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Unfolding opportunities from the use of APIs in Europe

THE ROLE OF API IN DATA GOVERNANCE PROCESSES

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Abstract

This document summarises the outputs of the third multi-stakeholder workshop organised by the API strategy essentials for Innovative Public Services (API4IPS) project that took place 9th of February 2021. The API4IPS project focuses on identifying technical, legal and organisational conditions that will ensure the deployment of efficient, competitive and robust API-enabled digital ecosystems in government environments. The project, funded by the ISA² programme, is a joint effort among three European Commission's directorates: DG DIGIT, DG CONNECT, and DG JRC, representing policy, implementation, and research actors involved in analysing governments' digital transformation in the EU.

The workshop gathered an interdisciplinary group of experts to explore the role of API in the implementation of data regulatory processes and to evaluate API-related data governance opportunities and challenges. The document contains three sections. The first one sets the context of API in the current data governance landscape. The second summarises the highlights of the panel discussion. In the concluding section, we provide a list of emerging research questions and propose the following steps to advance the debate.

1 Introduction: the role of API in data governance processes

APIs enable the connection of systems and organisations. APIs define what data can be accessed, who can access it and under which conditions. The monitoring of these connections can provide insights about digital interactions. APIs can easily be re-defined to steer these interactions. The flexibility to re-define digital relationships among actors makes APIs a valuable object of study for its potential in steering data governance processes.

A relevant example of how APIs are used in implementing data-related regulatory processes is the payment service regulation in the Banking sector [PSD2] (European Union, 2015). API interactions wire its implementation. Open Banking API-powered standardising initiatives have gathered entrepreneurs, investors and innovators. This cooperation has enabled the rapid development of a vast and powerful fintech ecosystem that positively benefits citizens, e.g., Berlin Group NextGenPSD2 (The Berlin Group, 2021). Another example is the General Data Protection Regulation [GDPR] (European Union, 2016), particularly the implementation of article 20. Data portability is acknowledged as a fundamental subject and is considered a means to facilitate fair competition in the digital market. APIs could be a technical enabler of GDPR's data portability implementation. However, the technological adoption of data portability is uneven, and the outcomes of its performance are still unclear.

APIs also explicitly feature within regulatory initiatives that are currently about to be rolled out. One example is the update of the Open Public Sector Information directive (European Union, 2019a). Its goal is to unlock the value of public sector data by exposing them and enabling their re-use. Specifically, it dictates the provision of High-Value Datasets (HVDs) through APIs, intending to multiply the value of Public Sector Information through re-use. That could be achieved thanks to the flexibility that APIs grant to data sharing. APIs can be concurrently accessed by many actors and systems, scale at near-zero marginal costs, and allow monitoring and control of their use.

Beyond the data strategy, APIs may feature in other policy initiatives under the European Digital Strategy, linked to the use and access to data, functionality and infrastructure. For instance, APIs may play a role in the regulation of the uptake of AI applications. APIs will be critical to support the creation and orchestration of data spaces within the European Data Strategy. APIs will enable the technical integration of actors and systems essential in fostering industry innovation (including Small and Medium Enterprises).

The event was organised within the API essentials for Public Sector Innovation (API4IPS) project of the Digital Economy Unit of the Joint Research Centre, funded by the ISA² programme. The project aims to identify technical, legal and organisational essentials that will ensure efficient, competitive and robust API-enabled government digital ecosystems. The project is a joint effort among three European Commission's directorates: CONNECT, DIGIT and JRC, representing policy, implementation, and research actors involved in analysing governments' digital transformation in the EU. The project builds on the investigation of the role of APIs in the digital transformation of Government that the team performed in previous years. The results of this investigation include i) a report with the full analysis of why APIs are a foundational component of government digital transformation (Vaccari et al., 2020), ii) a framework proposal for the adoption of API with a 'whole of government vision' (Boyd et al., 2020), which includes a self-assessment tool for governments to assess the maturity of their API infrastructure, and iii) a technical report evaluating the Web API standards (Santoro et al., 2019). All material including datasets, reports, workshops can be found in the 'API for Digital Transformation' Joinup collection (European Commission, 2020a).

The workshop 'Unfolding opportunities from the use of APIs in Europe - regulatory perspective (EU data strategy, GDPR, PSD2)' is the third multi-stakeholder event organised under the API4IPS project. In this occasion the event intended to spark a debate about the role of API in data governance processes. Policymakers, innovators, and worldwide experts discussed about APIs' role in current European regulatory contexts and those to come. European data regulatory actions were introduced. Then, the role of APIs in current regulatory processes (GDPR, PSD2) was presented. The event finished with a discussion panel. Attendees, including renowned worldwide API experts, policy makers, innovators and public and private practitioners participated in the debate. There were lively discussions around the role APIs play in data regulatory aspects including i) data portability, ii) the applicability of API neutrality concept in data governance processes, iii) the value of data and how APIs can contribute to its distribution, and iv) the attitude towards the eminent regulation of the Technology sector.

2 Unfolding opportunities from the use of APIs in Europe

The event took place on the 9th of February 2021 [15-18h CET]. The meeting was attended by over 80 participants with an average of 60 participants at any time. Geographically, the audience covered 31 different countries in the world (Figure 3). Both the public and the private sector were well represented (30-70%) with representatives from different industries (Figure 2). As intended, the profile of the audience was rather varied ranging from technical, legal, advisory and managerial roles (Figure 1).

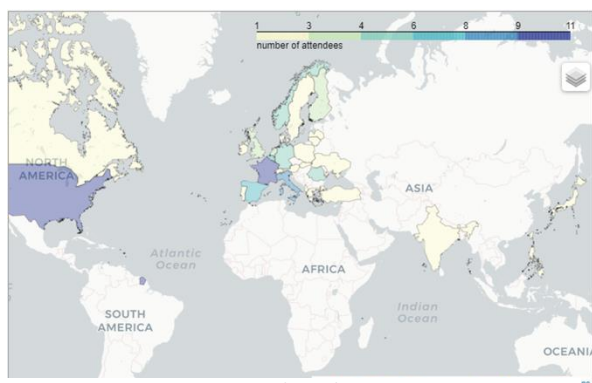


Figure 3. Attendance by country

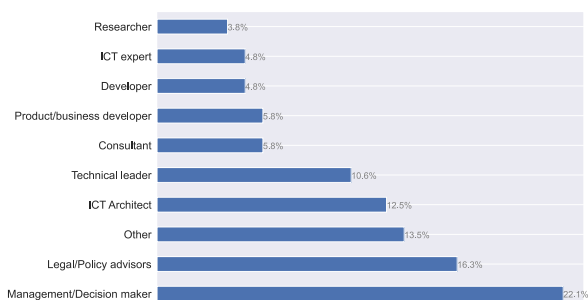


Figure 1. Attendance by professional profile

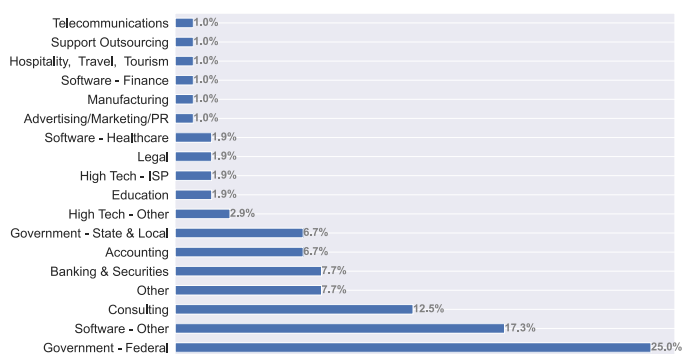


Figure 2. Attendance by industry

AGENDA – 9th February 2021 [15-18h CET]

15:00 - 15:15 Introduction.
European Commission & APIdays

SETTING THE CONTEXT

15:15 - 15:45 The European Data Strategy.
Dr. Néstor Duch Brown (Research Leader Digital Economy Unit – European Commission)

15:45 - 16:15 The state of GDPR portability.
François Xavier CAO (co-founder of gdpr.dev)

16:15 - 16:45 Developing data-sharing frameworks in financial services.
Prof. Markos Zachariadis (Alliance Manchester Business School)

DISCUSSION PANEL

16:45 - 17:45 Moderated by Mehdi Medjaoui (APIdays co-founder)
Panellists:

- Kin Lane (the API evangelist);
- Mark Boyd (CEO of Platformable);
- Tyler Singletary, Product manager at Tagboard, Expert on APIs and Platform models

Workshop speakers and panellist details:

ORGANISERS:

- Mónica Posada-Sánchez, API4IPS Project leader - Research fellow at the Digital Economy Unit (JRC-European Commission)
- Mehdi Medjaoui, founder of APIDays Conferences, author of the book Continuous API management, and former co-founder of API Identity platform OAuth.io

SPEAKERS:

- Néstor Duch-Brown, Research Project Leader in the Digital Economy Unit of the Joint Research Centre (European Commission)
- Francois Xavier CAO, Software Engineer, PhD candidate on APIs and regulations & co-founder of gdpr.dev
- Professor Markos Zachariadis, Full Professor and Greensill Chair in Fintech & Information Systems (Alliance Manchester Business School) and international lecturer, Member of the Global Future Council of Resilient Financial Systems (World Economic Forum), FinTech research fellow at Cambridge Digital Innovation (University of Cambridge). Chief Fintech Advisor to the President (Hellenic Competition Commission).

PANEL

Moderator:

- Discussion panel moderated by Mehdi Medjaoui (APIdays co-founder)

Panellists:

- Kin Lane: author and influencer of apievangelist.com, Chief API evangelist at Postman, former presidential innovation fellow on APIs for the Barack Obama administration;
- Tyler Singletary: COO at Tagboard, former VP and director of Platform at Klout, expert and influencer on the politics of APIs and platforms;
- Mark Boyd: API journalist and author, co-author of many Industry reports on APIs for Banking or APIs for Governments, and founder of the API economy analyst Platformable.com.

2.1 Setting the context

When setting the context, first, the European data regulatory initiatives were summarised. Then, the role of APIs in current regulatory processes (GDPR, PSD2) was described.

2.1.1 European data strategy

In his presentation 'The European Data Strategy', Néstor Duch-Brown presented a general overview of the European data strategy launched on 19 February 2020 (European Commission, 2020b). The European data strategy provides for policy measures and investments to enable the data economy for the coming five years. At the time of the adoption of the strategy, the European Commission also presented Communication on "Shaping Europe's digital future" (European Commission, 2020c) and a White Paper on artificial intelligence (European Commission, 2020d). Duch-Brown focused on the following aspects of the data strategy: the aim, stage of implementation, problems addressed by the strategy, its vision, the four pillars of the strategy, and its international approach.

Data is becoming an increasingly important asset as its global volume grows. Data reshapes the way we produce, consume and live. We observe a change in how data is stored and used. In 2018, 80% of data was processed in centralised computing facilities and 20% in the networks of smart connected objects. However, projections show that by 2025, the ratio will reverse and 80% of data will be processed in the networks of smart connected objects. Handling data in a way that advances EU values requires a multidimensional approach: technical solutions, legal structure and fair socio-economic mechanisms.

The European data strategy aims to "make the EU a leader in a data-driven society. Creating a single market for data will allow it to flow freely within the EU and across sectors for the benefit of businesses, researchers and public administrations". Duch-Brown highlighted that the strategy proposes the free flow of data in the EU along with people, goods, and services. The European data strategy is a part of a broader regulatory framework relating to digital domain. This framework includes instruments such as the General Data Protection Regulation [GDPR], the regulation on the free flow of non-personal data [FFD] (European Commission, 2018) ; the Cybersecurity Security Act [CSA], (European Union, 2019b), the Open Data and Public Sector Information Directive (recast); the Digital Content Directive (European Union, 2019c). Additionally, it also includes sector-specific legislation on data access: automotive, payment service providers, smart metering information, electricity network data, or intelligent transport systems.

The vision of the European data strategy encompasses the following:

- Data can flow freely in the EU and across sectors (mobility of data);
- European rules and values, in particular personal data protection, consumer protection, and competition, are fully respected
- The rules of access to and use of data are fair, practical and clear, and there are clear and trustworthy data governance mechanisms in place
- There is an open but assertive approach to international data flows, based on European values.

There are four pillars that sustain the European data strategy (key actions and timeline):

1. A **cross-sectoral governance framework** for data access and use.

Key actions:

- Framework for the governance of common European data spaces, Q4 2020: Data Governance Act (DGA), already proposed – tackles liability and outlines new responsibilities for digital service providers
- Implementing act on high-value datasets (under Open Data Directive), Q1 2021 – focuses on high quality data for SMEs and innovation
- The importance of APIs is expressly recognised in the context of this action: "In order to open up key public sector reference data sets for innovation, it shall start the procedure for the adoption of an Implementing act on high-value data sets (Q1 2021) under the Open Data Directive, making these data sets available across the EU for free, in machine-readable format and through standardised Application Programming Interfaces (APIs)"
- Data Act, Q3 2021 – better access to and control over data for a fair data economy
- Analysis of the importance of data in the digital economy (e.g. through the Observatory of the Online Platform Economy), and review of the existing policy framework in the context of the Digital Services Act package (Q4 2020): Digital Services Act (DSA), Digital Markets Act (DMA), already proposed.

2. **Enablers:** Investments in data and strengthening Europe's capabilities and infrastructures for hosting, processing and using data, interoperability (investments in data)

Key actions:

- European data spaces, encompassing data sharing architectures (data sharing architecture and governance mechanisms), 2022
- Sign Memoranda of Understanding with Member States on cloud federation, Q3 2020
- Launch a European cloud services marketplace, integrating the full stack of cloud service offering, Q4 2022
- Create an EU (self-)regulatory cloud rulebook, Q2 2022.

3. **Competences:** Empowering individuals, investing in skills and in SMEs

Key actions:

- Empowering individuals with respect to their data: enhance the portability right for individuals under Article 20 of the GDPR giving them more control over who can access and use machine-generated data (possibly as part of the Data Act in 2021)
- Investment in skills and general data literacy
- Dedicated capacity-building for SMEs.

4. **Common European data spaces in strategic sectors** and domains of public interest

Key action:

- The Commission will support the establishment of data spaces in the following sectors (non-exhaustive list): industrial (manufacturing), Green Deal, mobility, health, financial, energy, agriculture, public administration, skills.

The European data strategy promotes open but assertive approach to international data flows based on the European values. It foresees the creation of a European analytical framework for data flows in cooperation with financial and international organisations (e.g. EIB, EBRD, OECD, IMF).

2.1.2 Data Portability implementation status (Article 20 GDPR)

In the presentation "The state of GDPR portability" the speakers presented the findings of a study about the status of implementation of Article 20 of GDPR, i.e., *data portability*. EU citizens, business and countries are meant to benefit from data portability. If properly implemented, citizens could select the services that can use their personal data, this flow will even give the citizen the opportunity to monetise their data. Moreover, citizens should be able to recreate their identity when changing provider. In the case of EU business, advantages include opportunities for innovation (possibility to build new products), more revenue (faster and pooled availability of data) and possibly a fairer competition (especially for start-ups and disrupter companies). For EU market, data portability can strengthen EU data sovereignty, create more equity, increase data literacy and allow individuals to choose sharing their data with small local business instead of their data being used by big digital giants.

The work attempted to shed light on how much value is captured by data and has the potential of being redistributed. One direct measure comes from the fact that data are used as products that can be sold or bought and enriched with additional information about the behaviour of the user for selling or advertising him profiled products. Value of data can be calculated by either calculating the advertising value per user the company is gaining, or by taking the market value of the company for each of its users (in the case of Facebook, for example these values are 31\$ and 259\$, respectively). The value varies geographically, i.e., value is higher in US than in Africa or Asia. It is important to leverage the potential of art. 20 of GDPR - data portability - to increase the competitiveness of EU companies.

The study revealed that often data portability was inoperative in companies and that it was very difficult for users to obtain their data out. **Only 10%** of the **data controllers** analysed were proposing a **takeaway service**. The study offered participants the possibility to port/obtain their data from data controllers with the assistance of 3 legal advisors. Results will be available soon in an extended report. Some 230 companies were requested data from, and only 60 of them answered to the requests. The study was launched publicly asking for citizens that would like to participate. 48 were initially interested but only 14 of them actually used their rights to portability of which only 7

arrived to the end of the process. The main reason of the abandon was that it was too hard to obtain their data because of many barriers.

According to GDPR's enforcement tracker¹, from July 2018 to December 2020, just over **250M € in fines** have been issued to companies due to **breaches of GDPR**, notably, **0 €** were due to **Article 20**.

The study identified 6 different recurrent obstacles in the current implementation of GDPR's data portability:

1. Data were **not transferred in a machine-readable** format and mixed the right to access and the right to data portability.
2. Personal data were **considered too difficult to provide** (e.g. technical infeasibility or security risks)
3. Personal data were transmitted with a file with no useful or incomplete information
4. Personal data **delivery was delayed** (max period mentioned by GDPR is 30 days)
5. Data subjects **experience was fragmented** (most companies ask for additional information, to discourage users to proceed with their request).
6. Data portability **requests were seen as troublemaking** by companies (some companies were proposing deleting the user' data/account completely instead of answering or providing them). This might lead the user to stop with their request because of the fear to lose their account

The study proposes 10 solutions to reduce these obstacles and operationalise GDPR data portability:

1. **Educate** policy makers, business owners and no-profit consumers associations (the ability to port phone numbers can be taken as an example)
2. **Simplify** the procedure (e.g. certification on accessibility) also requested from policy makers.
3. **Standardisation** (specific format, specific interfaces) that must be followed by companies
4. **Develop alternative models** (e.g. the one provided by Mozilla) to collect and apply the regulations
5. **Facilitate and build the transition** (e.g. by EU funding companies to build tools to make it easy data portability)
6. **Join efforts as a community** (e.g. mydata.org, Mozilla, etc.)
7. **Mandate API** by building APIs that enable instant data portability from data repositories (e.g. the banks case)
8. Create the **case for GDPR data portability fines** (no fines for art. 20 so far)
9. Disincentive data retention with a **digital VAT on data**
10. Push for **"API neutrality"** on platforms

¹ Source: <https://www.enforcementtracker.com/>

2.1.3 APIs role in the implementation of PSD2

Prof. Zachariadis provided a comprehensive analysis of the role that APIs play in the innovation of the banking/finance sector after the enforcement of the PSD2.

The banking/finance market structure has undergone a profound change. Traditionally, the market was vertically-integrated and it quickly transitioned to a complex multi-dimensional architecture (See Figure 4) after the enforcement of PSD2. The change in the market's architecture has resulted in a sharp increase in innovation in the sector, which can be observed in new value chain propositions and business models. The new business models range from the *unbundling of bank products*, passing by the *bank-as-a-platform* concept, up to the re-bundling of financial services embedded in digital ecosystems (Zachariadis and Ozcan, 2017). Consequently, new economic activity has flourished, and a myriad of new actors (aka fintech) have incorporated into this sector. As a result, there is a new wave of competition within the market.

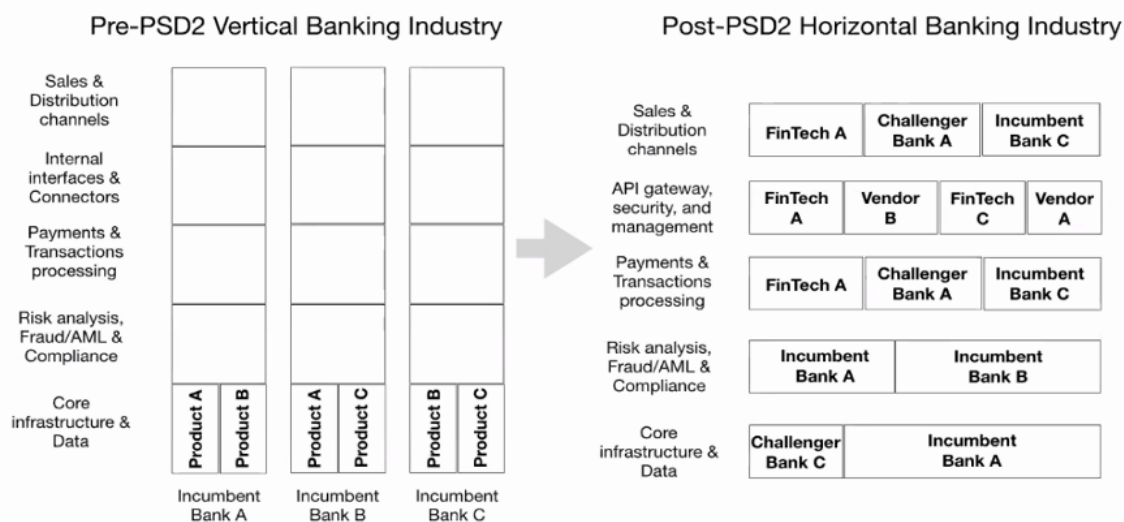


Figure 4: Banking industry market structure before and after PSD2 (Ozcan, Zachariadis 2018)

APIs have a crucial enabling role in this transformation. The modular nature of API infrastructure and the opening of access to its components to different actors (BEA-EBA) boosted the structural market change. According to Prof. Zachariadis, API openness' analysis will also help understand data-sharing dynamics among financial service actors. Specifically, by observing aspects such as the levels of accessibility of their APIs, the functionality exposed through them, their technical terms of service, the use of standards and the integration of alternative API modules external to the sector, e.g., social media, IoT or advertising (Markos Zachariadis, 2020). Tactically, banking/finance organisations can steer their digital relationships with other actors by tuning the access to their APIs through technical, organisational and legal means.

How this freshly renovated market will mature is yet to be seen, and it is a concern for regulators worldwide. Decision-makers need to ensure the market's stability and integrity while maintaining levels of competition that will bring fair outcomes for consumers. However, these objectives do not always overlap and are often not easy to reconcile. Regulators need to set their priorities, e.g., fostering competition, consumer-centric fairness, or social welfare. Then, they will need to choose between different instruments such as policy-mandates, incentive schemes, or fostering market-driven regulation initiatives.

Several issues are at the stake for the governance of data-sharing in the banking/finance sector. As a summary, open questions distilled from Prof. Zachariadis' session, which may be relevant for regulators in the sector: How to monitor fintech-ecosystems to ensure fair competition among all its actors? How to manage uncertainty and assess risks in fragmented value chains? Is the imposition of certain standards (APIs, data) justifiable, or else is it better to let the market adjust? How to fairly define liability chains in modular services? How to ensure there are no parties left aside?

2.2 Discussion Panel

In the panel, experts discussed their views on the technical, economic, social, and policy concerns of data-sharing from an API viewpoint. Specifically, the session focused on four main topics: data portability of personal data, API neutrality applicability, the value of data, and the imminent regulation of the technology sector.

2.2.1 Data portability of personal data

The study presented by Francois Xavier CAO shed some light on the implementation status of Article 20 of the GDPR: little evidence of operational data portability (only 10% of cases analysed), € 0 fines due to data portability non-compliance out of € 250M in GDPR breaches. Is this a missed opportunity for fostering fair competition? If the barriers to the implementation of data portability do not disappear, will this hinder the return of generated value on European's personal data back to local economies? How do market players perceive data portability?

The experts raised shared concerns about the lack of clarity around the data portability limits regarding technical, legal and organisational aspects. To give some examples:

- What data is portable? (e.g., are Twitter likes portable? are links of your networks portable? are the interim data products created by third parties portable? If so, which entity is liable/accountable for it?)
- What are the technical extents of portability? Two options: extract useless data dumps or else extract dumps susceptible to being automatically imported in other platforms/applications. The latter will require considerable efforts into the mapping of the digital world into objects, the definitions of common schemas and standards. Who will arbitrate this? Is this only a challenge or else can be perceived as an opportunity for SMEs to fill this data portability gap?
- API-driven portability puts an additional requirement on the tech-stack for companies. This implies development/operational/maintenance costs that can be a burden for SMEs. Does data portability contemplate different schemes of application depending on the size of the firm?
- How to define limits to data portability such that unique value propositions are not exposed? Does data portability output need to match APIs specs? Wouldn't that erode business viability? Wouldn't that steer innovation away from the 'right spots'?
- Does data portability consider the lack of regulatory reciprocity issues? The geographic dimension is important as some companies that are not subjected to the same regulation can take competitive advantages to the ones that must obey to regulations of their country or region of the world.

2.2.2 API neutrality applicability to data governance processes

The term 'API neutrality' was first coined by Prof. Jonathan Zittrain, Professor of Law and Professor of Computer Science at Harvard University, in his book *The Future of the Internet and how to stop it* (Zittrain, 2008). *API Neutrality* argues, likewise Net neutrality, that an API must be neutral and don't discriminate users, usage or quality of service to any ecosystem's player.

The experts discussed the applicability of this concept in data governance processes. There were different tastes about it. One expert considered that API neutrality should be mandatory on APIs dealing with personal data. In his view, this will commoditise the market of personal data.

Other expert advocated for nuances beyond the dichotomy of open=good/closed=bad. Platform business models have proven to be beneficial in creating economic and social welfare through the flourishing of digital ecosystems. Platforms are evolving and are far from being in their final form. Adjustments on what is wrong or doesn't work are common and necessary. For instance, the winner takes all tactics has been mitigated, and initiatives to enhance interoperability among platforms are more and more common.

2.2.3 Societal concerns about data governance: the value of data.

The experts reflected on the value of data and how APIs do have control over its distribution. According to a recent paper on the return on data (Kolt, 2019), users provide data to data controllers for free because they value the service they receive more.

On this point, one expert discussed the risks derived from information asymmetries between data controllers and users. If individuals are not aware of their data's actual value, they may act against their benefit. Thus, data illiteracy is a worrying issue as it may remove the agency from the individual.

Another reflection, from an API viewpoint, was that diverse actors perceive data value differently. Consumers, developers, platform owners, or regulators assign value to data using different parameters. APIs could help to provide measures of data value for the different actors.

Moreover, the value assigned to data also varies over time. As an example, the access to data through APIs typically start open and democratic, then this openness is adjusted to its monetisation potential once the analysis of API usage helps to clarify it.

Going back to personal data, a discussion about the market capitalisation of the individual developed. Questions arose about the fact that data governance should consider the individual is not for sale. *'Me and my friends in public spaces'* has more than pecuniary value. There were concerns about continually framing the value of 'myself and my data' and assigning price tags to it. To keep doing so may leave important decisions in the hands of the market.

2.2.4 Data regulation is rapidly evolving

The experts acknowledged the fact that more regulation is coming in the Technology sector, in particular concerning data governance. Regulation is gearing up also in the US, specifically in sectors such as Finance, Healthcare and in even the public sector. Regulation in the technology sector may relate to API infrastructure on aspects such as the tuning of API openness, the operationalisation of data portability, the definition of standards and the contents of the terms of use. Most likely, APIs will play a role on the regularisation of platforms too.

The experts sent positive messages calling for business to embrace these initiatives and to look for opportunities. However, they pleaded for finding the right instruments to ensure fair competition, consumer fairness and investment in innovation while protecting business viability (safeguarding investments and reducing risks) and defending individual rights.

In the case of highly dynamic environments such as digital platforms, regulation is a moving target. Experts perceive governments as slow movers in anticipating the effects of technological uptake. Regulation typically reacts to failures (e.g., antitrust case in the US open to Facebook). One strategy could be to impose the slowdown of the development, although this could cause a competitive disadvantage for countries. One expert suggested that the use of technological sandboxes could improve policy makers' forecasting capabilities.

Experts perceive API management as a central technical enabler for implementing data governance processes, including data portability. Organisations that excel in API management are more flexible in digitally interacting with other actors and tuning the dynamics of these interactions. Additionally, experts argued that, mandated or not, the definition of common API vocabularies and agreements on standards could help to implement data governance actions.

At legal and organisational levels, the experts called for increasing horizontal conversations around 'API commons'. They perceive that parallel discussions are happening around API's technicalities, about API's business and about the politics of APIs. They suggested that these threads mingle more often to get the API-led data governance right.

The experts posed other ideas such as imposing API-VAT on data which is kept without disclosing its value, the idea of making APIs copyrightable, or even imposing reporting on data aspects in firm's Balance sheets.

3 Conclusions and next steps

This report summarises the content and discussions of the third multi-stakeholder event organised by the API4IPS project, which aimed to contribute to the debate on the role of API in data governance processes. There was an overall recognition that data governance processes are necessary and that they are already being shaped in different areas of the world (e.g., EU, US, AUS, SG, NZ). It was acknowledged that APIs already feature in these processes at the implementation level.

By analysing the presentation and discussions several crosscutting questions surfaced that could be matter of study in the near future:

1. The GDPR and PSD2 regulations have followed a different technical implementation path. The outcomes of this implementation are markedly different. PSD2 has drastically altered the banking market structure and rapidly transitioned to a flourishing digital ecosystem. GDPR implementation of article 20 to date is often non-operational. Is the adoption of APIs a differentiating factor? What aspects of this adoption are the most relevant (technical, legal, organisational)? Does the use of API bring value to all societal actors in PSD2?
2. If the implementation of the Open Data and PSI Directive follows a similar development as that of PSD2, will mandated API infrastructure enable the creation of a digital ecosystems around public sector information? Will this be a stepping stone in the 'platformisation' of governments? Would this require differentiating action levels depending of the applicable government level (i.e., local, regional, national or pan-European)?
3. Can the API adoption model of PSD2 be exported to other sectors? How to monitor fintech-ecosystems to ensure fair competition among all its actors? How to manage uncertainty and assess risks in fragmented value chains? Is the imposition of certain standards (APIs, data) justifiable, or else is it better to let the market adjust? How to fairly define liability chains in modular services? How to ensure there are no parties left aside?
4. Is there a need to clarify data portability limits in technical, legal and organizational terms?
 - What data is portable (e.g., are twitter likes portable?)?
 - What are the technical extents of portability, is data ported meant to be actionable, i.e., usable in other contexts?
 - Does data portability contemplate different schemes of application depending on the size of the firm?
 - How to define limits to data portability so that unique value propositions are not exposed? Does data portability output need to match APIs specs? Wouldn't that erode business viability? Wouldn't that steer innovation away from the 'right spots'?
 - Does data portability consider the lack of regulatory reciprocity issues? The geographic dimension is important as some companies that are not subjected to the same regulation can take competitive advantages to the ones that must obey to regulations of their country or region of the world.

These questions touch upon the intersection of technical, legal, organizational, economic and even societal aspects. Thus, their analysis call for a multidisciplinary effort to set the boundaries to appropriately frame the issues.

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List of abbreviations and definitions

| | |
|---------|---|
| API | Application Programming Interface |
| BEA-EBA | European Banking Association |
| CSA | Cybersecurity Act |
| DGA | Data Governance Act |
| DMA | Digital Markets Act |
| DSA | Digital Services Act |
| EBRD | European Bank for Reconstruction and Development |
| EIB | European Investment Bank |
| FFD | Regulation on the free flow of non-personal data |
| GDPR | General Data Protection Regulation |
| IMF | International Monetary Fund |
| JRC | European Commission Joint Research Centre |
| OECD | Organisation for Economic Co-operation and Development |
| PSD2 | Payment Service Directive 2 |
| JRC | DIRECTORATE-GENERAL JRC - Joint Research Centre |
| CONNECT | DIRECTORATE-GENERAL CONNECT - Communications Networks, Content and Technology |
| DIGIT | DIRECTORATE-GENERAL DIGIT - Informatics |

Annexes

Annex 1. Material of the workshop

[Event description](#) and full [recording of the event](#)

The European Data Strategy [\[Slides\]](#)

The state of GDPR portability [\[Slides\]](#)

Industry-led vs Regulatory led API regulations [\[Slides.\]](#)

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