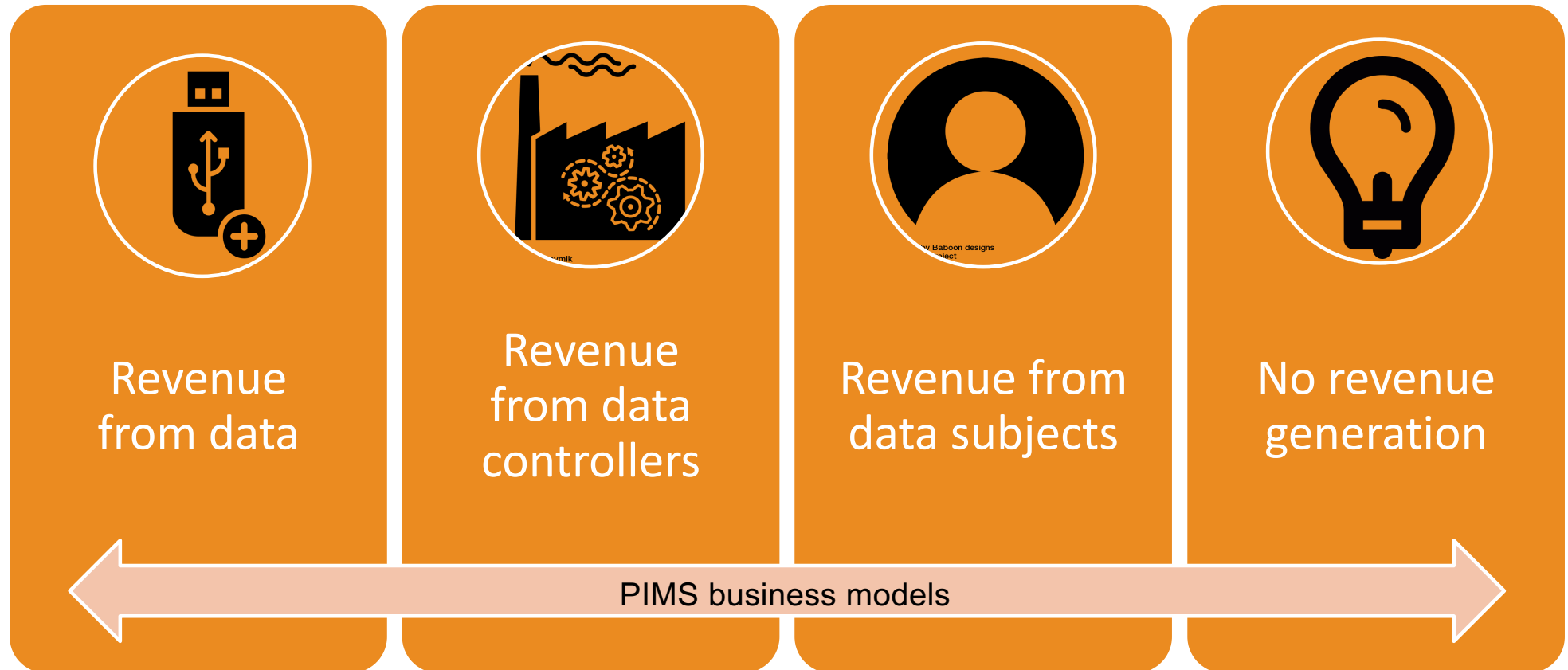
Hidaji, H. Take Out Your Data: Impact of the Right to Data Portability on Platform Competition. Available at: <http://www.teis-workshop.org/papers/2019/TakeYourDataWYouV3.pdf>

The Role of Personal Data Information Systems

- PIMS offer a centralized dashboard that facilitate user control over consented data flows
- Possible functionalities of PIMS include
 - Identity management: Authentication at various services
 - Permission management: Overview of data transactions and connections, including management of legal rights and consent
 - Service management: Linking various data sources
 - Value exchange: Accounting and capturing the value of data, including remuneration (personal data broker)
 - Data model management: Managing semantic conversions (schemas) from one data model to another
 - Personal data transfers: Implementing interfaces (APIs) for standardised and secure data exchange between various data sources and data recipients
 - Personal data storage: Storing data from various sources, including data generated directly at the PIMS.
 - Governance support: Ensuring compliance with legal frameworks
 - Logging and accountability: Keeping historic logs of any data access and exchange facilitated by the PIMS
- But lack of standards
- Is there a sustainable business model for PIMS?

<https://mydata.org>

Business Models for Personal Information Management Systems (PIMS) and their economic sustainability



Can PIMS generate revenue from data?



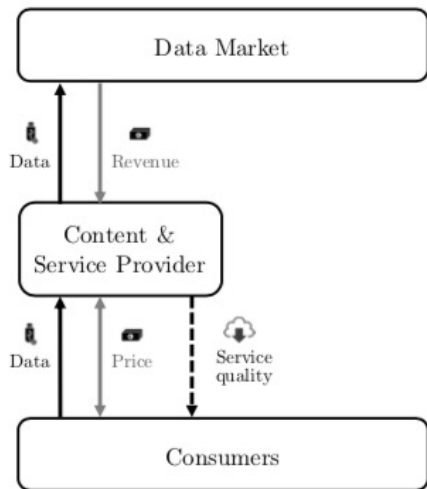
First question: Why would users transfer their data to PIMS?

1. To exert competitive pressure on big tech by creating an alternative seller on the data market
 - Only fraction of data can be ported (volunteered and observed)
 - Not all consumers will port data
 - Will PIMS ever have be able to compete with inferior data?
2. To gain more control over the sale of their data on data markets
 - Would only relate to data sold by the PIMS, but not by original data controller
 - Creation of an additional problem, which can then be partially fixed
 - In California (CCPA), however, consumers can deny original data controller to sell data
 - This is turn, would trigger provision of finer control rights at the original data controller
 - Which then makes the use of PIMS obsolete
3. To benefit from value of their own data (→ Personal Data Broker)

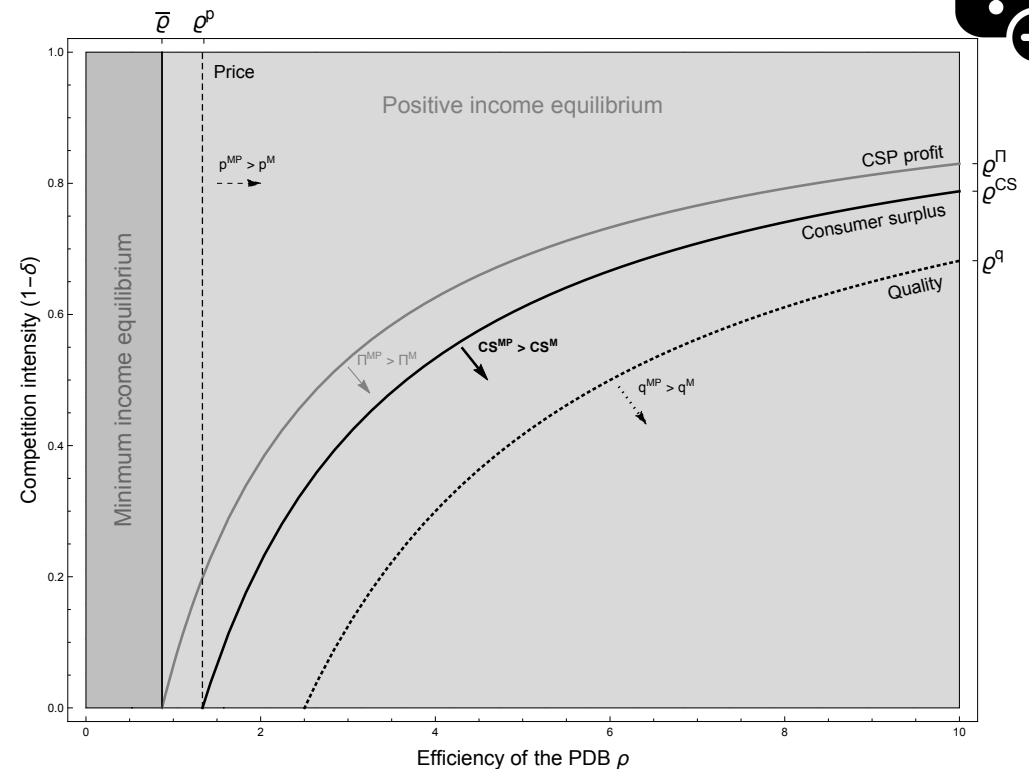
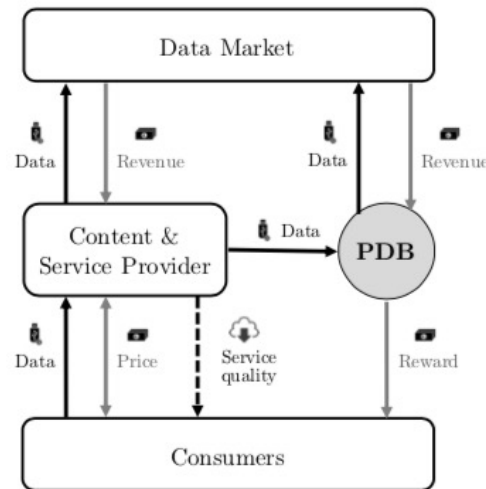
Can PIMS generate revenue from data?

Personal Data Brokers (Haberer, Krämer & Schnurr, 2020)

Without Personal Data Broker (M)



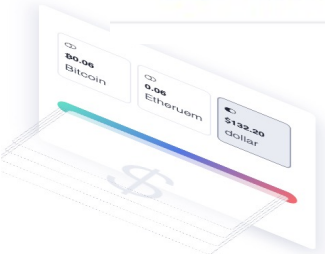

With Personal Data Broker (MP)



Haberer, B., Kraemer, J., & Schnurr, D. (2020). Standing on the Shoulders of Web Giants: The Economic Effects of Personal Data Brokers. Available at SSRN: <http://dx.doi.org/10.2139/ssrn.3141946>

Can PIMS generate revenue from data?

Stuck in the minimum income equilibrium?



It's time to get paid

Earn cash, discounts, or cryptocurrency for connecting and exchanging your valuable data. Keep earning through ongoing data sales.

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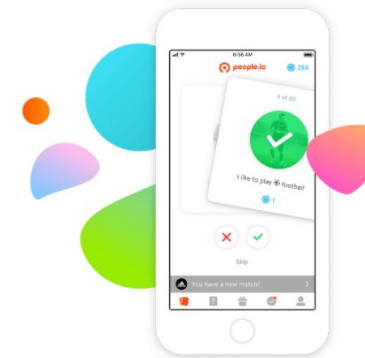
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Ready to connect with the value of your data?

[Let's do it](#)



Closing [\[edit \]](#)

On November 19th, 2019, Datacoup announced they will be closing and deleting all data. This is the email sent to users:

Hi there, Datacoup is shutting down operations and will be decommissioning all of our servers. Any data you previously added to the platform was never sold. If you received payments in the past, they were coming from the Datacoup treasury account. The server decommission process will erase any data you previously connected to the platform. Thanks for your support over the years. -Datacoup Team

 **J Avery**
[1 review](#)



22 Jun 2020

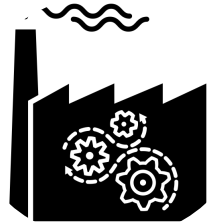
Doesn't work anymore, feeling ripped off

Hadn't used this app in a long time, but decided to start again as I've been redundant due to covid and need all the help I can get. But nothing was working. Checked app store, doesn't exist anymore! Feeling a bit ripped off as I can't cash in the points I had.

Googling lead me to this page. Had no idea it's been a terrible experience for so many other people too.

Can PIMS generate revenue from data controllers?

- PIMS as a compliance service for (small) content providers
- May work, but will have no effect on large platforms / data controllers on the Internet



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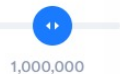
Per month, billed annually
\$650 per month, billed monthly

[Start free trial](#)

Consent Manager

Use our centralized, immutable consent management platform (CMP) to simplify your backend and promote consumer trust.

How many users?



\$17,396

Per month, billed annually
\$19,136 per month, billed monthly

[Request access](#)

Can PIMS generate revenue from data subjects?



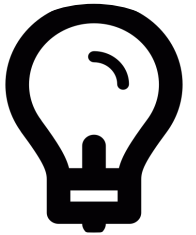
- PIMS should act in the best interest of consumers.
Only flat-subscription-fee-based business model „ethical“
(German Data Ethics Commission, 2020)
 - Not dependent on amount of data
 - Not dependent on data subject
 - Not dependent on „value of data“
- But what prevents ruinous price competition if differentiation is limited?
- Will PIMS be able to safeguard data if subscription fee is low?
- Is there a willingness to pay for PIMS if subscription fee is high?
- Is this in line with European values, where only wealthy can afford a PIMS?

German Data Ethics Commission (2020). Opinion of the Data Ethics Commission.

Available at: https://www.bmju.de/SharedDocs/Downloads/DE/Themen/Fokusthemen/Gutachten_DEK_EN_lang.pdf?__blob=publicationFile&v=3

Do PIMS need to generate revenues?

- State-run PIMS?
 - Is the state a dynamic enough entrepreneur?
 - Is the state the better data controller?
- Open-Source Non-Profit PIMS?
 - Data Transfer Project?
 - Incentives to participate without regulated standards?
 - Financing of centralized infrastructure?
 - Need to trust security and confidentiality



German Data Ethics Commission (2020). Opinion of the Data Ethics Commission.

Available at: https://www.bmju.de/SharedDocs/Downloads/DE/Themen/Fokusthemen/Gutachten_DEK_EN_lang.pdf?__blob=publicationFile&v=3

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- **Blockchain-based Identity management**

- *Self-Sovereign Identity*: Independent of centralized authority (government or firms)
- Verifiable data registry for decentralized identifiers (DIDs)
- Examples
 - Tykn (<https://tykn.tech/identity-management-blockchain/>)
 - Idento.one (<https://idento.one>)
 - Cai, T., Yang, Z., Chen, W., Zheng, Z., & Yu, Y. (2020). A blockchain-assisted trust access authentication system for solid. *IEEE Access*, 8, 71605-71616. <https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9064776>

Blockchain solutions in the context of PIMS/data portability

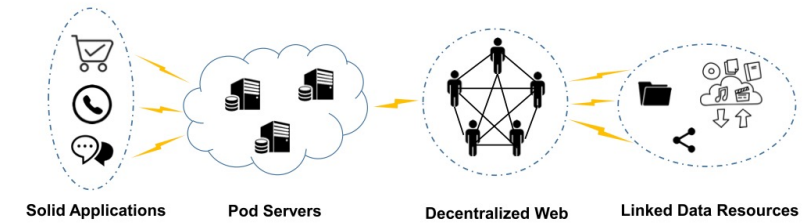
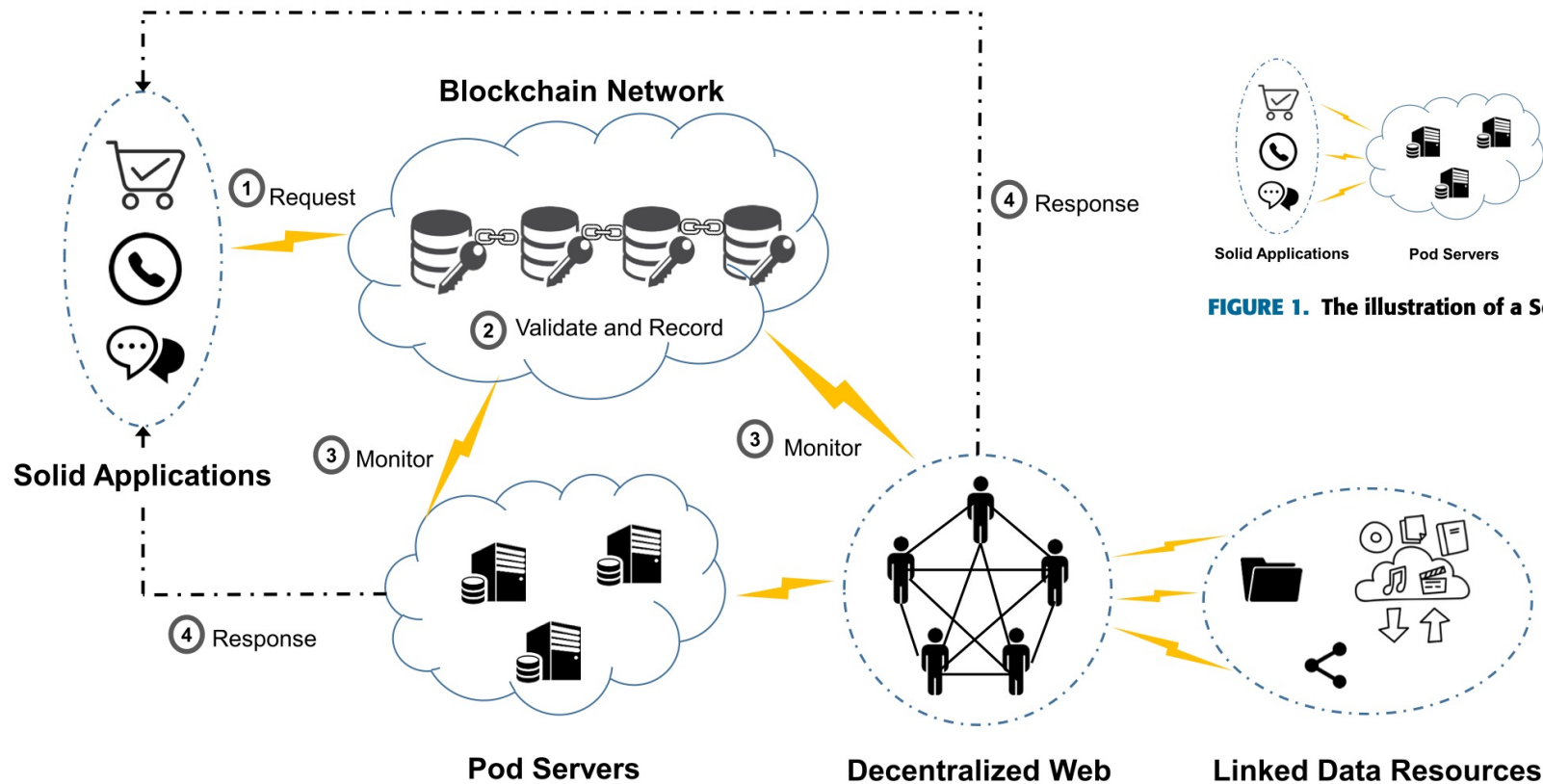


FIGURE 1. The illustration of a Solid ecosystem.

FIGURE 2. Proposed blockchain-assisted trust access authentication system for Solid.

Cai, T., Yang, Z., Chen, W., Zheng, Z., & Yu, Y. (2020). A blockchain-assisted trust access authentication system for solid. *IEEE Access*, 8, 71605-71616. <https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9064776>

- **Blockchain-based personal data management system**

- First things first: No personal data should ever be put on the blockchain!
- But blockchain could store database references (pointer) to the data and check for permissions to access off-blockchain data (in decentralized or centralized DB)
- Examples
 - Cai, T., Chen, W., & Yu, Y. (2019, December). BCSolid: A Blockchain-Based Decentralized Data Storage and Authentication Scheme for Solid. In *International Conference on Blockchain and Trustworthy Systems* (pp. 676-689). Springer, Singapore.
https://link.springer.com/chapter/10.1007/978-981-15-2777-7_55
 - Zyskind, G., & Nathan, O. (2015, May). Decentralizing privacy: Using blockchain to protect personal data. In *2015 IEEE Security and Privacy Workshops* (pp. 180-184). IEEE.
<https://ieeexplore.ieee.org/iel7/7160794/7163193/07163223.pdf>

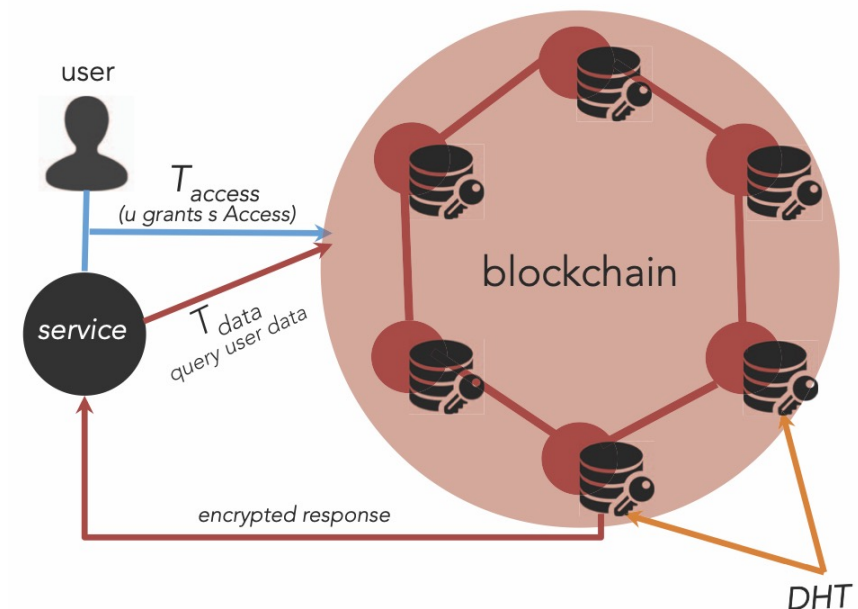
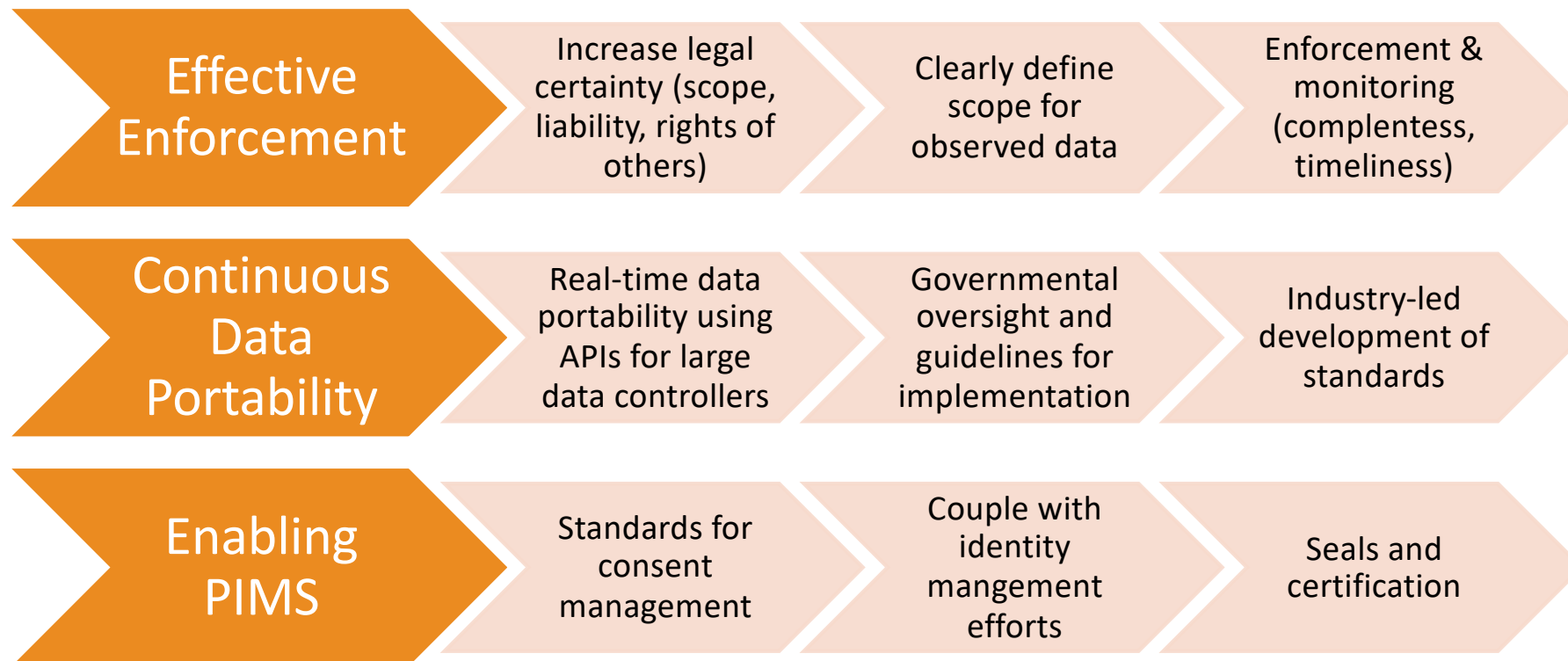


Fig. 1. Overview of the decentralized platform.

Making data portability more effective for the digital economy



Thank you for your attention!



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