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# DATA AS TAXES

WORKING PAPER ON TAXATION OF DIGITAL ECONOMY

A Blueprint for a Technical, Institutional, and Normative Framework for the Data Economy  
to pay taxes in Data

One of the greatest challenges of the current era is the taxation of the digital economy, as it is argued that digital/data-driven multinational enterprises is not taxed adequately, leading to unfair competition, monopolisation, and breach of trade reciprocity for the unrestricted use of 'modern nations treasury – data'. A variety of unilateral measures or ongoing proposal by multilateral institutions like the Organisation of Economic cooperation and development, United Nations or the European Union commission are trying to address challenges surrounding the taxation of the digital economy and looking for a mechanism for the fair allocation of taxing rights amongst different jurisdictions.

However, as data has become a much-required key economic factor, an attempt has been made to highlight the urgent need to develop new policies, mechanisms, and technologies to support the democratisation of data and enable easy access to it. Further, to address the central problem of a fair distribution of profits among jurisdictions, we propose a system that differs from the current normative approaches – namely, a proposal to share data in certain cases rather than to allocate multinational enterprises' profits between nations and, accordingly, allowing exchange of data instead of levying taxes in certain cases.

Taxes paid through a data exchange system would benefit not only the public sector but also the Government in a variety of ways (like improving the infrastructural services/ health sector or other general welfare services etc.); it could spark a new wave of innovation and provide the raw material for innovative research and development in a variety of jurisdictions, as well as promote the enhancement of public policies and services. Also, for the long-term development and to revive the economy from the impact of COVID-19, countries need timely and quality and disaggregated data to support evidence-based policy-making, as the same may also impact other challenges arising from the climate/ natural or other unforeseen crisis.

Hence, the paper aims to describe the benefits and challenges arising from the establishment of such a data exchange concept named 'Data as Taxes', by developing an Inclusive Data as Taxes Framework based on a technical, institutional, and normative blueprint, highlighting how this framework may not only stabilise the increasingly pressurized international tax system and form a counter-model to isolationist tendencies, but can also help in transforming the digital data economy into an innovative blessing by data incentives through cross border data flow. This might also reduce international tax competition and ease monopolist tendencies.

**Keywords:** Data Economy / Data Justice / Data Sovereignty/ Tax and Data / Data as Taxes / Pillar 1 / Pillar 2 / Tax Incentives / Tax Competition

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# SECTION I

Introduction

## 1 BACKGROUND OF THE DATA ECONOMY

The Data economy can be defined as the universe of initiatives, activities, and/ or projects whose business model is based on exploring and exploiting the structures of existing databases (traditional databases and those originating from new sources) to identify new opportunities for generating products and services. [1] Some of the key characteristics of a thriving data-driven economy include, amongst others, the availability of datasets from actors across the economy, the necessary infrastructure to enable businesses to access data across sectors, markets, borders, and languages, and the existence of knowledge and skills within companies that would enable data sharing and re-use. [2]

Data is thus regarded as the central anchor point for most digital transformation, i.e. it is the lifeblood of the digitisation process. [1] Cloud storage, new data science techniques, dramatic increases in processing power and speed, as well as the further development of Artificial Intelligence (AI) have all enabled economic actors to unlock new insights from their data

assets [3]; companies are implementing data-driven business models/ data-driven decision making and strategies to attain competitive 'data advantage' in the market.[4] Emerging data-driven technologies and economies facilitate interests in making data a new economic value (data commoditisation) and consequently identifying the new properties of data as economic goods. [5]

The volume of incomprehensibly large data store is expected to increase substantially in size every three years (with the increase in market size - as depicted in the Figure 1).[6] This sheer increase in quantity has pushed data up the political agenda, capturing the attention of businesses and policy-makers alike.

Even data created, collected, or used in individual business processes may be sold to other organisation in raw/rich or rather unprocessed / processed form to have an additional source of revenue; hence it can be regarded as a product in itself rather than just being the enabler. [7]

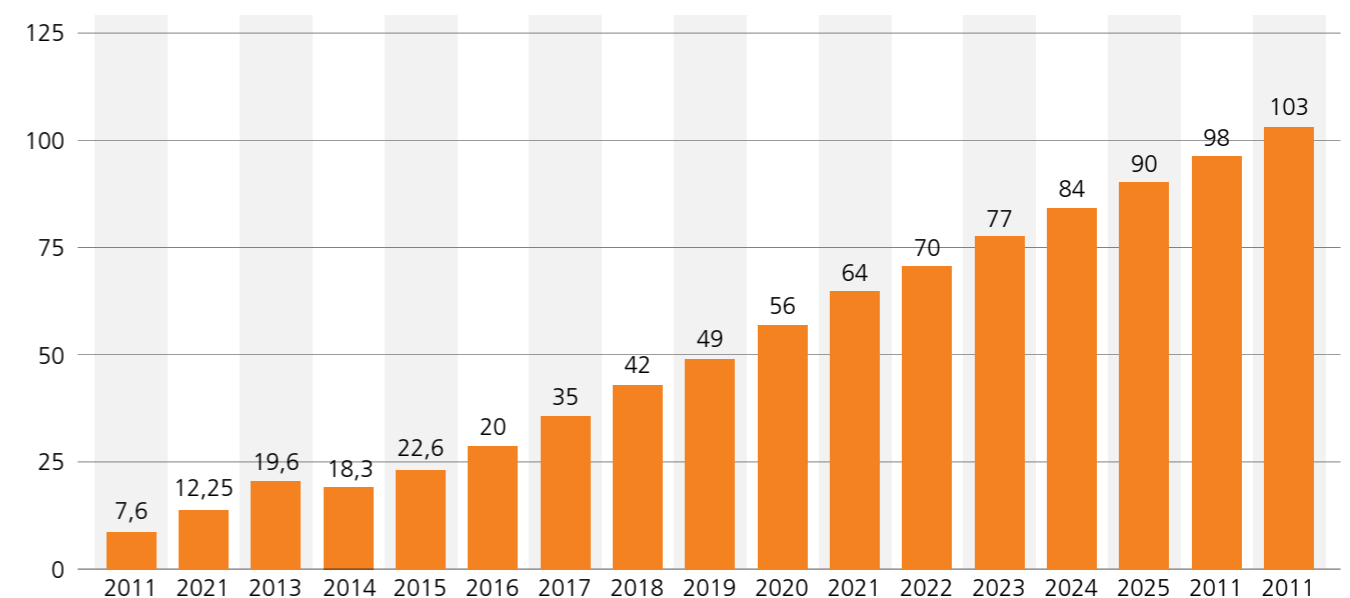


Figure 1: Use of public cloud computing in companies in Germany from 2011 to 2019 (KPMG Cloud Monitor 2020)

Therefore, it might come with no surprise that we will see more countries jostle over data as data becomes ever more valuable. Data plays an enormous role in politics and the question of how it changes the power structure of the geo-economics, like the nations around the world attempt to have an economic advantage [8] by improving their productivity with data [9], trying to control the cross-border data flows [10] to harness data as an asset. [11] This can also be reflected, for e.g., by the European Union (EU's efforts to catch up with their economy by establishing a cross border data exchange, like the GAIA-X exchange system (which would create a European alternative to the U.S.-based cloud services that currently store most European consumer and business data) or the European Data Governance Strategy. [12] At the moment, those instruments aim to foster the availability of data for use by increasing trust in data intermediaries and by strengthening data-sharing mechanisms (e.g., across the EU with the Data Governance Act [13] or the implementation of a Data Innovation Board). [14] This form of standardisation is a necessary first step for a (cross-border) data exchange flow. [15]

On the other hand, highlighting the robust correlation between data sovereignty and competitiveness, Peter Altmaier, Germany's federal minister for economic affairs and energy, said GAIA-X would help 'further the digital sovereignty of Europe' through strengthening 'competencies in key technologies' and push the development of a 'potent gigabit-infras-structure.' [16]

Another example might be of communication by Indian Minister for Communications and IT, Ravi Shankar Prasad, that India would not compromise its data sovereignty after the country blocked 59 apps from Chinese developers because of sovereignty and security concerns. [17]

Considering the above discussion and data being one of the most debated topics (from different perspectives – sovereignty, governance, privacy, taxation, localisation etc.) of the current period, the following questions arise to ponder upon from business economics and taxation perspective amongst various other questions:

- i) How can data be priced fairly, considering the cost of privacy and security breaches, to share the gains of the data economy?
- ii) How does the price of data affect countries' comparative advantages in data and product markets?
- iii) How does the rise of monopolies in the data economy affect income and wealth inequality?
- iv) How does the rise of monopolies affect investment in other sectors of the real economy?
- v) Should firms in the data economy be taxed differently, and most importantly – how?

Answers to these questions, though not easy to derive, will allow us to ensure that the data economy works for all, and not just, as the United Nation (UN) puts it, 'for few innovators and investors that capture all gains and delivers sustainable development outcomes'. [18] In the next section, we discuss how the data business and typical data ecosystem business model works.

## 2 DATA BUSINESS AND THE TYPICAL DATA ECOSYSTEM BUSINESS MODEL

In the data economy, value is not created by a single actor but by a combination of different actors, some of which may be part of the data ecosystem/ value chain. [19] Also, a value chain consists of different actors conducting one or more activities, and each activity can consist of several value-creating actions or techniques. The value of data grows exponentially when it is connected and combined with other heterogeneous sources; this shows the importance of data fusion and big data integration (interoperability). [20] Just look at the data value chain figure, describing the process of extracting, analyzing, and using data from collection, publication, uptake to impact, separated in production and use. Also, there are many ways to describe digital data business models.

Therefore, we think that a typical data business model must reflect not only the variety of actors, all contributing cross border flowing data to the platform but also their interconnectivity and their impact on value creation and value capture part and its focus on the outcome (services).

Those data ecosystem businesses are at the forefront of the digitalised economy. They might have the only capacity under SME and even MNE to provide proper data governance. It is argued that several companies (like Facebook or Amazon) believe their greatest asset is the data they hold (i.e. their entire business model revolves on data). [21] However, although the companies and their investors are well aware of the value of that data, and although data companies are set to grow increasingly rich and powerful, it seems that accountants, regulators, and governments have still to catch up with this new reality giving rise to broader challenges of fair allocational issues. [22]

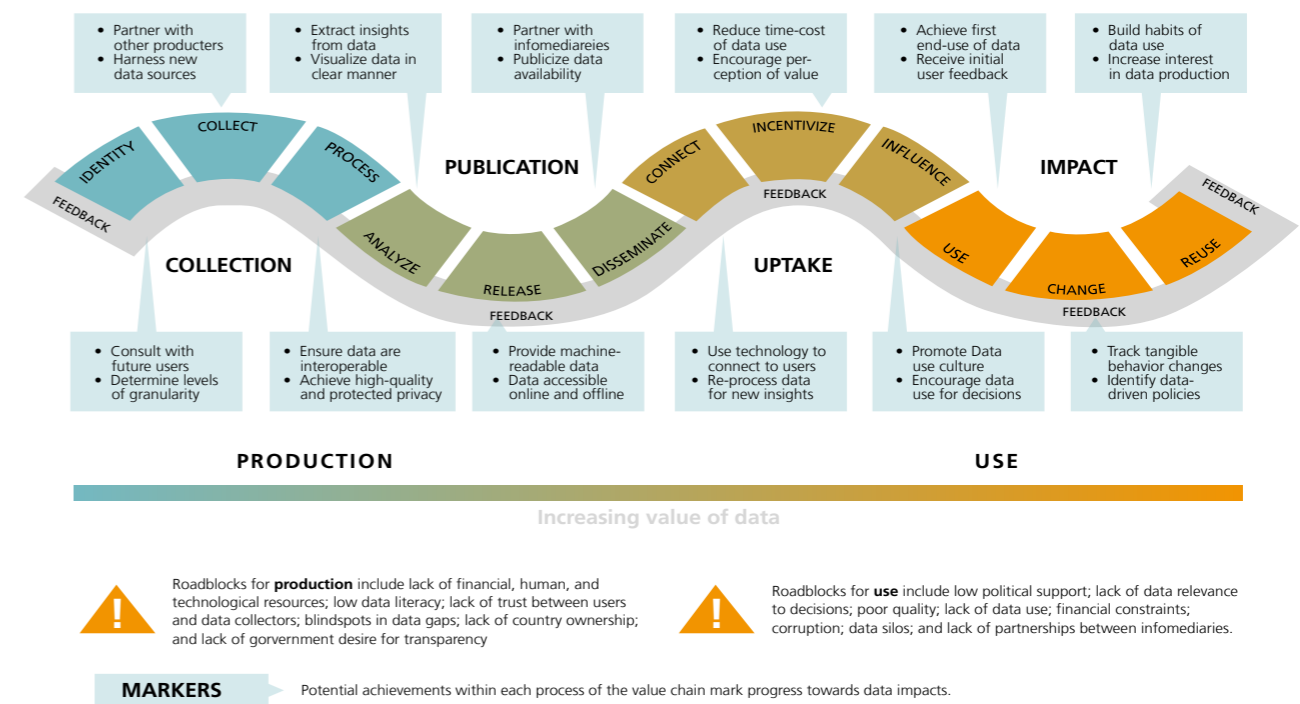


Figure 2: The Data Value Chain: Moving from Production to Impact / Source: The Data Value Chain: Moving from Production to Impact – Open Data Watch

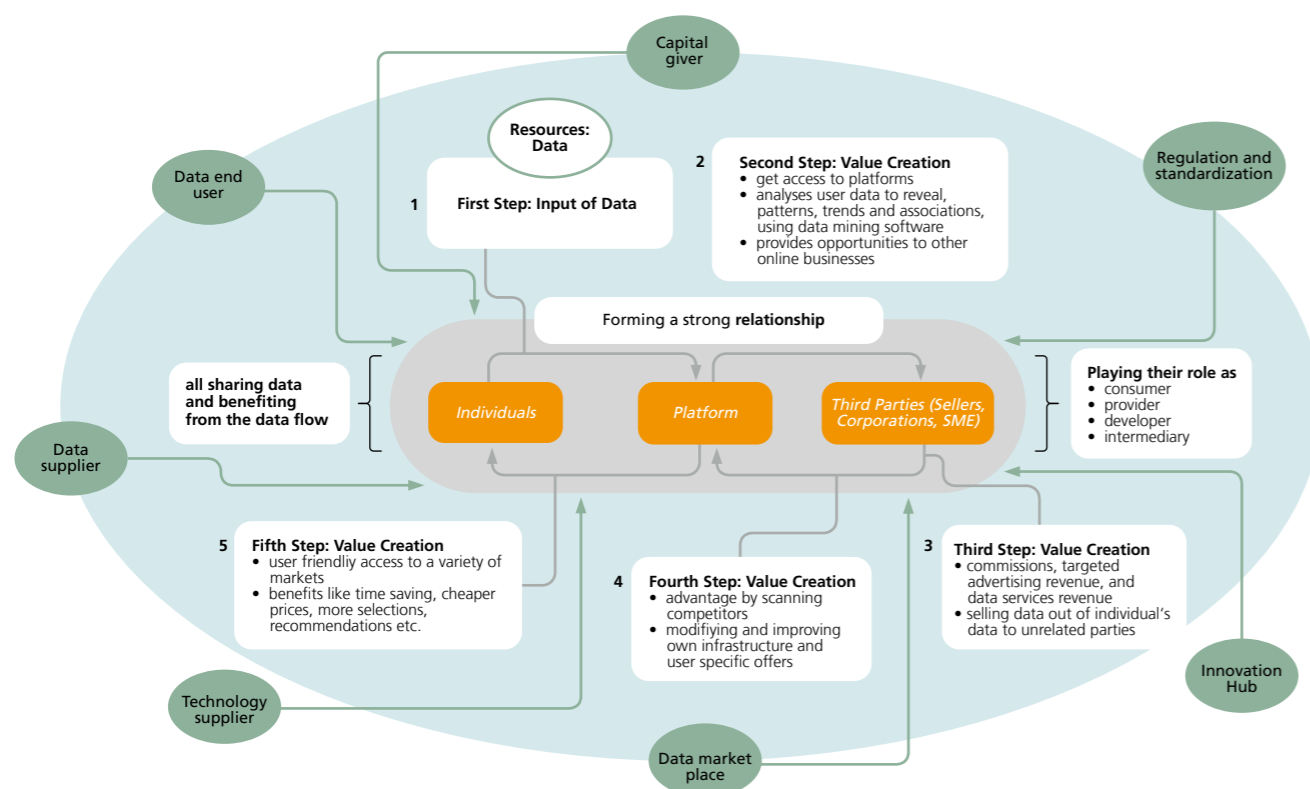


Figure 3: Data Ecosystem Business Model / Source: Confluxdata, Digital and Data is the Talk of the Time, available at <https://confluxdata.net/f/how-a-value-chain-analysis-can-capture-the-value-creation-of-data>

### 3 CURRENT IDEAS REVOLVING AROUND THE TREATMENT OF DATA

It does not come as a surprise that the current discussion regarding the treatment of data revolves around a variety of topics (mentioned earlier too), starting with the use of data as a greater time saver (e.g., in the form of automated tax returns [23]), to more data protection (e.g., in the form of different GDPR-rules in different jurisdictions), towards the idea of data common [24], data trusts [25], and even repossessing your data from a consumer/user perspective to gain full data sovereignty (e.g., in the form of the creation of a digital avatar who controls the individual data flow and allows a tradeoff directly between business and consumer/user, [26] so-called

Personal Information Management Systems or self-sovereign identities (SSI). [27] E.g., SSI is often built on distributed ledger technologies (DLT) like blockchain; self-sovereign identities rely on encrypted data stores (a.k.a. wallets), gathering a person's identity attributes and enabling individuals to decide, on a case-by-case basis, which piece of information to share and with whom, thus giving them complete control over their data. Over the last five years, many small-scale SSI projects have been launched worldwide, e.g., Sovrin [28] or DECODE [29]. Considering the geopolitics of cross-border data flow treatment and the fear of missing out on the next technological revolution, the importance of data is increasing, giving rise to more challenges.

### 4 DATA ECONOMY IN THE CONTEXT OF INTERNATIONAL TAXATION AND ITS ALLOCATIONAL CONFLICT

However, the data economy is not just a problem of how to treat data along with competition (law), privacy (law), and their effect on international policies, but also of elemental concern for taxing the increasingly digital and data economy *fairly*. The increasing transmission of the economy into a digital and data economy and various associated changes in the modes of operation have led to a situation where existing international tax rules are said to have not been able to keep pace with the changing situations. Under the current system, the fundamental anchor point and tax nexus for the allocation of profits to the MNEs is mainly linked to the existence of Permanent Establishments (PE). Once PE is established, the allocation issues (dealt with under business profit article of the tax treaty) relies more on the significant people's function – although people might not be the one crucial element of an economic presence in a market state in times of digitalisation and automation anymore. [30] It is argued that under current international income tax rules, these jurisdictions have no or minimal rights to tax such a company even if the company has a significant and sustained economic presence (but no or limited physical presence) in a jurisdiction because of the non-existence of permanent establishment criteria in the market jurisdiction/s. [31] Even if there is a taxable nexus and, therefore, right to tax, to allocate the profit between the jurisdiction, it is necessary to determine the appropriate transfer price for cross-border supplies and services between the various business units of the various business units the group. The problem here is: it is not only unclear what exactly 'data' means [32], but also whether, and if so, how a value should be assigned to the specific data set, data service, or data-driven function. [33] In this respect, an adaptation of the national/ international tax law to the increasing digital data-driven business models and functions is considered long overdue. [34] The ongoing debate on taxation of the digital economy and the solutions on the plate all aims to allocate a fair share of distribution to the market economy and questions the existing profit allocation methodology.

However, it is doubtful whether these reform proposals in place will consider all the digital and data economy problems.

Of course, when talking about the modern economy, we are talking about innovations of using people, technology, capital, and not only data, to become a frontrunner business and monopolist with the help of the network effect. It may be even controversial what value contribution raw data exactly makes [35], or whether the processed data and its transformation into applicable knowledge must not be regarded as the only key value driver of modern digital business models. [36] However, regardless of the exact impact of data, there is agreement that the collection, analysis, use and monetisation of data has become the basis of modern digital business models through the results obtained by the use of artificial intelligence, machine learning and deep learning of the data sets. [37] Typical examples of such digital business models of the 'data economy' [38] are not only platform economies but also algorithm-driven business models as well as digitised technologies that connect technical machines (Industry 4.0), [39] insofar as digitalisation has allowed businesses to collect and use data across borders to an unprecedented degree, forming digital data ecosystem monopolies. [40]

The extent to which data and users contribute to the added value of digital data-based business models is therefore discussed within the worldwide tax community: For example, institutions such as the OECD [41] and the European Commission [42] agreed in principle that so-called Highly Digitalised Businesses are dependent on data and that these are to be regarded as key value drivers and basic frameworks of modern companies [43]. In the area of automated digital services – such as sales or other use of user data, social media platforms and online search engines – one of the basic ideas is that these revenues are generated, one reason being - based on (user) data. [44] However, a fundamental question for tax law is whether this should give the respective source or market state to which the data can be assigned a right of taxation.



## 5 INTRODUCTION OF OUR PROPOSED FRAMEWORK

Considering the possibility of cross-border exchange of data (taking into account the other developments in this area), the paper aims to analyse that whether the problem of distributional justice could be reduced – not by taxing the data or their collection, profiling, storage in the server in the source country and evaluation, but by exchanging the data extracted from the respective state as taxes for the entry to the market and its resource data. [45]

To sum it up: instead of paying a certain portion of taxes in money, one might think about contributing the key value driver of modern businesses itself – data. Moreover, by data, we mean either in the form of a (raw or aggregated) data set that the data business extracted and is shared with the jurisdiction where it was extracted from. Alternatively, in the form of sharing a data service, which is based on the data sets extracted by MNE or by data sets provided by administrations, businesses or individuals – although in this case, not the data itself is shared (and remains within the MNE), but the Big Data Analysis provided for the specific need of the jurisdiction actor's demand. The reason behind this might be simple – instead of considering the return on investment in the data business, we expand this idea and focus on the return of data one get for investing in a specific marketplace.

Such a transformation of data in a common asset might allow the built out and expansion of the respective national digital infrastructure or private-public partnerships. A movement towards partial payment of taxes in data only for handling the problem arising out of digitalisation rather than money could turn a portion of private assets into common goods. [46]

Several barriers may arise in creating such a system because of various laws and regulations found in multiple jurisdictions (some being data protection laws (which includes data privacy laws, data localisation/ residency laws and restrictions on cross border flows of data),/ data sovereignty issues etc.). [47] The lack of trust between governments, their tax administrations and MNE's, the protection of the MNE's business secrets as well as the personal data of the customer (data security), and the question of the data sovereignty of the data customer, the unknown way of transforming or using this data as knowledge for the use of infrastructure (interoperability of data), and the creation of a multilateral organisation in times of isolationist tendencies, as well as the effort for the establishment of new normative approach deviating from existing norms, are challenging the concept of data as taxes.

However, there are off course, benefits to implement such a concept, some being that there is a need for addressing the challenges arising from the taxation of the digitalised/ data economy adequately, further, that data as a common good might turn the resource curse 'data exploration' into a 'resource blessing' for the greater good by enhancing nation' infrastructure globally and therefore their ability to improve citizen's life and maybe even hinder the increasing monopolisation [48] of the digital world. That is because data conveys significant social, economic, and political power. Unequal control over data — a pervasive form of digital inequality — is a problem for economic development, human agency, and collective self-determination that needs to be addressed. [49]

Therefore, data as the key resource of the future might be better allocated in a multilateral approach. Because instead of

letting the consumer/user bargain with MNE alone to repossess their data, the state enforces more efficient data sovereignty by regulating the cross-border data flow, and, as the representative of the citizen, level the playing field in a way a consumer/user alone could never be able to. [50] Such a system could enhance people, businesses, and the public sector to control their data by establishing a data space interoperable across sectors.

According to a study from the European Commission about B2B sharing within the European market, businesses already recognise the potential benefits of the concept of a data marketplace [51], stating that *Future data suppliers expect that data sharing may help them to establish partnerships with other companies, monetise their data and generate additional revenues, and support innovation. Future data users foresee that accessing data from other companies may increase the possibility for developing new products and/or services, improve their relationship with clients, or enhance their catalogue of products. Companies also indicated the factors that can potentially increase their willingness to share data in the future, including legal clarity about 'data ownership rights, the ability to track data usage, and increased certainty about the nature of and procedures related to licensing agreements. Companies engage in B2B data sharing and re-use to enhance their business opportunities and improve internal efficiency. Both data suppliers and data users share and re-use data with/ from other companies to explore the possibility of developing new business models and/or new products and services i.e. the same data can be of multiple use and can be exploited for multiple purposes and multiple parties without the data supplier losing ownership over it. Additionally, data suppliers*

*appear to engage in B2B data sharing to establish partnerships with other companies and generate revenue from their data's monetisation. In turn, data users seem to be interested in accessing data from other companies to enhance their catalogue of products and/or services, as well as to improve their internal efficiency.*

Connecting B2B data sharing with the obligation (or choice) to pay for the greater good and entrance of the marketplace might give new insights for reforming the pressured international tax system. Additionally, this approach could serve as a blueprint in general how to establish a sophisticated Global Big Data Governance Structure and its cross-border data flow – not only for the use of corporate tax regimes, transfer pricing but also for VAT or customary tax regimes.

## 6 LITERATURE REVIEW

Several institutions are discussing the new ways of reforming the old international tax system, evaluating multiple alternative solutions, for ex: expanding the idea of a digital permanent establishment (e.g. brought forward by the EU Commission earlier) [52], the UK study on user-based tax (UK user participation proposal) [53], a new type of intangibles (US marketing intangibles proposal) [54], the re-allocation taxation rights in general (OECD Unified Approach (Pillar 1) [55] or a Global minimum tax (Pillar 2) [56], a form of other digital tax (like the UN proposal on automated digital services [57] or the wide variant of unilateral measures adopted by countries for taxation of the digital economy [58]), along with a multitude of technical advisories of how to understand the data economy and its value creation as well as its valuation of data in a way to tax it more adequately [59]. A larger thought was given earlier by the French researchers (Collin and Colin) on the taxation of data. The report they drafted for a Taskforce on taxation of Digital economy [60] is testimony to it. Reproducing a para from page 121 of the report:

*Data form the raw material that fuels the digital economy. They have a special value that economic science and government statistics still have trouble capturing. They are produced by the 'free labour' of Web users contributing to the output of digital economy companies that the tax system has a hard time measuring. This means that any special tax needs to be designed about user-generated data and the use of these data. In the short term, without waiting to see how international negotiations on taxing profits turn out, we can introduce tax incentives based on companies' use of the data that they*

*collect through regular and systematic monitoring of the activity of the users of their applications.*

However, despite the variety of proposals for taxing the digital data economy by various multilateral institutions, different countries and scholars around the world, there seems to be only a few who have suggested that one might think about connecting the concept of data as a (common) commodity with International Taxation and including it within the corporate tax regime. [61] This comes with a surprise, as the concept of data as a commodity, e.g., trading data, e.g., on a B2B level, is not new, what a study from the European Commission pointing out that distinct business models for engaging in B2B data sharing already exists within the EU [62], like

- Data monetisation: unilateral approach under which companies make additional revenues from the data they share with other companies. Companies can enter into data sharing agreement with different companies/ marketplaces with whom they can anonymized data or through the provision of other services
- Data marketplaces: trusted intermediaries that bring data suppliers and data users together to exchange data in a secure online platform. These businesses make revenue from the data transactions occurring in the platform (data marketplaces are gaining increasing popularity in various domains. A few data markets have established themselves in recent years [63], e.g., Infochimps (infochimps.com), Factual (factual.com), Azure (datamarket.azure.com), and DataMarket (datamarket.com), catering to the requirements of the business world [64].

- Industrial data platforms: collaborative and strategic approach to exchange data among a restricted group of companies. They voluntarily join these closed, secure and exclusive environments to foster the development of new products/services and/or to improve their internal efficiency. Data may be shared for free, but fees may also be considered.
- Technical enablers: businesses specialised in and dedicated explicitly to enable data sharing through a technical solution. Revenues are obtained from setting up, using, and/or maintaining the solution (not from the data exchanged).
- Open data policy: companies that opt to share data for free to foster the development of new products and/or services.

However, although research on the question of how a data-sharing mechanism, in general, could work, already exists, analysed from a variety of disciplines like computer science [65], political science [66], economic science [67], or even legal aspects [68] (mainly with a focus on privacy law or competition law) [69], only the Innovation Editor of the New York Times Thornhill has brought forward the concept of Data as Taxes – in a two-page article. [70]

## 7 STRUCTURE OF THE ARTICLE

Considering the problems arising with the introduction of such a concept for a variety of reasons, beginning with technical problems, institutional (and above all national) sensitivities, as well as legal questions starting with Data as Taxes as a foreign object within the international tax system to being an issue of EU, WTO, and International Law as well as privacy law, the paper aims to describe the benefits and challenges arising from (the most plausible and feasible) establishment of such a data exchange concept named as 'Data as Taxes' in a five-step approach:

Step 1: Setting the technical framework to evaluate a blueprint of how data exchange between data-driven businesses and tax administrations worldwide might work, considering several inter-related factors such as data interoperability, data sovereignty, and data security/ privacy issues etc.

Step 2: Alternatives for establishing an institutional framework for the regulation of the proposed mechanism along with the rules for trust for a data institution, considering concepts from decentralised autonomous organisations.

Step 3: Evaluating the normative framework (this includes discussing how data allocation rule can be compared with existing profit allocation rule and how a legal data allocation rule can be implemented).

Step 4: As the above three steps are interrelated and rely on each other, in this step, we described how a merger of the earlier three steps in the form of an Inclusive Data as Taxes Framework could look like.

Step 5: Evaluating the proposed framework considering the Ottawa's taxation framework [71] five elements effectiveness and fairness, certainty and simplicity, flexibility, neutrality, and efficiency (as the Ottawa convention principles had become one of the central anchor points for assessing the Taxation of the Digitalized Economy) as well as a brief analysis from the point of view of some of the EU, WTO, and International Law Regulation. The assessment includes a comparison between the proposed framework's benefits and downsides compared to the Status Quo



# SECTION II

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Establishing an Inclusive Data as Taxes Framework with a Technical, Institutional and Normative Blueprint

If we want to establish a Data as Taxes Framework, we need to build the technical, institutional, and normative blueprint to include them in a most plausible and feasible concept. As per Demchenko, modern data architecture should handle big data V-properties some of which are volume, velocity, variety, and addressing data variability, veracity, value etc. [72] Apart from these, it should be cloud-based, elastic, customer-centric, automated, adaptable, collaborative, governed, secure, trusted besides supporting heterogeneous data exchange at different processing stages. [73]

## 1 STEP I: THE TECHNICAL BLUEPRINT

To establish such a data architecture for the proposed data as taxes framework, we start by discussing some of these questions: what data sets should be exchanged and in which form, which documentation system would allow interoperable data exchange, and how to establish a safe and trusted data exchange mechanism and what could be the probable solutions. Building on discussions surrounding these questions, we establish the technical blueprint for data sharing and exchange mechanism, suggesting two different sorts of mechanisms to let MNEs share aggregated data sets with jurisdictions and to give data services to the jurisdictions for the data collected from that jurisdiction.

### 1.1 GROUND BARRIERS FOR A TECHNICAL BLUEPRINT

#### 1.1.1 The question of the right data:

In which forms data should be exchanged (i.e., raw data, semi-processed data, processed data etc.)? This problem arises because of the heterogeneity in data forms [74] which enables it to be exchanged either in standalone form or in combined forms. However, if the concept of data as taxes would boost/increase innovation, it is difficult to exclude a type and form of data from the beginning, as every data type might be useful for some or the other task depending of the purpose and business line for which it is to be used, e.g.: [75]

- Health data can be used for research and clinical purposes – mainly for improving personalised treatments, providing better healthcare facilities and appropriately using available funds, setting up mechanism to deal with some other health crises (e.g. with Vital parameters of individual patients, health records, data from hospitals, doctors and other institutions, medication data). Thus, healthcare can be transformed by machine learning algorithms and AI for vaccine development, drug discovery, and rapid low-cost disease diagnosis.
- Environmental data: for combatting climate change, reducing CO2 emissions and fighting emergencies, such as floods and wildfires or other climate crises situations.
- Agricultural data: for developing precision farming, new products in the agro-food sector/ organic farming and use of more automated techniques in farming sector.
- Public administration data: for delivering better and more reliable official statistics and contributing to evidence-based decisions.
- Mobility data: e.g., sharing data on a European level might save more than 27 million hours of public transport users' time and up to €20 billion a year in labor costs of car drivers thanks to real-time navigation, as well as reduce time stuck in traffic and has benefits for the environment, due to reduced CO2 emissions and air pollution. [76]
- Supply chain optimization: The success of the supply chain network heavily depends on the availability of data and its effective processing. [77] Its provision is crucial to successfully enable a data ecosystem in logistics. [78]

- Financial services data: The flow of data reduces fraud in real time and can offer probable solutions to money laundering by revealing patterns of misuse of the system.

However, it requires the following considerations:

- Each of these forms may require different digital documentation approaches.
- Different data and its forms can have a varying degree of efficiency for the innovation boost.
- Also, the priority of different jurisdiction varies as all jurisdictions are not at the same level of development.

Hence, data transformation and translation services are required to homogenise the data available in different forms and formats. However, a catalogue service could enable both hosting metadata information and historical/provenance information about data sets and data transformation. The following summarises possible data catalogue properties and services needed for an exchange of data: [79]

- cataloguing data sets
- cataloguing data operations
- metadata catalogue
- searching
- data curation
- data quality assessment and data categorisation
- linking data properties and applications
- recommendations and relationships
- data sets evaluation
- data access policies and API
- usage metadata
- lineage/provenance
- integration and interoperability
- aggregating data sets as a method to make data sets comparable through organisational as well as technical attributes [80]

### 1.1.2 Digital Documentation system as an interoperable and trusted form of data governance

**Interoperability:** [81] The main objective should be to support a trusted data ecosystem providing easy-to-use privacy mechanisms and solutions that guarantee citizens and business entities ways to fully manage data sharing and consequential privacy concerns. The challenge is thus to provide a corresponding overall technical architecture that needs to consider the key reference platforms and technologies to support data sharing, to improve existing solutions and architectures, to define the overall reference architecture, and to design platform-agnostic trusted data sharing building blocks and interoperability.

However, the mechanism should also guarantee a minimum amount of security and sovereignty for the user and their privacy sphere/ for the MNE and its business secrets and should entail a mechanism to handle sovereignty issues of the countries based on trust.

- **Data Sovereignty:** [82] The framework should also support compatibility with various emerging legislation, like the EU's General Data Protection Regulation (GDPR) or other country-specific data protection laws and laws on free flow of non-personal data, as well as ethical principles, like IEEE Ethically Aligned Design. This will increase trust in industrial and personal data platforms, which will enable larger data markets to combine currently isolated data silos and increase the number of data providers and users in the markets. The result should aim to be platform-agnostic to be applied in multiple domains with platforms based on different technologies.

- **Trust:** [83] The quality of data is becoming arduous and have contributed to wavering public trust in data/ evidence and institutions in different parts of the world. Thus, the principle of transparency is probably the biggest and most complex challenge for data governance. New methods are needed to increase trust in data sharing so that more data would be available for new applications. What is needed is a framework that includes building blocks for data sharing, data management, data protection techniques, privacy-preserving data processing and distributed accountability and traceability. In addition to providing technology for platform developers, the framework should provide incentive and threat modelling tools for data sharing business developers and strategists who consider opening data for new cooperation and business.

A solution for an interoperable, secure, and sovereign way for the data exchange might be a feasible data governance system in the form of digital documentation.

As already highlighted earlier that a data value creation process relies strongly on the interconnectivity of various local actors, the contribution of cross border data flow, as well as on the use of intangibles, as shown in the Data Ecosystem Business Model; hence, a documentation approach based on digital documentation tools if modelled correctly should be able to take these factors into account. This modelling can be done via process/ data mining tools, application programming interfaces and blockchain-based distributed ledger techniques, or a combination of some other tools. Another alternative might be the use of Linked Data: In contrast to Web APIs, Linked Data mashups are statements that link items in related datasets. Rather than releasing data into the cloud untethered and untraceable, Linked Data allows organisations and individuals to expose their data assets in a way that is easily consumed by others whilst retaining indicators of provenance and a means to capitalise on or otherwise benefit from their commitment to openness. [84]

Regarding data security and data sovereignty, it is required to provide a certain degree of encryption with the mentioned documentation approaches. The data documentation might only be appropriate if it were not possible for the authorities to control the communication processes to obtain an associated knowledge of their contents (so-called individualised content). [85]

Nevertheless, there are already studies that show that process mining can offer that kind of protection of confidential data [86], and there are other ways of implementing encryption like qualified digital signatures through various secured mechanics— well known and used for decades [87] – which might be better suited and more feasible than the rather understudied approach of blockchain. [88] Though, we are not ruling out the possibility of use of blockchain which is definitely to live for ages to come.

Among these are the initiatives dealing with implementing distributed data architectures and the associated sovereign data exchange, and the associated possibility of annotating terms of use. This facilitates simple data exchange while adhering to compliance with regulations and economic considerations, such as the annotation of prices for data use under standardised and interoperable conditions. For example, the results of the International Data Spaces (IDS) [89] project launched in 2015 gave rise to a technological agnostic standard for sovereign data exchange. Data security and data sovereignty are indispensable in this context if data exchange across company and industry boundaries is considered. DIN SPEC 27070 [90] specifies the requirements for a security gateway for data exchange in terms of gateway architecture and cyber-security measures. GAIA-X [91] is a project initiated by Europe for Europe and beyond by the Ministries of Economy of Germany and France towards the end of 2019. It extends the requirements for a sovereign exchange of DIN SPEC 27070, which focuses on data in use, requirements and architecture decisions in the area of technical infrastructure and thus the perspective of data in rest. The goal is to identify common requirements

for a European data infrastructure and translate these into a technical specification and standard that ensures basic organizational organisational and technical regulations. Representatives from several European countries and other international partners are currently involved in the project.

From the perspective of documenting data exchange, the architectures of the above initiatives provide various components that make data use transparent and traceable. In the architecture, the clearing house is worth mentioning in this regard, which 'logs all activities performed in the course of data exchange. After a data exchange, or parts of it, has been completed, both the Data Provider and the Data Consumer confirm the data transfer by logging the transaction details at the Clearing House. Based on this logging information, the transaction can then be billed. The logging information can also be used to resolve conflicts (e.g., to clarify whether the Data Consumer has received a data package or not).' [92]

The architecture model of GAIA-X references these functionalities and uses the concept of GAIA-X Federated Services to map the data exchange transparently and documented via the corresponding infrastructure. The GAIA-X architecture addresses

- Logging and Auditing, which refers to the access to runtime log information that is generated by a Service or Node
- Monitoring and Alerting, as access to status information of Services and Nodes
- Metering refers to access to performance indicators and consumption statistics as core elements, thus forming a feasible digital documentation system for an Inclusive Data as Taxes Framework.

### 1.1.3 Interim Conclusion

Such a data exchange could help identify which kind of data shall be shared in a feasible manner without the loss of personal data protection and trust, but might also allow the necessary control in respect to data localisation and value contribution from a tax authority perspective.

## 1.2 EXCHANGE AND SHARING MECHANISM BETWEEN MNE AND NATIONS

### 1.2.1 Two alternate possibilities

How could a feasible exchange and sharing mechanism between MNE and the respective (market) jurisdiction from which the data originates look like? One might think about obligating MNE to send data directly to governments. Such a direct linkage requires data storage the Government as well other data user would have direct and unrestricted access to. However, regarding data sovereignty and the problem of governmental run data storages of personal data and the issue of business secrecy, a data institution should not be established for storing the data. Thus, we dismiss the idea of a "direct linkage", as MNE should not send their data directly to governments.

Therefore, the concepts of exchange to be considered further are either the establishment of a mechanism where data sets are sent from MNE to a form of data marketplace institution, where they are collated, processed, and conditioned, and sent through a form of search & inquiry or tendering to the respective market jurisdiction. Alternatively, putting aside the concept of an intermediary in the form of a data institution and thinking about MNE offering data services in the form of ready to for use mobility, health, or agriculture analysis on-demand purposes or based on tendering by the respective market jurisdictions. Both concepts do not require data storage accessible from the Government, but instead rely on an indirect link between Data Storage and Data User.

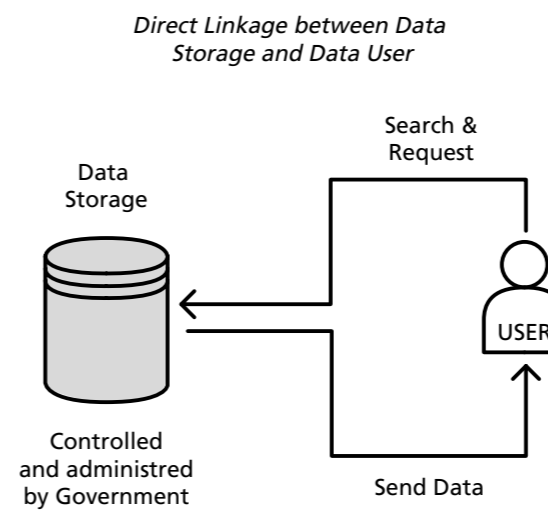


Figure 4: Direct Linkage (Source: Own)

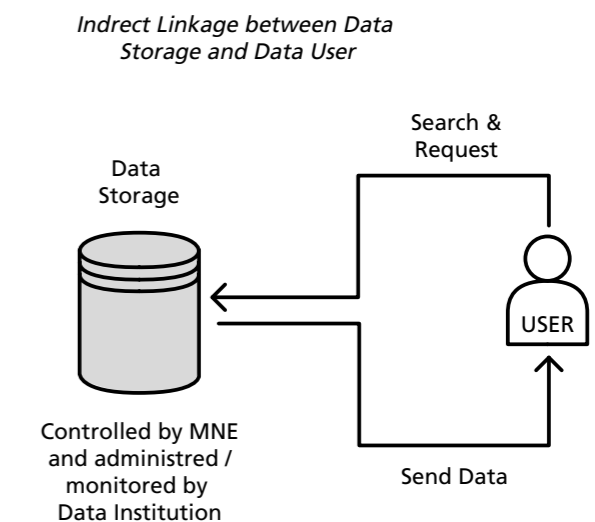


Figure 5: Indirect Linkage (Source: Own)

Nevertheless, both concepts have their ups and downsides. If the intermediary is skipped as a control and clearance mechanism, it might be better suited if it is aimed for better privacy and to keep business secrets intact. However, the downside of a concept without an intermediary would be a lack of control and clearance mechanism. As there can be different alternatives to this point, below, we have provided a short overview of the possible mechanism with an intermediary (Variant A) and without an intermediary (Variant B).

### 1.2.2 Variant A: The exchange of Data Sets and the need for a data market-place

#### 1.2.2.1 General description of a data-market place within a data ecosystem

Data marketplace platforms serve as a data intermediary instance that can provide the technical infrastructure to multinationals for exchanging data between data providers and data buyers. This intermediary instance is often called a 'digital broker'/'data-trustees'(pertinent to mention that there are existing data marketplaces which provides users data sets for purchase). Crucial for a successful Data Exchange and Sharing mechanism is the presence of an adequate Data Provider System: [93]

- A data provider makes data available for being exchanged and/or shared between participants in a data ecosystem. Data providers lay the foundation to successfully engage in data ecosystems internally within the organisation. The data provider requires a precise overview of existing data assets and which business models can be realised with these assets. Ideally, data providers can specify their data resources and performance evaluation techniques regarding their value proposition.

- Elaborating on pricing models for data requires a high maturity in the management and governance of data. The whole data life cycle from the generation until the provision on data marketplaces depends on adequate governance structures that allow having transparency over the relevant data assets.

The better a Data Provider can ensure a feasible aggregation of data along with Data governance & clearing and Data arbitrary & trust approaches, accordingly the value of data in the marketplace may vary.

Questions arise as to whether a data marketplace should be based on a centralised or a decentralised approach. In the decentralised approach, all relevant and possibly sensitive raw data always remains with the data provider and is only transferred directly – peer to peer – to the buyer/puller in the event of a purchase. The data marketplace only stores the data descriptions (metadata) and has no access to the raw data at any time. [94] However, as some centralised institution might be necessary, considering the need for a trusted arbitrary/clearing/governance institution and some degree of control, above all in the context of International Taxation, we base our model on a rather centralised approach.

#### 1.2.2.2 A three-step approach to exchange and share data sets

A feasible exchange and sharing mechanism could be based on the following three-step approach:

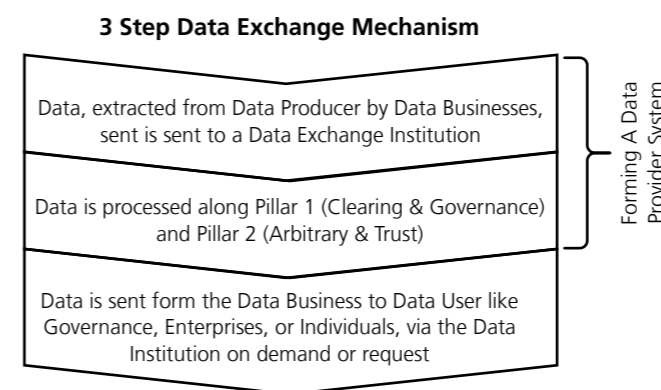


Figure 6: Data Exchange Mechanism (Variant A)

**Step 1: Data Sending:** In this step, Data is sent from an MNE to a Data Exchange and Sharing Institution. This step heavily relies on the right data, adequate aggregation of data sets (anonymised/encrypted personal or company-related); data, which is extracted and used for value creation and capturing purposes by the MNE using data catalogues. [95]

**Step 2: Data Processing:** This consists of Data processed by a Data Institution (see Institutional Blueprint). By data processing here we mean, i.e. segregating the data sets on certain criteria so as to make the processed/ analysed data results usable for the Government. The Data Institution relies on two Pillars: Pillar 1 provides the necessary Data Clearing and Data Governance as a form of technical preparation of the Data for the Data Exchange & Sharing. Pillar 2 provides the necessary Data Arbitrary and Data Trust as a form of normative correction for the case the Data Exchange & Sharing mechanism is questioned by the participating parties (see Institutional Blueprint).

**Step 3: Data Sharing & Exchange:** This step consists of the processed Data along Pillar 1 and 2, shared and exchanged with

Data User for various applications, covering a wide range, e.g., mobility, environmental, public administration, or agriculture purposes. However, the open questions remain: First, who can access the Data (Personal Scope); secondly, for what purposes can someone access the data (material scope); how can the data be accessed (a direct or indirect mechanism)?

#### 1.2.3 Variant B: Governments gives the algorithm that MNE's can run on the data and provide data services

However, if we want to develop the data exchange mechanism further and bring it to another level, a feasible approach might be to try overcoming the role of the intermediary. This is like the idea of the indirect linkage (Figure 7). But in this variant, we leave out the intermediary and think about an exchanging mechanism with any direct administration or monitoring of the data storage from the market jurisdiction.

Insofar, we suggest that rather than getting hold of the MNE's data, governments can give algorithms to the MNE's which they can run on the available data and provide the results to the Government. However, the algorithm should be designed so that the results from running these algorithms would be compliant with data privacy and other laws and feeds the appropriate needs of the Government. In this case, data is exchanged in a three-step approach, as shown in the figure.

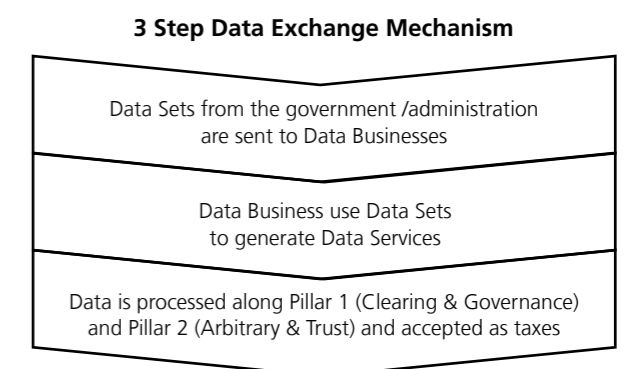


Figure 7: Data Exchange Mechanism (Variant B)

### 1.2.3.1 General description of a remote processing approach within a data ecosystem

The concept of sending the algorithm to the data is called federated or collaborative learning. It is a common technique that can be used to train an algorithm across multiple decentralised data sources without directly exchanging them, e.g. to control data usage by the provider. This approach contrasts with traditional machine learning techniques where all the local data had to be uploaded to a central instance (data user or intermediary). Federated learning enables to build a common, robust machine learning model based on distributed data without sharing it. Using the federated learning approach allows addressing critical issues regarding data sovereignty, such as privacy, security, usage control and access to heterogeneous data.

This approach ensures that the data does not leave the company, as the calculations and processing take place directly within the company's infrastructure and no data is leaked.

### 1.2.3.2 Steps to compute algorithms on remote infrastructures

**Step 1: Exchange application and agree on usage policies:** The first step is to exchange certified or attested applications between authorities and companies in advance and agree on common rules of play. This concerns the prerequisites for data processing (e.g., data types) and rules on regulations (e.g., that results do not contain any data relating to individuals). Changes in the application, such as a new version, lead to a renewed exchange and agreement of the rules.

**Step 2: Remote Execution:** When the time of processing is reached, the authority sends a data processing request to the company. The company deploys the pre-exchanged application and performs the corresponding calculations on the internal data sources. The calculations can be arbitrarily complex and may include several processing steps. The only important thing is compliance with the rules and result types agreed in advance.

**Step 3: Responding to the results:** After running the calculation on the internal data sources, including a post-processed compliance check, the company sends back the result to the authorities. This result only includes the processed data and no reference to the application's raw data. The approach of remote processing is depicted in Figure 8, which, for the sake of completeness, also include a reference to an instance of identity management performing an authorisation step to prevent abuse.

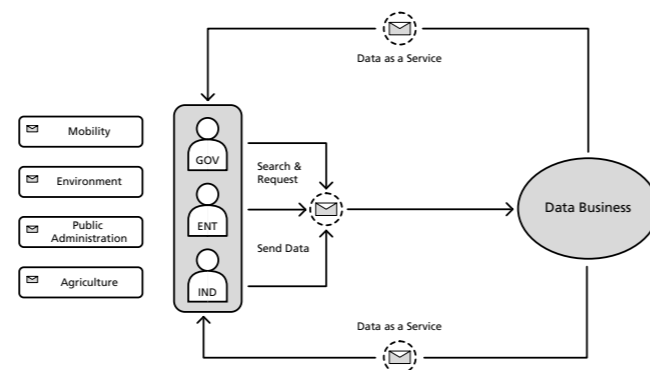


Figure 8: Approach of remote processing

### 1.2.3.3 Merging results for governmental data services

In order to produce benefits for the Government and to improve the results of the calculations for the provision or improvement of public services and sovereign tasks, the individual results must be collected and combined into an overall result. After the partial results have been combined, a result is available to the authorities, which can subsequently be used for value creation.

It is conceivable that this could be a merged data source of pre-processed data or, for example, trained models for artificial intelligence algorithms. While the former leads to the same result as the approach described under 1.2.2, with the difference that the company controls the processing steps, the latter results in statistical models and does not consist directly of data.

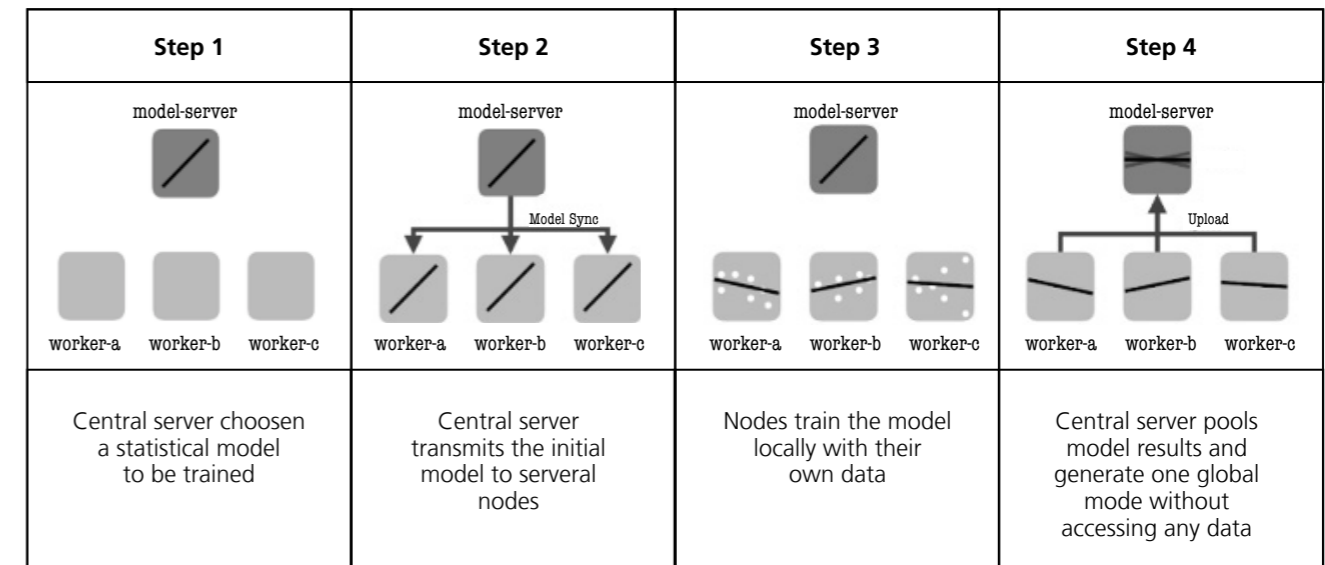


Figure 9: Federated learning general process in central orchestrator setup [96]

### 1.2.4 Personal and Material scope of the data set sharing mechanism

Both variants have implications for the handling of the data and the associated possibilities for use. The personal and material scope is decisive here.

#### Personal Scope:

Suppose we want to design a Data Market as a form of data pool to use for various applications like mobility, healthcare or public services, or personal services. In that case, we can identify three key data receiver/data user in our scenario:

1. The Government: Data could be used for building data infrastructure. This can help improve and foster public services by administration / governmental organizations organisations or private-public partnerships or to use it to improve other public services. This could include undertaking public-funded or organised research and development.

2. Private Sector: Data could be used by other companies, SME and MNE alike, to improve innovation and competition or earn additional revenue sources.

3. Individuals: Data could be used by individuals themselves to get back control over their data. Suppose individuals, they have access to the data marketplace. In that case, they could not only get an opportunity to know what kind of data is owned by third parties and, as a result, limit or prohibit further use; they could also use the data for their personal application, e.g., for applying for a bank loan/visa, finding out individual preferences, or start to trade their data.

#### Material Scope

If we want to design a Data Market as a form of the data pool, checks can be placed on the nature and volume of data that can be accessed from the market – Some argue that data is ultimately a public good. This is crucial, as a data market accessible without any restrictions might be a strong counter-



argument for the issue of individual and company secrecy and an incentive to not extract new data anymore for other companies than the already existing data monopoly companies. Therefore, there might be the following purposes for access to a Data Market, aligned to the groups of Public Interest, Research & Development, and Private Use.

- **The purpose of the Public Interest:** Although hard to define the general good of public interest, access to data could be allowed only for structural policies which address the problem of inadequate basic infrastructure provision and raise the standard of essential services, e.g., regarding transport, communications, water, energy, taxation, education (purpose of basic infrastructure). This purpose is instead aimed at the Government.
- **The Purpose of Research & Development:** Access to Data could be allowed for research & development activities for governmental as well as non-governmental organisations.
- **The Purpose of Private Use:** Access to Data could be allowed for Private use by those whose data was extracted from. Private Individuals could therefore take back control over the data. a feasible digital documentation system for an Inclusive Data as Taxes Framework.

### 1.3 INTERIM CONCLUSION

If designed correctly with a data governance documentation system, a technical blueprint for possible data exchange can be achieved, despite several ground barriers of the question of the right quality and quantity of data, of data interoperability, security, and trust. We presented two designs of how a data exchange might work. A design with an intermediary in the form of a data marketplace/ data trustee institution (Variant A) might better be suited to aim at the needs of control and clearing. In contrast, a design without an intermediary and, as a result, without direct governmental access to personal and business data might be instead accepted by governments worldwide, taking data privacy and sovereignty and other concerns into account (Variant B).

## 2 STEP II – THE INSTITUTIONAL BLUEPRINT

This section analyses the institutional reality and describes how the alternative approaches for an institutional blueprint might look like. First, we lay down general rules for trust as a basis for a data institution. In the next step, we have presented how a data institution in the context of International Taxation may look like, which is to establish either through a multilateral approach (with an organisational body embedded within the UN, OECD or EU) or a solo-national approach (with an organisational body embedded at a national level).

### 2.1 RULES FOR TRUST AS A BASIS FOR A DATA INSTITUTION

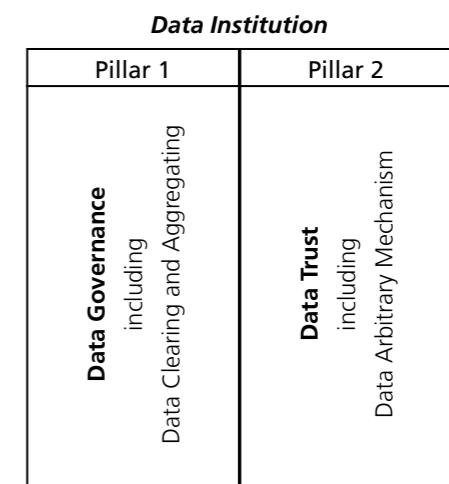
As elaborated above, there are different options to design a technical blueprint in a way that data interoperability, sovereignty, governance, and trust can be established. However, above all, trust through data governance are the cornerstones for a data institution.

Rules for trust through governance provide the basis for trusted relations between data market participants and reducing contractual and operational risk between participants. This includes the following rules, policies, and services: [97]

- policy framework and platform bound mechanisms to participate in and cooperate with parties in the data market
- models for agreements between parties in the data market and end-users, with engineering for scalable (software) contracts and supporting architecture
- compliance assessment tools of the big data infrastructure to enable trusted interaction between market actors
- infrastructure and transactions auditing for performance and disputes.

Considering these rules for trust through governance for a data institution and the mentioned challenges and options as elaborated in the technical blueprint, a data institution should include two pillars:

Pillar 1: Data Governance does not only mean the administration of data in the form of a policy framework and law but also (as shown above) a data aggregating and clearing mechanism to get the right data in the first place.



**Figure 10: Data Institution and its two Pillars**

Pillar 2: Data Trust does include rules for trust as a basis for a data institution. This form of a data trustee provides a neutral platform, assesses the quality of the data, addresses IT security, and ensures compliance with data use terms. [98] This means, above all, that rules in the form of data allocation model conventions (e.g., what kind of data is right, how to aggregate, send, and use the data, etc.) must be established and shared. But of significant importance is also a form of Data Arbitrary Mechanism Infrastructure that can audit the performances and solve disputes between the actors.

## 2.2 A DATA INSTITUTION IN THE CONTEXT OF INTERNATIONAL TAXATION

Suppose, we adopt those rules for trust through governance for a data institution in the context of International Taxation. In that case, it is challenging to say which actors in the International tax system can fulfil the task of it, still it is difficult to say which actors in the International tax system can fulfil the task of data governance and data trust and form the two pillars of a Data Institution. Because of the role of national and international policy-making organisations, we consider national/ domestic governance and their tax administrations and International Organisations like the UN and the OECD or some supra national body as the central actors to support Pillar 1 and 2.

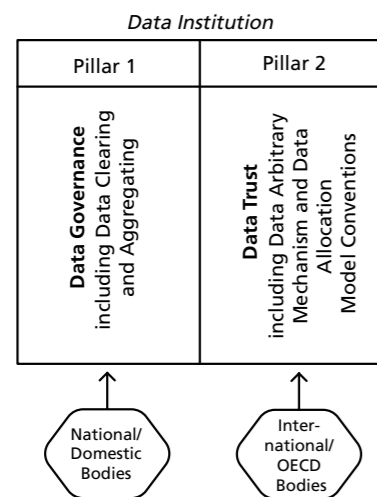


Figure 11: Data Institution in the context of International Taxation

To be most effective, but also realistic in a sense that governments around the world tend to hold their power (with good reasons regarding the massive impact of cross-border data flow), we propose an institutional framework that includes Data Governance managed by National / Domestic Bodies, and Data Trust managed by International Bodies such as the OECD or UN.

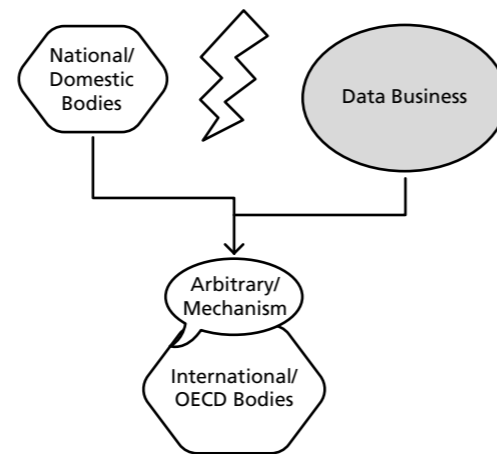


Figure 12: Conflicts in the arbitrary mechanism

Suppose, e.g., a data business is sending data to the data institution (Variant A of the technical blueprint, see 1.2.1) or a data business is sending data directly to the market jurisdiction (Variant B of the technical blueprint, see 1.2.2). In that case, the most realistic scenario might be that national/domestic bodies still want to decide if the right data has been allocated to their jurisdiction. For the case that national/domestic bodies consider this data (set or service) not right enough due to a lack of quality or security because it has not been made anonymous, both parties can refer to the Data Trust arbitrary mechanism to resolve the case.

Resolving disputes/ conflicts as an obvious step could be then turned to an arbitration committee supported by the supra-national bodies and also including representatives from various countries, as well as representatives of the Global Enterprises and independent external specialists (increasing the degree of harmonisation and at the same time creating a legal basis for the more intensive mutual cooperation that will be required from countries in the new profit tax system, as well as creating a legal basis for the role of a central body such as the OECD and for resolving disputes through an arbitration committee). *The Mutual Agreement Procedure* [99] might serve as an exemplary character.

## 2.3 DECENTRALISED AUTONOMOUS ORGANIZATION

However, as digital technologies are also changing the innovation logic of an organisation, instead of using classical mechanism we know from the context of International Taxation, a data institution for our concept might require a new kind of governance and organisation which diverges from the common management processes present today. In recent years, digital tools and platforms have emerged as facilitators of innovation and collaboration, enabling loosely coupled networks of firms to merge knowledge and capabilities to create competitive advantage. [100] Building on the architecture of smart contracts, new forms of entities are now emerging from the blockchain environment, called Decentralized Autonomous Organizations (DAOs). DAOs let participants manage resources in a decentralised manner through predefined governance rules inscribed on a series of smart contracts deployed on a blockchain [101], representing an innovation in the design of organisations, in its emphasis on computerised rules and contracts. [102] The blockchain keeps a record of data and transactions in a decentralised, and immutable form. The self-executing smart contracts on a blockchain ensure transparency and automation of the decision-making process in a DAO. [103]

*As Hsieh and Vergne put it: Imagine working for a global business organization whose routine tasks are powered by a software protocol instead of being governed by managers and employees. Task assignments and rewards are randomized by the algorithm. Information is not channelled through a hierarchy but recorded transparently and securely on an immutable*

*public ledger called "blockchain". Further, the organization decides on design and strategy changes through a democratic voting process involving a previously unseen class of stakeholders called "miners". Agreements need to be reached at the organizational level for any proposed protocol changes to be approved and activated."* [104]

As blockchain and smart contract-based technologies improve, the emergence of DAOs will likely accelerate. A legal, organizational framework which fosters political, legislative, and social debate around the governance of DAOs and codifies the current standard of governance is essential in establishing a consistent roadmap for a data institution. [105]

## 2.4 INTERIM CONCLUSION

An institutional blueprint must be built on the two pillars of data governance and data trust to establish a feasible data exchange mechanism. Data governance, meaning the administering and clearing of data, should be taken over by domestic/national bodies, while data trust, e.g., the establishment of a normative framework, including an arbitrary mechanism, should be taken over by multilateral institutions to establish the data institution as close as possible to become a data trustee. On-chain DAO governance can help to enable dynamic regulatory features that facilitate unprecedented decentralised regulatory solutions. [106] However, considering the early stage of development of DAOs, however, caution is needed, especially to potential protocol vulnerabilities and legal uncertainties. [107]

### 3 STEP III – THE NORMATIVE BLUEPRINT

Below we have analysed the normative reality and describe how a blueprint for a normative driven approach might look like, differing between an approach aligned to the current international tax system and an approach outside of the system.

#### 3.1 NORMATIVE REALITY AND OUR PROPOSAL FOR A NORMATIVE BLUEPRINT

The current allocation rules are based on the arm's length principle (ALP), which is included in almost every double tax treaty agreement. According to the ALP, transfer prices for goods and services between associated enterprises must be comparable to prices on which two independent parties would have agreed. The determination of transfer prices is required by tax authorities to allocate the taxable income among different countries between associated enterprises and ensure appropriate taxation. Therefore, profits from transactions between associated enterprises are allocated based on the functions, assumed risks, and assets used (the so-called functional analysis). However, there can be situations in which transfer pricing may not be applicable and only Article 7 (i.e. the allocational issues) comes into play.

The key question is: how to implement the data as taxes concept in this existing international tax system, although taxes are a debt usually owned in money? Nevertheless, there are various options to implement the idea, along with the tax concepts of a customary tax, a VAT regime, and the corporate taxation regime. Suppose it is a solo-national approach, not including a cross border data flow/change. In that case, we can think about establishing a kind of customary tax (within one jurisdiction / or within the EU if we consider it as one jurisdiction). This might work within the EU as a kind of levy tax or duties on the extraction of data. An advantage might be that it can help circumvent the problem of the lacking political will to share data. This might be a feasible political goal with the EU as a regulative frontrunner. Also, the concept of Data as Taxes can be designed in a way like a VAT is working. In this scenario, data must be exchanged and shared between the

data extracting actors (like MNE as Amazon or Facebook) and a data institution every time a data transaction is enforced.

However, the concept of data as taxes might be best suited to be aligned to corporate income taxation in the international context. Because the data exchange and sharing mechanism can be regarded as a form of allocation or split mechanism – like the way profit allocation is working.

In the following, we propose two designs:

- Design A, which either aims to reform the OECD Model Convention by introducing an Article 7B Data Split, and accordingly by modifying the transfer pricing guidelines (TPG) by a data split method. and
- Design B aims to frame separate guidelines/ instrument for data allocation rules rather than integrating them within the existing tax treaties.

For both designs (Sharing data sets or sharing data services), a data allocation is necessary – although it might be more convincing for the exchange of data sets, as the justification for the exchange is, that a data business is extracting data and therefore should share this extraction. However, in the end, it is also applicable for the exchange of a data service.

In the case of the exchange of data services, it might be hard to know what basis and to what degree a data exchange is justifiable, as the extraction of data is not necessarily unfolded for the administration. However, although many countries have not passed strict data protection laws, which would require the retention of data within the local servers to protect their companies' sensitive information, in contrast, the E.U. has a draft of regulations (see above 1.3), as well as the United States [108], Australia [109], and Asia have started to increase enforcement of data security regulation in recent years – including the 'Act on Real Name Financial Transactions and Guarantee of Secrecy' in South Korea, which aims to protect

data collected by financial services; Japan also imposes strong restrictions on the use and transfer of private data with the 'Act on the Protection of Personal Information' [110]. Thus, as we can assume that, to a certain degree, administrations around the world know what kind and amount of data businesses are extracting, we can also assume that an allocation formula (regarding data sets and services) can be aligned to the quantity and quality of the respective data extraction.

#### 3.2 APPROACH 1 – DESIGN A: REFORMING THE OECD MODEL CONVENTION/ TRANSFER PRICING GUIDELINES

##### 3.2.1 Introduction of an Art. 7 B 'Data Split'

The OECD Model Tax Convention, a model for countries concluding bilateral agreements, plays a crucial role in preventing double taxation/ non-taxation of a particular income stream. Considering the OECD Model Tax Convention as our basis for a data allocation/data split, we propose an adjustment of Article 7 OECD Model Tax Convention (which allocates taxing rights concerning the business profits of an enterprise of a Contracting State between jurisdictions) by implementing an Article 7B 'Data Split'. The scope of Article 7B might be every data extracting business model, while the objective could be to tax the extraction of data from a jurisdiction, allocating a certain amount of data to the data institution to exchange and share. This probably does not exclude the obligation to pay taxes at all within a jurisdiction but might be only by choice for the MNE if they do not have a physical presence in the jurisdiction with the result that the market (data) jurisdiction does not get a right to tax otherwise.

Art. 7B could be established as follows:

*'If an enterprise carries on data business/data extraction in the other Contracting State through the extraction of data related to the Contracting State instead or through a permanent establishment, it can levy the data business in the form of data if the business agrees. Data business is defined by the extraction of data. The exchange and the methodology to define what data can be levied, the exchange process and its distribution allocation formula are the responsibility of those Regulatory Authorities to which the data are submitted for regulatory purposes. Regulatory Authorities are the Data Institutions on a national and International level.'*

##### 3.2.2 Modification of the TPG by a Data Split Method

For efficient working of this data split, a method can be introduced as another Transfer pricing method, which governs the rules of data allocation from an international tax perspective (this can be implemented to address related party transactions where transfer pricing shall come into play).

Following Amount A of Pillar 1, a certain part of the aggregate of a politically defined deemed residual profit should be allocated to market countries using a new global profit split method. The crucial factor for reallocation is supposed to be a revenue-based nexus. In the area of automated digital services (ADS) – such as sales or other alienation of user data, social media platforms, and online search engines – one of the primary ideas is that these revenues are generated based on data. [111] However, if data is the underlying key driver of this proposal, why are these approaches not focusing on it appropriately? One central argument for it might be that it could be easier to share and exchange the extracted data than to determine its value exactly.

As a result, we propose that, instead of allocating the aggregate of a defined residual profit to market jurisdictions, preferably the aggregate of a politically defined deemed data split amount should be allocated to the place where key actors of the ecosystem are located.

Nevertheless, as a data split is still a foreign particle in the International Tax System and might collide with other rules like Article 7 OECD Model Tax Convention or Article 12 OECD Model Tax Convention, another option is to *revolutionize* the system and develop a global data split method outside the OECD (or UN) Tax Model Convention.

### 3.3 APPROACH 2 – DESIGN B: FRAMING A SEPARATE INSTRUMENT FOR DATA ALLOCATION RULES RATHER THAN INTEGRATING IT WITH THE EXISTING MC

A complete separate set of new guidelines can be framed for data allocation, and this guideline will take precedence over existing tax treaties in situations of data transactions/ exchange of data etc. In such situations, an exception should be included in existing Article 7 of the tax treaties, stating that *'for the rules governing data allocation shall be guided by this separate framework, and it will take precedence over the existing Articles of the tax treaties for matters relations to data allocation'*.

Further, the new guidelines should contain definitions/ enabling provision and the allocation rules in a detailed and clear manner to reduce interpretative issue. These guidelines should also state its interplay with existing tax treaties and should

specify areas where these guidelines will take precedence over existing tax treaties. The allocation methodology under these guidelines may provide for different alternatives for establishing a data split framework.

Also, countries will have to mutually negotiate (bi-laterally or multilaterally) and ratify these guidelines to ensure the binding effect of these guidelines. Going by this route, would retain the essence of relevant articles of the existing tax treaties which are modelled mainly for profit allocation. These will leave old provisions undiluted with the new framework of data exchange which works on separate modalities as this is not linked to profit allocation which requires people to work with financial numbers (i.e. the need for preparation of separate profit and loss account) for determination of the allocational amount.

### 3.4 INTERIM CONCLUSION

Of course, there are many other open questions. Which businesses would be affected? Does the data business/data extraction comprehend every data transaction, or should there be a threshold? Is there an obligation to share data, or this would only be a choice? What are the incentives for the MNE, e.g., a burden of proof during an audit or the sheer flexibility and higher speed of an audit due to the automated and digitalised procedures? How can this data share be offset with other profits? What about losses? However, if we assume that measuring the exact value of data-driven transactions between data businesses and their data functions is a difficult task, exchanging data (sets or services) might be easier and provide more benefits regarding the key-value driver 'data'.

## 4 STEP IV – THE FRAMEWORK OF A TECHNICAL, INSTITUTIONAL, AND NORMATIVE BLUEPRINT – THE INCLUSIVE DATA AS TAXES FRAMEWORK

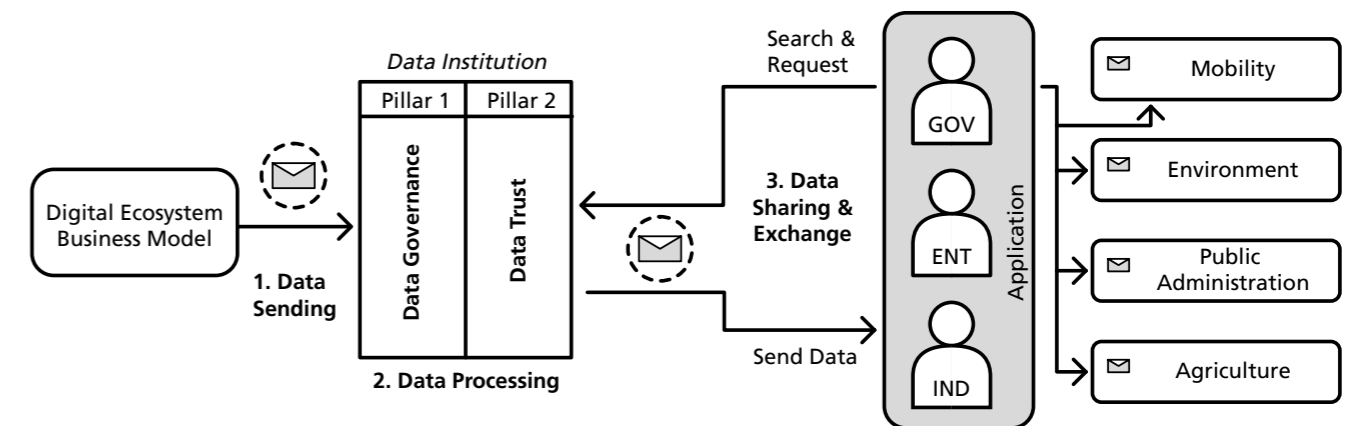
The three frameworks are complementary to each other and by no means supplementary. The rules may work by adopting either of the approaches discussed for technical and normative blueprint. We present the Inclusive Data as Taxes Framework along with those two concepts.

In this case, an Inclusive Framework along Variant A (the exchange of data sets) can be seen as a 'One Data Course Only', originating from the data business sending the data sets to the

data institution for processing and then exchanging the data for the data user (the respective market jurisdiction).

The Inclusive Framework along Variant B (the exchange of data services) can be seen as a 'One Data Loop', originating from the market jurisdiction requesting an analysis of the data sets they are sending to the data businesses, which they are sending back in the form of data services for the use of the respective data users of the market jurisdiction.

*Inclusive Data as Taxes Framework along Variant A of the Technical Blueprint*



**Figure 13: Framework Variant A: If we think about Variant A of the technical blueprint, an Inclusive Data as Taxes Framework includes a Data Sending from the Data Business to a Data Institution, which processes the data (by clearing / administering / controlling), possibly as a decentralised autonomous organisation, and shares & exchanges the data by search and request of Data User (Government / Entrepreneurs/ Individuals) for specific applications.**

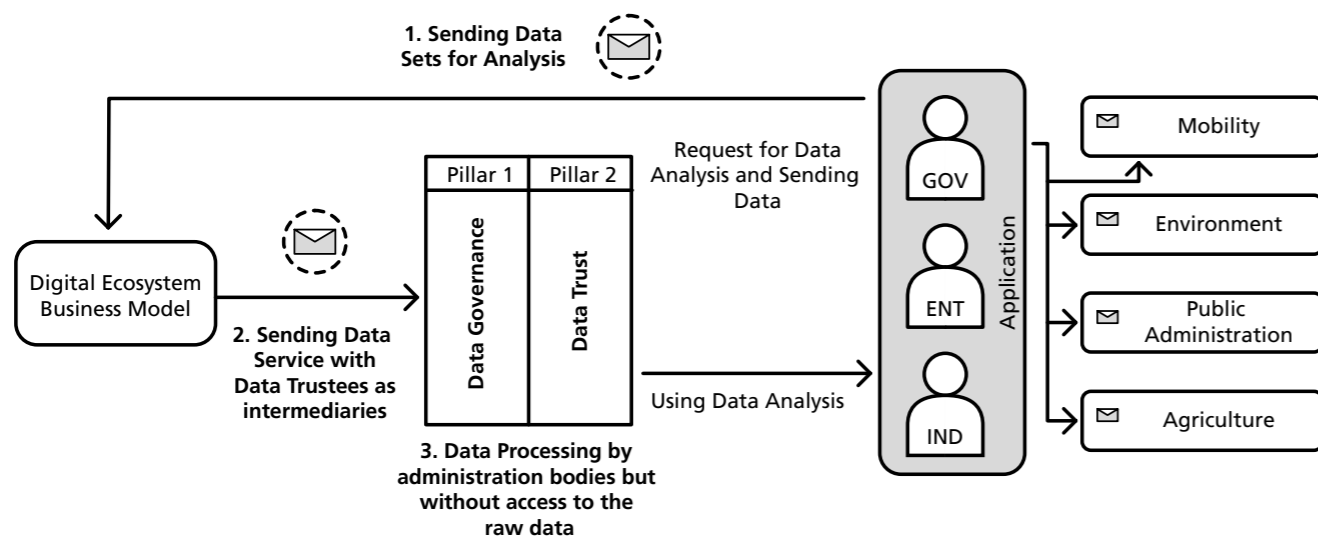


Figure 14: Framework Variant B: If we think about Variant B of the technical blueprint, an Inclusive Data as Taxes Framework includes a Data Sending from the respective Data Users of the market jurisdiction to a Data Business, where the data trustee analyses the Data and, with the help of the BigDataUnit, sends back the data analysis (data as a service) to the market jurisdiction, where it is processed and then used by the respective Data Users again. The administration bodies can be decentralised autonomous organisations.

## 5 STEP V – ASSESSMENT OF THE INCLUSIVE DATA AS TAXES FRAMEWORK

In this section, we assess the proposed framework under some of the existing principles/ framework. We conclude the section with a discussion about the benefits and challenges of the proposed framework, focusing on modern data architecture features compared to the current tax system.

### 5.1 ASSESSMENT BASED ON THE OTTAWA PRINCIPLES FRAMEWORK

The Ottawa Principles became one of the central anchor points for assessing the mechanics for taxation of the Digitalized Economy. Hence, we have assessed the above-discussed framework on Ottawa Principles framework:

1. Effectiveness & fairness: It means that there should be adequate/ fair taxation imposed on various transactions, and the potential for tax evasion and avoidance should be mini-

mised while keeping counter-acting measures proportionate to the risks involved. In the proposed framework, this means the right amount of data should be exchanged at the right time, making the determination of the demanded quality and quantity of data crucial. Additionally, it is essential who/ how the right amount of data can be decided – and if a neutral assessment (through MNE, the involved tax administration, as well as the data governance and trust intermediary) can be provided. However, as elaborated above – determining the right aggregation of data sets and services might be an easier task than the task to determine the exact value of data (sets) or data-driven transactions.

2. Certainty and simplicity: It mean, that the tax rules should be clear and simple to understand so that taxpayers can anticipate the tax consequences in advance of a transaction, including knowing when, where and how the tax is to be accounted for. Lack of highly trained personnel tax professional

in the data world might make the system hard to control; the more technical it gets, the complex it is for the addressee to understand in the initial periods. This problem is increased due to the fact that the digital economy is dominated by transnational companies that are resident in developed nations. This provides generous opportunities to reduce tax liabilities by engaging in transfer mispricing activities. [112] This form of BEPS even accelerates because the tax administration to which the MNE group is resident may have much more informal and formal access that helps in designing and implementing tax regimes at an advantage for their fiscal and commercial policies. [113] However, again, this problem inherently lies in the problem with the treatment of intangibles and might be reduced by only aggregating instead of exactly valuing data. Also, adaptability to a new system may take time, but this should not be confused with certainty and simplicity.

3. Flexibility: It means that the systems for taxation should be flexible and dynamic to ensure that they keep pace with technological and commercial developments. The proposed framework might ensure this flexibility, building on the resource data and its outcome (data as service). Above all, the Variant B (discussed in Section 4 above) and its focus on the tendering of data services instead of the sheer exchange of data sets might be a flexible way of keeping pace with Digital Global Era developments.

4. Neutrality: It means that taxation should seek to be neutral and equitable between forms of electronic commerce and between conventional and electronic forms of commerce (horizontal/ vertical equality). However, the proposed framework would mainly impact data businesses and may not work for traditional business models. If designed to get data sets, then only data extracting industries are affected. If designed to get data services, then only data extracting industries even have the chance to pay their tax in data.

5. Efficiency: It means that administrative and compliance costs for taxpayers should be minimised as far as possible. On the one side, costs for introducing new data governance regulation might rise in a first step; but regarding the need of knowing what kind of data is extracted and can be used not only from the perspective from society but from MNE as well, incentives for introducing a data as taxes framework might offer gigantic opportunities for cost-reduction from an overall perspective at later stages.

In an interim conclusion, it may be presumed that once the system is in place with a proper framework and establishment of data allocation rules, it can fulfil a minimum threshold of the Ottawa principles.

### 5.2 ASSESSMENT BASED ON TRADE LAWS AND EU BASIC FREEDOMS REGULATION

This section presents high level thoughts on how data as Taxes concept may interplay with these regulations. However, detailed discussion of the interplay of the proposed framework with these regulations was beyond the scope of this aper.

#### 5.2.1 International Trade Law

Concerning international trade law, there are various legal instruments relevant to an analysis of the Inclusive Data as Taxes Framework, some of which are WTO moratorium on customs duties on electronic transmissions (hereinafter 'the Moratorium'), the WTO General Agreement on Trade in Services (hereinafter 'the GATS'), and Individual bilateral or plurilateral free trade agreements. [114]

The WTO moratorium on electronic transmissions would most likely not cover the Inclusive Data as Taxes Framework, as it is explicitly limited to formal customs duties. Nevertheless, a country could potentially bring the claim against the framework under the GATS national treatment and discrimination principles. Another claim can be made along individual bilateral treaties based on 'nationality discrimination'.

To avoid such discrimination claims, one might think about expanding the Inclusive Data as Taxes Framework on every data extraction within a jurisdiction, targeting not only foreign resident MNE.

### 5.2.2 EU Regulation

European Union law is a body of law specific to the EU Member States and citizens - or in the case of legal persons, EU nationals. U.S. parent companies targeted by the framework might rather operate in Europe through registered subsidiaries and, as such, those subsidiaries - being EU nationals - have the right to challenge the framework under EU law either before their domestic court or through specific procedures before EU institutions.

Claims could be brought forward under the fundamental freedoms and the state aid rules laid down in the Treaty on the Functioning of the European Union. The crucial point here is whether the framework constitutes an obstacle to exercising the freedom of establishment and the freedom to provide services by nationals from the other Member States. A measure capable of affecting cross-border trade must be applied in a non-discriminatory manner. The framework's discriminatory features - such as a possible global data extraction threshold which might be necessary to implement - may make it to apply only on big data-driven MNCs. However, even if discrimination is established, a European country could justify the measure under a legitimate public policy interest, provided that it is appropriate for ensuring the attainment of the objective pursued and does not go beyond what is necessary to attain that objective. This is a high standard because - assuming discrimination is established - a nation would not only have to come up with (1) a convincing public policy interest, but it would also have to demonstrate that the framework is (2) suitable and (3) proportional measure to achieve that objective of, in this case, taxing the digitalised economy adequately. Nevertheless, looking at the pros and cons of the framework in the next steps, one might argue that a legitimate public policy interest could be established.

## 5.3 BENEFITS AND CHALLENGES OF A DATA ALLOCATION

### 5.3.1 Benefits: Arguments for the Data as Taxes Concept

- **Breaking the silos 'exchange of Key-value driver':** If we truly consider data as one of the central cornerstones of modern businesses, then the proposed mechanism might be an innovative way to reflect the reality of the exchange of the treasure. This institutional modification seems justified not only because the data extraction heavily relies on the required infrastructure [115] and access to the market but also because of the antitrust issues. Thus, this framework may help reduce the concentration of data in the hands of a few MNE's and break the silos for efficient use of the data as public goods.
- **Ability to boost the innovation across jurisdictions:** Incentive for cross border exchange on a worldwide scale - just imagine, one nation gets data from other countries that other nation may rely. We need innovation not only within the private sector but also in the public sector to tackle the global problems of today, which can only be achieved by using the knowledge we have. If we say we want to make a technology approach for the 'Great Transformation', the state is a key player within an economy; thus, they should interact and share the pie. The concept could even boost the cooperation between MNE and nations and re-establish the trust in the capability of MNE for innovation.
- **Additional Innovation Benefit** with data ecosystems precision and usefulness of trained functions hinge on the quality of the data used for training (e.g., relevance to the task, distribution, coverage of relevant cases, etc.). Training data and data analysed by trained functions (e.g., about habits and preferences of consumers) has already become a critical factor for business success, making data the strategic resource for business success. In this regard, the argument that data is not the new oil, but the new plastic

- abundant and already too much of it - might have some truth in it but cannot explain the success and importance the economy itself is attributing even raw data (see above Section 1). An easy and free access to data might not be the solution for every problem politics, economy, and society, in general, is facing. Nevertheless, structured, evidence-based decision-making needs mapping and managing data sources the data as taxes concept can provide.

- **Data Sovereignty:** A data as taxes framework can give the respective data market jurisdiction back control over its extracted data. However, what about the data producer - the individuals and businesses who have produced the data in the first place? Although the consumer should be the property owner of at least his/her private data, the MNEs have the right to possess and even trade data as well. Nevertheless, what happens, if the consumer can exclude his/her private data by the right to be excluded from the data exchange mechanism? Or to think it more revolutionary: what happens when not only governments can have access to the data sets or the data services, but also user, making it not only possible to process (and trade, if wanted) the data on its own, but also use the data to run it on an algorithm from the respective data business? Then the user might be able to be better suited to protect its own data, considering the concept of representation. Because if we think about the data exchange mechanism in a way that his jurisdiction represents the user/consumer, the latter might be able to enforce data protection and, therefore, data sovereignty from the MNE, by its sheer bargaining power.
- **Protection to the end-users/ consumers:** If the consumer gets the chance to be sovereign over its data, they can reduce the increasing digital inequality resulting from digital platforms, as Levina is arguing. [116]

### 5.3.2 Challenges: Arguments against the Data as Taxes Concept

- **Lack of political will:** Arm's Length Principle and the existing mechanism is already accepted or at least heavily discussed worldwide - thus, from a political view, an introduction of a completely new concept seems to be difficult. This counts even more, considering the jostle over data in the context of geopolitics and political capital.
- **Feasible Data Governance:** One crucial element for a successful data exchange mechanism is a framework that includes building blocks for data sharing, data management, data protection techniques, privacy-preserving data processing and distributed accountability and traceability. A possible solution might lie in technical adjustments, for instance, through *design by privacy or design through obscurity* [117]. Nevertheless, we need to establish a way to track and therefore localise data without breaching privacy issues. This might be possible if MNE follows the documentation system elaborated above but is highly disputed / controversial in light of GDPR rules worldwide. Additionally, it is necessary to establish a proper valuation of the data (sets or valuation) or, at least and maybe already sufficient, a form of aggregation of data (like this benchmarking proposal [118]), e.g., with the right cataloguing, to prevent the conflict between MNE and administrations. [119] Insofar, a possible solution might lie in establishing data trustees [120] within MNE as an intermediary to bridge the demands of the jurisdiction and the MNE. Another but still under-researched, the solution might lie in designing the data institution like a decentralised, autonomous organisation. [121]

- **Data cataloguing issues:** The foundation builds the improved interchangeability of data and the availability of external data sources through data markets and platforms. However, data Interoperability can be established if a balance between having control over data resources and willing to share data to design and deliver common value propositions is implemented. This might be reached by a comprehensive aggregation and cataloguing of data within the Data Providing System as laid down within the technical blueprint.
- **Trust and privacy issues:** The rise in the number of high-profile cases of data breaches highlights the shortcomings of data security. There is a need to balance security and compliance risks for business with the need to use and even share data to formulate viable solutions and generate new economic opportunities, along with more sophisticated research efforts in data privacy and security will be required. This means future efforts must focus on the support of security interoperability for technical and organisational security policies as well as regulatory and legal policy frameworks. Moreover, as security is an essential part of trustworthiness and trustworthiness is a qualitative decision-making criterion for exchanging information between companies, qualitative, transparent standards for evaluating the trustworthiness of companies/ business partners and their products, systems and processes are required. Additionally, rules for anonymising and pseudonymising data in a secure manner are needed to ensure that a great variety and large amounts of data and secondary data can be used for flexible value creation in the data economy without the fear of espionage and political influence.
- **Mechanism of data processing:** If data is processed using multiple cross border data exchange – who can actually “tax” the MNE? What about processed data – if data is a bundle of information, how can we unbundle the information as a necessary step for data allocation to the respective jurisdictions. What happens if a nation uses data

from a shared data pool and processes this data – does this processed data also has to be shared again? Focusing on raw data as the tax object (and at the same time tax debt), the answer might be traceability, as elaborated in the issue of double taxation.ce-based decision-making needs mapping and managing data sources the data as taxes concept can provide.

- **The Double Taxation:** Strongly connected to the issue of data processing is the avoidance of double taxation, the aim of every double taxation treaty (DTT). To meet this challenge, one must address how to allocate the data (sets and services) to the various market jurisdictions where the data is originating from. Like a Bits & Bytes-Taxation approach, it is necessary to fulfil specific requirements resulting from controlling, adequate value contribution, and exact data localisation [122], as well as a feasible allocation formula. However, this might be solved by establishing a kind of data source identity number we rather know from the customs & duty area (regarding components) [123] or VAT (regarding identities) [124]. With this kind of serial number and the use of New Technology (like Blockchain) [125] or old Technology (like a digital signature or hashing algorithms [126]) along with a corresponding cataloguing system as described above, an implementation with this identification and verification approach should be possible to allocate the data. [127] Further, such problems will also be taken care of by the approaches of the Normative framework discussed earlier, which will prescribe broader guidelines in this regard.
- **Implementation challenges:** If MNE, even Data Ecosystem Business Models, are capable of implementing the necessary data governance in the form of the documentation system in their value chain is a rather open question. [128] If MNE wants to share this information of their precise internal cross border data exchange with externals like tax authorities around the globe is hard to imagine – at least not without any incentives. Those could arise, e.g.,

by the simple fact that optimising digital business models via traceability of internal processes can be an external competitive advantage. At the same time, this transparency can benefit companies that already use such standards for their internal company documentation. Once integrated, administrative costs could be minimised, litigation avoided, and risks identified early through a steady flow of information. Of course, under the condition, tax authorities can even establish a trusted system where data can be controlled. Additionally, they must be capable of following this trend to digital transfer pricing systems. Nevertheless, new governance rules are complicated initially, although they might pay off in the end.

- **The digital gap and a forced free trade arrangement:** a possible digital gap between developed and developing nations and current international tensions regarding the function of free trade might be heavy barriers for implementing new digital documentation standards. Developing countries might neither have the capital nor the human resources to implement a controllable system in their favor, preventing a level playing field.

# SECTION III

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## Conclusion

There is a need to develop more data literacy at the level of the individual, organisations, and society so as to exploit the further potentialities of the data economy. All actors are empowered to navigate the complexity of the modern data ecosystem. Therefore, the article highlights the broad idea of the Data as Taxes, evaluating the most promising and feasible frameworks.

We conclude that exchange and sharing data mechanism is possible: either in the form of a (raw or aggregated) data set that the data business extracted and is shared with the jurisdiction where it was extracted from. Alternatively, in the form of sharing a data service, which is based on the data sets extracted by MNE or by data sets provided by administrations, businesses, or individuals, and sent and analysed by data businesses themselves. This might support the nations' tasks for transforming their states infrastructure with the help of ICT and data science and data hoarding with national borders with not help in maximising the value or boosting the economies. The proposed modifications in international tax law within or outside the existing tax law seem be justified because the data extraction heavily relies on the required infrastructure and access to the market and the antitrust issues.

However, it remains an open question if the follow-up problem of balancing the dichotomy between transparency and business secrets and between the state's interest in information and the freedom of privacy can be solved. Opportunities in innovation, sovereignty, lower monopolistic tendencies, data producer empowerment, and risks regarding the lack of political will, data governance and interoperability issues, and privacy and trust challenges are evenly balanced. Nevertheless, we assume that instead of determining the exact value of data transactions within the arm's length principle, the exchange of data along a standardised cataloguing system might be better suited to tax the data economy adequately.

However, the workability of the various alternatives discussed in the paper needs to be further evaluated and shall entail engagement and discussion with key stakeholders. Understanding the risks, benefits, and end utility of the proposed data analysis and its use needs user engagement as much as it would need the quantitative analysis of the data itself. Empirical research and simulation would need to be carried out by jurisdictions and a sample of MNE's to see how these techniques would be beneficial to them. We conclude that despite the barriers of the Data as Taxes Framework it might be worth diving down more in this area. This will enable unlocking silos so that the most is made from the available data sets.



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[109] Another example the Australian Privacy Principles ('APP') contains specific rules for handling data sovereignty. Section 8 of the APP discusses about the disclosure of personal data across borders. It strives to confirm that overseas organisation will handle personal data according to their guidelines. APP clearly defines when it is appropriate for an entity to transmit data and also what data is allowed to be transmitted

[110] India adopted a strict privacy and security regulation a few years ago called 'Information Technology (Reasonable Security Practices and Procedures and Sensitive Personal Data or Information) Rules, 2011' where international information or sensitive data transfer "may be allowed only if it is necessary". These rules also state that the same level of protection should be provided in a foreign country whenever sensitive personal data may be transferred.

[111] The approach to defining ADS recognises that certain MNEs can generate revenue from the provision of ADS (including revenue from the monetisation of data) that are provided on an automated and standardised basis to a large and global customer or user base and can do so remotely to customers in markets with little or no local infrastructure. [...] They often benefit from data and content contributions made by users and from the intensive monitoring of users' activities and the exploitation of corresponding data.' OECD (2020), Tax Challenges

Arising from Digitalisation – Report on Pillar One Blueprint: Inclusive Framework on BEPS, OECD/G20 Base Erosion and Profit Shifting Project, OECD Publishing, Paris, <https://doi.org/10.1787/beba0634-en>, para. 24. See also TARCÍSIO DINIZ MAGALHÃES, T. D., CHRISTIANS, A., 2021. [online] Rethinking Tax for the Digital Economy: After COVID-19, HARVARD BUSINESS LAW REVIEW, 21 [accessed on Apr 11, 2021] available at <http://dx.doi.org/10.2139/ssrn.3635907>.

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[113] Id. at 75.

[114] It is important to note that, under all of these instruments, a claim challenging a Inclusive Data as Taxes Framework must come from a member state—in contrast to the international tax context, where an aggrieved company itself would bring the claim. The U.S. is the country most likely to bring such a state-to-state challenge because most of the companies affected by the Inclusive Data as Taxes Framework are U.S.- headquartered companies.

[115] Thus, the right of data extraction, e.g. expressed in Art. 5 GDPR, in favour for the data-based businesses, might result in the duty of sharing.

[116] LEVINA, O., 2019. Digital Platforms and Digital Inequality - an Analysis from Information Ethics Perspective.

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[118] SPIEKERMANN, M., WENZEL, S. and OTTO, B. supra note 39 This paper proposes a high-level conceptual model for the assessment of data sources value. It consists of an ap-

proach for comparing data sources based on a common description of data and individual metrics definition enable a benchmark process. The development of the model and its practicability has been validated in a case study.

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pointing out the trilemma arising out of the taxation of data driven business models.

[120] FEDERAL MINISTRY FOR ECONOMIC AFFAIRS AND ENERGY (BMWi), supra note 99.

[121] THE BRITISH ACADEMY, THE ROYAL SOCIETY, TECH-UK, 2018. [online] Data ownership, rights and controls: Reaching a common understanding [accessed on Apr 11, 2021] available at <https://royalsociety.org/-/media/policy/projects/data-governance/data-ownership-rights-and-controls-October-2018.pdf>, stating that with the rise of General Data Protection Regulations, organizations have already started to identify and register all their data assets properly.

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[126] KIYOMOTO, SHINSAKU, RAHMAN, M. S. and BASU, A., 2017. "On blockchain-based anonymized dataset distribution platform." 2017 IEEE 15th International Conference on Software Engineering Research, Management and Applications (SERA). IEEE, 2017; Chai, Heyan, et al. "A robust and reversible watermarking technique for relational dataset based on clustering." 2019 18th IEEE International Conference On Trust, Security And Privacy In Computing And Communications/13th IEEE International Conference On Big Data Science And Engineering (TrustCom/BigDataSE). IEEE, 2019.

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