
How the European Data Regulation Enables Innovation for Platform Ecosystems?

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Abstract: The emergence of data-based economy is in the interest of the industry, academia and authorities. The EU has established several initiatives to support and control the emerging European data economy, mainly through data regulations and related implementation actions. A question remains, how the regulative actions taken by the EU support the innovation activities related to data platforms and ecosystems.

We explore through action research the opportunities for the emergence of a data ecosystem based on a digital data marketplace within the smart city domain. Based on the learnings from our research, we highlight interlinkages between different platform options and recent European data regulations that aim to impact the formation of future European data markets. We propose academic and managerial insights into forming an ecosystem of actors and roles needed for the development of different types of data platforms and ecosystems.

Keywords: digital platforms, data marketplace, data ecosystem, Data Act, Data Governance Act, platform design, value co-creation

1 Introduction

This paper aims to contribute to the development of future European data economy by identifying key value creation layers of data platforms, and key elements embedded in these layers. The paper investigates how different value creation layers correspond to the requirements set and opportunities opened for the actors of the future European data economy by the regulatory authority. This is done through identifying actors and their roles set out in the regulations, mechanisms laid down in the regulations and placing them on the value creation layers.

The paper intertwines data platform research and regulatory aspects into managerial insights aiming to contribute to the implementation of the European data regulation by

industry, academia and authorities. Based on established digital platform and business model literature and a framework of identifying value creation opportunities, empirical findings from action research in a joint research project and regulatory analysis, this paper presents four options for data platforms. Thereafter we identify regulatory enablers for each value creation layer and examine the impact of regulation to innovation activities in a research project context.

This study structures as follows: first we introduce relevant theoretical foundations from existing literature and introduce the selected regulative actions analysed in our research. We then introduce the research design and key findings from the empirical data. Selected regulations are analysed with the empirical findings and finally we present key conclusions.

2 Theoretical background and core regulations

2.1 Digital Platforms and Ecosystems

We based our study upon previous research related to digital platforms and ecosystems, which have been a target of academic attention for a long time (Parker and Van Alstyne, 2005; Evans and Schmalensee, 2010; Afuah, 2013; Hagi, 2014; Evans and Gawer, 2016; Cusumano, Gawer and Yoffie, 2019; Kim and Yoo, 2019; Otto and Jarke, 2019; Karhu and Ritala, 2021). Platform business differs from traditional business in the sense that the value is created by interaction of participants on the platform rather than charging money for a product or service (Karhu, Gustafsson and Lyytinen, 2018; Zhao *et al.*, 2020).

Digital platforms can be classified into transaction platforms, innovation platforms and hybrid platforms (Evans and Gawer, 2016; Cusumano, Gawer and Yoffie, 2019). Transaction platforms enable transactions between different users on different sides of the platforms. Innovation platforms on the other hand enable and support users on different sides of the platforms to make digital services on top of the platform. It is natural for platforms to evolve from one extreme to another, and hybrid platforms are located between these two extremes combining features from both (Cusumano, Gawer and Yoffie, 2019). An innovation platform may act as a basis for a data ecosystem (D'Hauwers, Walravens and Ballon, 2022). A data ecosystem can be understood as fostering innovations, value creation and development of new business amongst multiple stakeholders by sharing and reusing data (Oliveira *et al.*, 2018). The digital platform has relevance also on the ecosystem level, as the platform is needed to ease and steer the interaction between ecosystem members (S. Oliveira, Barros Lima and Farias Lóscio, 2019).

The challenge of designing and building a platform business is well known (Sorri *et al.*, 2019; Pussinen, Wallin and Hemilä, 2023). To examine the value creation opportunities of a digital platform, we turn to the 4C framework presented originally by Wirtz & al. (2010). The 4C framework has been utilized especially for identifying value creation opportunities of internet-based business activities, comprising of four layers: connection, content, context and commerce (Wirtz, Schilke and Ullrich, 2010). The 4C framework presents different layers for value creation for business model in the Internet era and the framework has previously been used to analyse platform ecosystems as each layer is

considered as a nested layer (Yrjölä, Ahokangas and Matinmikko, 2015a). We use the 4C framework as a layered structure for a platform, where the lower layers enable the potential business models in the higher levels of the framework (Yrjölä, Ahokangas and Matinmikko, 2015b; Perätalo, Mohamed and Iivari, 2022).

Based on the different types of digital platforms and the 4C framework, we utilize an adapted framework for analyzing the value creation opportunities, which is illustrated in figure 1. This framework provides us with an opportunity to identify different value creation dimensions and further assess it in relation to regulatory actions.

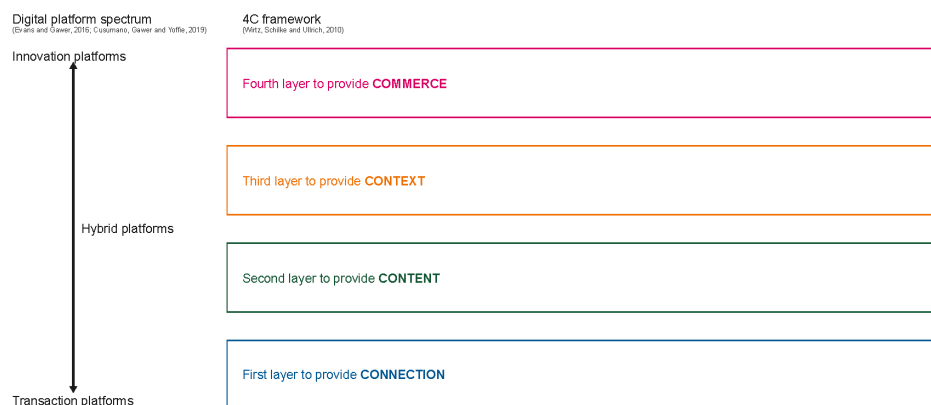


Figure 1 Adapted framework: the 4C framework combined with digital platform spectrum.

Many of the business opportunities related to data require sharing and co-operation, therefore opening the value to be co-created (S. Oliveira, Barros Lima and Farias Lóscio, 2019). Therefore, in our framework we regard that value creation in each layer expands to co-creation.

2.2 Regulatory Frameworks

From the regulatory perspective, the concurrent European data regulation landscape is in a dynamic development stage. There are several important horizontal data regulations in different stages of implementation. The work commenced with the European strategy for data¹. It lays down the core aim for Europe to become a leader in data-driven society by creating a single market for data.

Based on the European strategy for data, two core horizontal regulatory actions were taken, namely drafting of the Data Governance Act², hereinafter referred to as the DGA,

¹ COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS A European strategy for data, 2020

² Regulation (EU) 2022/868 of the European Parliament and of the Council of 30 May 2022 on European data governance and amending Regulation (EU) 2018/1724 (Data Governance Act) (Text with EEA relevance), 2022

and the Data Act³, hereinafter referred to as the DA. The DGA aims to create a structural framework for the data economy actors, whereas the DA aims to increase access to data in a more specific manner, e.g., by regulating data generated by the use of a connected products.

In addition to the DGA and DA, the European data strategy touches also areas of consumer protection and competition law with regulations like the Digital Markets Act⁴, hereinafter referred to as the DMA, and the Digital Services Act⁵, hereinafter referred to as the DSA. Both regulations aim to address the imbalances in the European data economy relating existing large digital platforms and creating a level playing field for data economy actors. The DMA regulates the gatekeepers and the DSA very large online platforms and search engines.

Together with the Artificial Intelligence Act⁶, hereinafter referred to as the AI Act, the DGA, DA, DMA and DSA form the so-called Big five regulations of the future European data economy. However, there is additionally one central regulation that affects the implementation of the Big five regulations, namely the General Data Protection Regulation⁷, hereinafter referred to as the GDPR. The GDPR, covering processing of personal data, has been applied already for quite some time and is deeply interlinked with all of the Big five regulations.

This study focuses specifically on two core regulations identified above, namely the DGA and the DA. These regulations were chosen for the analysis due to their horizontal nature, concurrent nature, and features present in the joint research project. Additionally, these regulations contain elements that are enabling in their nature, and, thus, may cause disruptive opportunities. From the DGA and the DA it is possible to monitor these future opportunities, while the DMA and the DSA regulate to a higher extent the existing platforms. From the DGA and the DA, the paper identifies anticipated roles for the data economy actors, interactions taking place between them, mechanisms introduced by the regulations, and maps these to value co-creation layers. In addition to the text of the regulations and their recitals, this study takes also into account the guidance given by the regulatory authorities (European Commission, 2024b) and (European Commission,

³ *Regulation (EU) 2023/2854 of the European Parliament and of the Council of 13 December 2023 on harmonised rules on fair access to and use of data and amending Regulation (EU) 2017/2394 and Directive (EU) 2020/1828 (Data Act) (Text with EEA relevance), 2023)*

⁴ *Regulation (EU) 2022/1925 of the European Parliament and of the Council of 14 September 2022 on contestable and fair markets in the digital sector and amending Directives (EU) 2019/1937 and (EU) 2020/1828 (Digital Markets Act) (Text with EEA relevance), 2022)*

⁵ *Regulation (EU) 2022/2065 of the European Parliament and of the Council of 19 October 2022 on a Single Market For Digital Services and amending Directive 2000/31/EC (Digital Services Act) (Text with EEA relevance), 2022)*

⁶ *Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence and amending Regulations (EC) No 300/2008, (EU) No 167/2013, (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1139 and (EU) 2019/2144 and Directives 2014/90/EU, (EU) 2016/797 and (EU) 2020/1828 (Artificial Intelligence Act) (Text with EEA relevance), 2024)*

⁷ *Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation) (Text with EEA relevance), 2016)*

2024a), and studies about data intermediaries (European Commission. Joint Research Centre., 2023) and (Bobev *et al.*, 2023).

Based on the above, the research question for the paper can be formulated as: *Does the European data regulation support business innovation activities related to digital platforms and ecosystems?* In our study, we utilize the 4C framework to identify the value creation potential of an emerging data marketplace (based on a digital platform) and analyse the potential impact of selected regulatory actions to platform design and value co-creation opportunities.

3 Research Design

3.1 Data Collection

Our study is based on applied anticipatory action learning which is a future oriented approach to action research (Inayatullah, 2006). This method was chosen to provide rich content from an innovation project with multiple stakeholders focusing on innovating a digital platform and a data ecosystem for the urban environment. Action research was selected because it provides a scientific approach to research the resolution of significant social or organizational topics together with those experiencing it (Coghlan and Brannick, 2005). For the regulatory analysis, we used legal dogmatics focusing on the empirical findings gained from the action research, the system underlying the regulations and practical implications thereof. We consider this combination of action research and legal dogmatics is the best way to address the above research question.

The premise of the study is embedded in a joint research and innovation project initiated by six different companies and a research organization interested in developing a concept for a data marketplace in a smart city environment. Initially the purpose was to identify opportunities to establish a digital platform as a data marketplace to provide access to different data sources related to buildings and infrastructure, as well as to help to match data users and providers. This data marketplace would act as a central point of data exchange for the companies and help to innovate novel digital services focusing on sustainability related services like energy efficiency. We examine what kind of platform options the project consortium innovated during the project, what kind of value creation opportunities were identified and how the selected regulative frameworks affected the identification of value creation opportunities. The aim was to work in an iterative way collecting diverse viewpoints from a variety of disciplines presented by the participants in order to examine the multidisciplinary aspects related to the value creation mechanisms.

The cyclical nature of action research was applied with multiple cycles during the research project with each cycle focusing on a specific theme of platform design. The cycles of action research are identified as analysis, planning, acting (execution), observing and reflecting (Hegney and Francis, 2015). The cycle and themes used in the study is illustrated in figure 2.

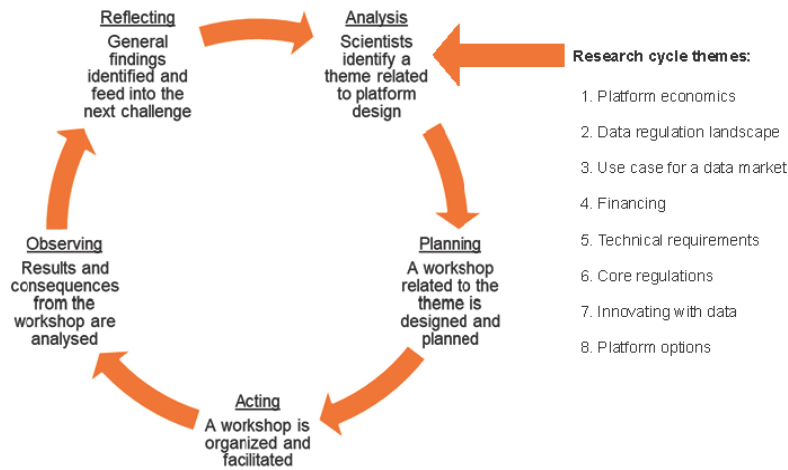


Figure 2 The Research Cycle.

In each cycle, the planning phase consisted of the research team of 3–4 scientists selecting a research theme relevant for innovating digital platforms based on existing literature and research, as well as input from previous cycles and project participants. This represented an identified challenge, or a known problem related to designing a digital platform. After a theme was selected and analysed, the team selected a method for acting via workshops with all participants to distribute the gathered knowledge and to collect data on how the participants reacted to the presented theme (observations). At the end of each cycle, the team reflected on the learnings from the participants and observations made during the cycle to plan the topics for the next cycle. Observations during the research cycles were made in an unstructured technique to allow more ad-hoc based approach and diverse observations (Turnock and Gibson, 2001). The roles of the different organizations in the research cycles are presented in table 1.

Table 1 Roles of the Organizations in the Research Project

<i>Organization</i>	<i>Roles</i>
Research organization	Observing the research process, facilitating, and contributing as an expert on selected research cycle themes (participant-as-observer)
Company A: Data platform provider (Large)	Data exchange infrastructure provider (participant)
Company B: Smart building automation service provider (SME)	Data user (participant)
Company C: Energy efficiency service provider (SME)	Data user (participant)
Company D: IoT service provider (SME)	Data user and provider (participant)
Company E: Smart city service provider (Large)	Data user and provider (participant)

Company F: Cloud and security service provider (Large) Data user (participant)

Further, the themes of different research cycles, participants in the cycle and their roles are detailed in table 2 below.

Table 2 Research Cycles

<i>Research Cycle</i>	<i>Cycle Theme</i>	<i>Participants</i>	<i>Roles</i>
Cycle 1	Platform economics: Introduction of platform economics for a data marketplace	4 scientists, 9 company members	Scientists: facilitator (1), observers (3) and platform economics specialist (1) Company members: data users and providers (7), infrastructure providers (2)
Cycle 2	Data regulation landscape: Mapping of the general data regulation landscape in Europe and scoping of the core regulations	4 scientists, 9 company members	Scientists: Facilitator (1), observers (2) and data regulation specialist (1) Company members: data users and providers (7), infrastructure providers (2)
Cycle 3	Use case for a data market: Service path mapping for an energy service use case using the data from the platform	4 scientists, 6 company members	Scientists: observers (4) Company members: company member as a use case specialist and facilitator (1), data users and providers (4), infrastructure providers (1)
Cycle 4	Financing: Financing models for smart services (based on a digital platform)	5 scientists, 1 external expert, 9 company members	Scientists: observers (4), external expert on financing and facilitator (1) Company members: data users and providers (8), infrastructure providers (1)
Cycle 5	Technical requirements: A set of minimum technological requirements (including required data sets) for the platform	4 scientists, 7 company members	Scientists: observers (3), facilitator (1) Company members: technical requirements expert (1), data users and providers (4), infrastructure providers (2)
Cycle 6	Core regulations: Focus on the DGA and DA (scope, actors, roles, requirements)	5 scientists, 8 company members	Scientists: facilitator (1), observers (2), regulation expert (1), one domain expert (1) Company members: data users and providers (6), infrastructure providers (2)
Cycle 7	Innovating with data: Data markets, value of data, European data regulation implementation and data spaces	6 scientists, 7 company members, 1 funding agency	Scientists: observers (2), facilitator (1), external expert on data market (1), platform economics specialist (1), regulation expert (1) Company members: data users and

		representative	providers (5), infrastructure providers (2) Funding agency representative (1)
Cycle 8	Platform options: Ecosystem workshop to discuss different platform options for the consortium	4 scientists, 8 company members	Scientists: observers (2), facilitator (1), data ecosystem specialist (1) Company members: data ecosystem specialist (1), data users and providers (5), infrastructure providers (2)

The duration of the research project was 24 months, and the research cycles were conducted during this time. The duration of research cycles varied between 3–4 months. Empirical data was gathered from each research cycle, from workshops (using tools like Miro-boards and whiteboards) and discussions (both online as well as face-to-face meetings) as well as emails related the cycle theme.

3.2 Empirical Data

Based on the empirical data gathered from the workshops in different research cycles as well emails and communication during the research cycles between project members, four different options for the concept of a data marketplace were generated as an iterative process when more details about the business and technical requirements related to the context of urban environment were unfolded. They varied from the initial sketch of a data-based transaction platform into an innovation platform and then towards a data ecosystem focused concept.

Option 1: A matchmaking platform

Data marketplace as a matchmaking platform features only a technical matchmaking engine as the core interaction of the platform. The platform connects buyers and sellers of data with one another, and the platform does not offer any other major services or features. For example, the platform does not store or host data or services/applications. This platform option focuses on the matchmaking of a data holder and data user enabling the data transfer between them. This was the initial idea at the start of the project and during the early phases of the project.

Option 2: A data transaction platform

A data transaction platform includes services that help to facilitate the data transaction between data sellers and buyers. Such data marketplace services can include, for example data catalogues and metadata services, contract templates for data trade, advanced payment mechanisms and services, clearing house services to clear that trades have been completed successfully, logging of transactions, identity services etc. These services are meant to support the data transactions on the platform by supporting data holders to gain visibility and provide access to different data sources and holders. This option is an advanced version from the initial idea, adding more features as it became clear for the participants that, for example, metadata needs to be presented in common way for data to be findable, accessible and usable by other parties.

Option 3: A value platform

A value platform expands a data marketplace from a transaction platform into an innovation platform by allowing service development based on the transacted data. This can be accomplished by adding support for generating 3rd party digital services on top of the platform. The platform will now act also as a service channel for distributing services of the platform participants related to the data transacted through the platform. Third option is born from the need to have a service channel for the data-based services that could scale efficiently for the 3rd party service providers.

Option 4: An Ecosystem of Platforms

The fourth option expands the idea towards a data ecosystem. This ecosystem will connect the platform to other major digital platforms and provide services needed for different data-based innovations. The ecosystem may also use digital platforms for governing the ecosystem. In a data ecosystem, different services, tools and data sources are provided for the ecosystem participants as well as ecosystemic governance services required by a fully functioning data ecosystem. This final fourth option was visioned already early in the project, but after development of the previous three options and further studies related to the smart city context, it became apparent that a data ecosystem could bring the desired data holders and data users together more prominently as the identified number of different organizations and actors holding the required data had grown significantly.

4 Analysis

Based on the classification of different digital platforms and the 4C framework introduced in the previous chapter, we have mapped the different platform options as value co-creation layers in our applied framework, illustrated in figure 3 below:

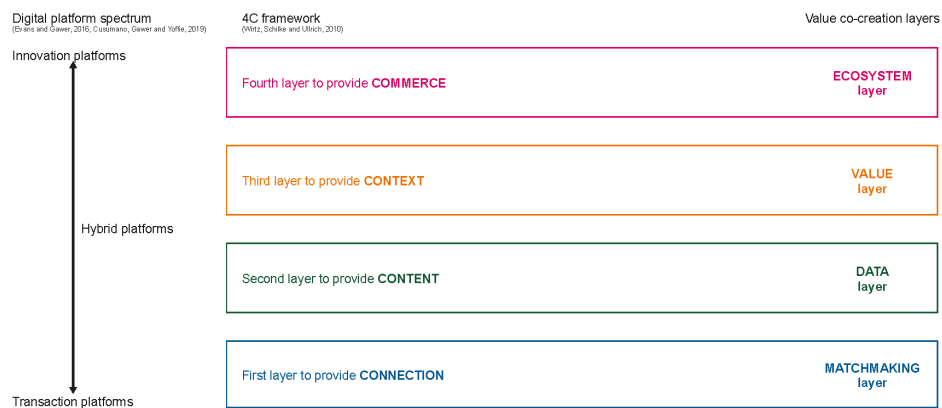


Figure 3 Value co-creation layers and the adapted 4C framework combined with digital platform spectrum.

We have associated each platform option with a specific layer in the adapted frameworks based on the features for value creation opportunities. The association is presented in table 3 below.

Table 3 Platform Options and Associated Layers

<i>Platform Option</i>	<i>Associated Layer in the adapted 4C framework</i>
A matchmaking platform	Matchmaking layer
A data transaction platform	Data layer
A value platform	Value layer
An Ecosystem of Platforms	Ecosystem layer

In this section, we will map elements from the chosen European core regulations, i.e., DGA and DA to the above value co-creation layers. These elements focus on actors, the roles of these actors that are needed to operationalize data transfers, data transactions, value generation, the ecosystem, and related regulatory mechanisms. We present these in different value co-creation layers based on 4C framework introduced earlier. This helps to assess the value creation streams of the platform options, actors, their roles and regulatory mechanisms as the features and requirements for the platform evolve.

There are two basic definitions relevant for all value co-creation layers, namely the terms data sharing and data intermediary. This paper uses the term data sharing as a general term describing the act of a data holder providing data to a data user. This is in line with DGA art 2(10)⁸. The afore mentioned definition thus identifies also two core roles involved in data sharing, namely the data holder and the data user between which the provision of data takes place. These roles form the basis for the first layer needed for establishing a matchmaking platform. The term data intermediary is used consistent with the definition introduced by the European Commission (European Commission. Joint Research Centre., 2023), meaning a role that allows the establishment of a relationship (either commercial or non-commercial) between data holders and data users. It should be noted that the role of the data intermediary changes from one value co-creation layer to another.

4.1 Matchmaking layer – First layer to establish connection

On the simple end of the platform spectrum, one can find matchmaking platforms that have the core aim of creating the connection for data transfers between the data holder and the data user. This forms our first layer (Matchmaking layer) in figure 4.

⁸ DGA art 2(10) states “‘data sharing’ means the provision of data by a data subject or a data holder to a data user for the purpose of the joint or individual use of such data, based on voluntary agreements or Union or national law, directly or through an intermediary, for example under open or commercial licences subject to a fee or free of charge”.

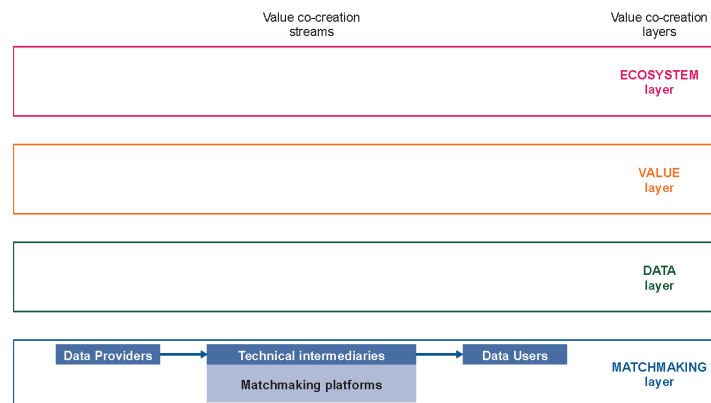


Figure 4 Value co-creation layers: Matchmaking layer.

The term data holder has been defined in somewhat different ways in the DGA⁹ and the DA¹⁰. The reason for different definitions becomes clear when looking at the scope of these regulations. DGA addresses European data economy on a more general, structural level. DGA art 1 para 1 pinpoints four key areas in relation to data sharing, namely re-use of certain publicly held data, provision of data intermediation services, data altruism and establishment of the European Data Innovation Board and lays down frameworks for them. Contrary, the DA has a more specific scope. Among other issues, it aims to make product data, related service data and certain other data available both for users of connected products and for third parties (see DA art 1 para 1). Additionally, it lays down rights and obligations relating to such access. Despite these differences in the definitions, both the DGA and the DA recognizes the data holder as a key role in data sharing.

The counterpart for the data holder, that is needed for the data sharing, is the data user, as defined in the DGA art 2(9)¹¹. In the context of the DA, the term data user, more specifically the primary counterpart for the data holder, is replaced with the term user¹², due to the core of DA being in product data and related service data generated by users.

⁹ In DGA art 2(8) “‘data holder’ means a legal person, including public sector bodies and international organisations, or a natural person who is not a data subject with respect to the specific data in question, which, in accordance with applicable Union or national law, has the right to grant access to or to share certain personal data or non-personal data”.

¹⁰ In DA art 2(13) “‘data holder’ means a natural or legal person that has the right or obligation, in accordance with this Regulation, applicable Union law or national legislation adopted in accordance with Union law, to use and make available data, including, where contractually agreed, product data or related service data which it has retrieved or generated during the provision of a related service”.

¹¹ DGA Art 2(9) defines the data user as follows: “‘data user’ means a natural or legal person who has lawful access to certain personal or non-personal data and has the right, including under Regulation (EU) 2016/679 in the case of personal data, to use that data for commercial or non-commercial purposes”.

¹² In terms of DA art 2(12), the ‘user’ is defined as “a natural or legal person that owns a connected product or to whom temporary rights to use that connected product have been contractually transferred, or that receives related services”.

DA art 3 stipulates the obligations to make product data and related service data accessible to the user and DA art 4 lays down the main rights and obligations between the primary counterparts of data sharing.

Interestingly, the DA art 2(14) recognizes also another term for the counterpart of the data holder, the data recipient. This can be defined as the secondary counterpart for the data holder, bringing in the business-to-business aspects of data sharing. This role will be addressed more closely below under the third layer regarding value platforms.

In order to establish the connection between the data holder and the data user an intermediary between the two is needed. This intermediary role is the final core role needed for the first layer establishing matchmaking. According to DGA recital 28, services that “only provide technical tools” that do neither aim “to establish commercial relationships between data holders and data users nor allow the service provider to acquire information on the establishment of commercial relationships for the purposes of data sharing” do not fall within the scope of the DGA. These technical tools include e.g., “the provision of cloud storage, analytics, data sharing software, web browsers, browser plug-ins or email services” (DGA recital 28). These are the kinds of intermediaries that we assess belonging to the first layer enabling the data transfer, but not having any role in the commercial relationship between the data holder and the data user. On the Matchmaking layer, before introducing the content (i.e., the data), technical tools highlighted above mostly contain services that can also be used for other purposes than data sharing, such as web browsers or email services. The diverse spectrum intermediaries aiming specifically for data sharing will be introduced below in connection with higher layers of platforms.

4.2 Data layer – Second layer to provide content

For a data platform to operate, it is not sufficient that merely the actors possessing rights and obligations for data sharing exist. What is additionally needed is that the platform manages to make data sources discoverable on the platform. The second layer (Data layer) focuses on the content, i.e., data to be transacted upon, as illustrated in figure 5. The Data layer highlights data as the core element in the transaction and shifts the focus to the scope of the regulations and to the type of data the regulation applies to. This will bring into front the roles that are upstream from the data holder. Data holders are dependent on these upstream roles to get access or control to the data. The DA sketches out, for example, the roles of a data subject, a manufacturer of connected products, a provider of related services, and data holders obliged to make data available pursuant to union law. These are essential roles one finds in the upstream of the data holder.

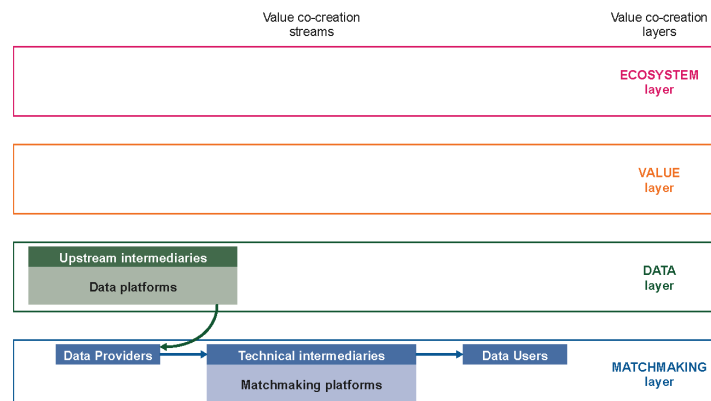


Figure 5 Value co-creation layers: Data layer.

The first example of the type of data covered by the DA is personal data. This scope is embedded in the DA art 2(11) definition of the data subject, which merely refers further to GDPR art 4(1). The second example of types of data covered by the DA is product data¹³ and the role of a manufacturer of a connected product. The third example addresses the provider of related services¹⁴. The final example of type of data covered by the DA is embedded in DA art 8 para 1, which sets out certain conditions for data holders with respect to data that are subject to an obligation to make data available “under other applicable Union law or national legislation adopted in accordance with Union law”. This may enlarge the application of the DA to a vast amount of data subject to data sharing obligations based on domain or sector specific regulation, and, also, to yet unknown types of data that may in the future be regulated.

Thus, the Data layer, introducing content to the interaction taking place between the data holder and the data user, addresses the whole spectrum of different types of data and related roles that possess rights or control to such data. Such data and roles vary significantly. Some of these roles are subject to special protection granted by a regulatory authority to individuals (e.g., data subject in the GDPR). Other roles may be in a key position to control collection of data or its further use (e.g., manufacturer of connected product or provider of related services in the DA) or subject to obligations to make data available (data holders subject to data sharing obligations under other Union laws).

¹³ According to DA art 2(15) “‘product data’ means data generated by the use of a connected product that the manufacturer designed to be retrievable, via an electronic communications service, physical connection or on-device access, by a user, data holder or a third party, including, where relevant, the manufacturer”.

¹⁴ The type of data covered by DA art 2(16) is related service data meaning “data representing the digitisation of user actions or of events related to the connected product, recorded intentionally by the user or generated as a by-product of the user’s action during the provision of a related service by the provider”.

Along with the introduction of content from the upstream roles on the data transaction layer, the role of the intermediary changes. The mere technical intermediary evolves into a true data intermediary, as on this layer the aim is to initiate the data flow towards the data user. These data intermediaries focus on intermediating content for the purpose of establishing a variety of data transactions. On this layer, the data intermediary service providers aim to provide services to the data holders, and do not yet focus on creating value based on the transacted data.

There are several roles a data intermediary can take and based on the role it takes, there are different legal implications. Examples of this kind of data intermediaries are diverse: one type of data intermediary on the second layer identified in DGA recital 29 is a repository enabling the re-use of scientific research data in accordance with open access principles without aiming to establish a commercial relationship between the data holder and the data user. Another example of an upstream data intermediary is a service provider offering services to data subjects. DGA recital 30 describes these services as the agents for the data subjects, e.g., to increase control over their personal data, manage their rights like consent, right of erasure and portability. According to said recital, focal issue is to assure that the business models of such data intermediaries do not contain misaligned incentives that could endanger this agency aspect.

As can be seen from the above, the variety of intermediaries, as is also the case with regard to the types of data, becomes immense. As the goal of the DGA is to set out the framework for the actors, it does not proceed in detailed regulation of these individual forms of data intermediation. Instead, it focuses on providing certain main boundaries for the actors falling under the general descriptions of these roles. The main boundary set out for the actors becomes visible when discussing the ecosystem platforms on the fourth layer.

4.3 Value layer – Third layer to add context

On the third layer (Value layer), visualized in figure 6, the focus turns into downstream data recipients and into the value these data recipients can produce from the data provided by the data holder. With this kind of service providers, that make use of the data transacted on the transaction layer, adding value on top of the data becomes possible. Platforms operating on this value layer can help finding answers to the question of why to share data, i.e. reasons and incentives for data sharing. This value adding phase can naturally be done by the data user itself. However, this layer opens value creation opportunities also for other actors providing services to data users.

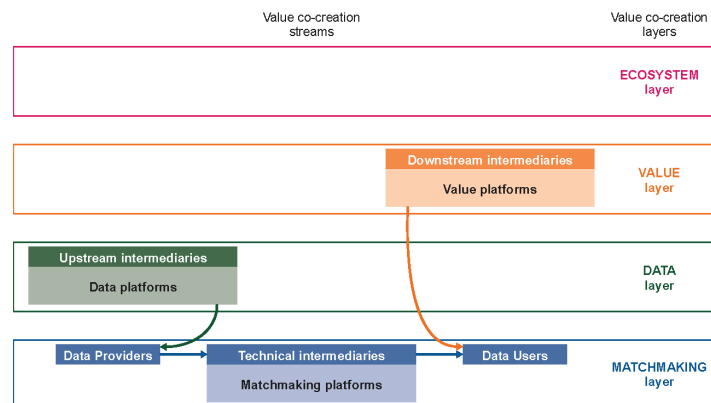


Figure 6 Value co-creation layers: Value layer.

The Value layer brings into focus the mechanisms that make the data flow towards the data users through service providers. The flow of data can be enabled by regulations – as is aimed for by the DGA and DA – but, lastly, business opportunities and incentives dictate whether the data starts to flow or not.

One example of the regulatory mechanisms aiming to affect value creation from data can be found in the DA. This highlights data recipients¹⁵ as the secondary counterparts for data sharing. The mechanism for these data recipients to get access to data is laid down in DA art 5. This broadens the data sharing opportunities to a wide scope of service providers. Service providers on the Value layer are those actors that create added value from the data transaction. In the first instance, it could be the data recipient or even the user itself. However, DA art 5 recognizes that the primary counterpart, the user, has the right to share data with third parties, the secondary counterparts. This right is independent of the access the user has under DA art 4 (European Commission, 2024a). These third parties are in a key position in the creation of value from the shared data. There is a monetary compensation element involved in data sharing (DA art 9). In addition, the DA recognizes also several conditions for data sharing (DA art 8) and for defining the compensation (DA art 9).

As is the case with the upstream roles, also the above-mentioned downstream service provider roles are multiple. DGA recital 33 portrays the array from consumers to enterprises, from not-for-profit to commercial purposes. Further, DGA recital 28 recognizes the pivotal role of the service providers as a value generating group by referring, for instance, to providers that aggregate, enrich or transform the data for the purpose of adding substantial value to it and license the use of the resulting data to data users.

¹⁵ According to DA art 2(14), “‘data recipient’ means a natural or legal person, acting for purposes which are related to that person’s trade, business, craft or profession, other than the user of a connected product or related service, to whom the data holder makes data available, including a third party following a request by the user to the data holder or in accordance with a legal obligation under Union law or national legislation adopted in accordance with Union law”.

One of the core aims of the DA is to affect this Value layer. This is written down in DA recital 5, which states that the regulation ensures, e.g., that the users “can use the data, including by sharing them with third parties of their choice”. This aim has been further clarified in DA recitals 33, 35, and 38. In essence, these recitals depict a vision of a vibrant and dynamic added-value service offering landscape by multiple providers. Such an environment would ensure smooth access to data for the service providers, and at the same time, proper competition and easy switching between them, and strengthen the rights under GDPR to port personal data and ensure the removal of technical obstacles hindering access to data. As the data sharing between the data holders and the data recipients allows reasonable compensation from the third-party data recipients, the mechanisms provided for on the Value layer include also monetary value creation. To ensure that this kind of market-based mechanism starts to work, DA art 4 sets out the minimum requirement, i.e., the right for the user itself to gain access without compensation. The rights of the third-party data recipients represent the voluntary, market-based mechanisms as the carrot for the actors and the rights of the user to get access without compensation as the stick for the actors.

These DA driven aims are well in line with the goals of the DGA, which sets out higher level framework for the European data economy. For example, DGA recital 2 underlines the importance of small and medium-sized enterprises (hereinafter referred to as SMEs) and start-ups in the European data economy landscape and the need for “data access neutrality and data portability and interoperability and avoiding lock-in effects”.

On the Value layer, once again, the position and role of a data intermediary changes, in case the platform of the intermediary covers also added-value services. Special attention should be given to the regulatory requirements, in case the data intermediary takes also part in the added-value services. Here, another core aim of the DA starts to manifest itself, namely the aim towards a level-playing-field between the platforms of very large enterprises and SMEs. On one hand, DA art 5 para 3 excludes the gatekeepers, as defined in DMA, from being able to benefit from broadened access to data. On the other hand, DA art 7 para 1 provides exclusion from DA obligations to the micro-enterprises, small enterprises and medium-sized enterprises. These aims become fully visible on the fourth Ecosystem layer.

4.3 Ecosystem layer – Fourth layer to enable full commerce

When a platform enables value creation beyond a single or limited amount of data transactions by introducing opportunities for scaling and commerce, we can talk about ecosystem platforms. These platforms emerge on the fourth layer (Ecosystem layer) as shown in figure 7. This layer concentrates on connecting data sharing actors, including different sorts of data intermediaries, on all lower platform layers, i.e., those providing technical infrastructure, those increasing access to data and those aiming to build value-adding services based on the data. These ecosystem services can, for instance, be in the form of orchestration of data sharing environments, joint and scalable value generation from the data, building interoperability or security for data sharing, or providing services for ecosystem formation and operation.

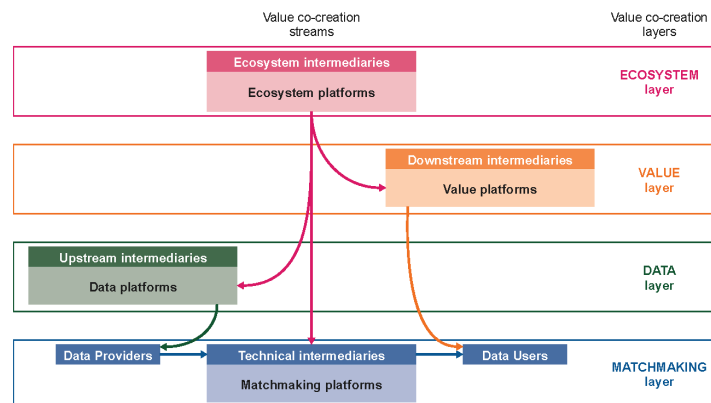


Figure 7 Value co-creation layers: Ecosystem layer.

One example of data intermediaries operating on the Ecosystem layer can be found in the data intermediation service providers¹⁶ within the meaning of DGA. Some examples of this kind of data intermediaries are given in DGA recital 28, i.e., data marketplaces, data pools and orchestrators of data sharing ecosystems. On data marketplaces undertakings make data available to others. Data marketplaces match the supply and demand of data, aim to lower barriers for data providers and provide incentives for all data sharing actors (European Commission. Joint Research Centre., 2023). Data pools are intended to license the use of jointly collected, pooled data in a manner that gives rewards to the contributors. In the core of the data pools, one finds a shared purpose, context or application aiming to benefit all participating actors (European Commission. Joint Research Centre., 2023). Finally, orchestrators of data sharing ecosystems are actors that can for instance operate in the context of European data spaces. Common European data spaces can be seen as an alternative to existing large digital platforms with their distributed ecosystems ensuring competition on all levels of data sharing (Bobev *et al.*, 2023). An additional example of data intermediation services is personal data wallets through which individuals can store and allow further use of their personal data (European Commission, 2024b).

It should be noted that these kinds of intermediaries can operate on all platform layers, but the clauses relating to data intermediation services in the DGA apply only in case the services aim to establish commercial relationships between an undetermined number of actors. Only this kind of large-scale data intermediation services within the scope of the DGA should be placed on the Ecosystem layer. If a data intermediary has a different scope in terms of their role or position in the data transactions, the services provided should be placed on lower levels of our four value co-creation layers. For example, if a data marketplace covers only matchmaking capabilities between data holders and data users and enables the data transaction to be completed on the platform but does not provide any

¹⁶ DGA art 2(11) defines “‘data intermediation service’ as a service which aims to establish commercial relationships for the purposes of data sharing between an undetermined number of data subjects and data holders on the one hand and data users on the other, through technical, legal or other means, including for the purpose of exercising the rights of data subjects in relation to personal data, excluding at least the following [...]”.

support for further value creation, the data marketplace would fall under the second layer. In case a data marketplace includes services for downstream service providers, it could be placed on the third layer. And finally, in case a data marketplace is capable of connecting an undetermined number of actors and orchestrating their interactions, we can place it on the Ecosystem layer.

The core difference between the data intermediaries operating on the lower platform layers and data intermediation services on the ecosystem layer is whether it provides services aiming to establish commercial relationships between an undetermined number of actors. In case the platform is closed, or it does not aim to establish commercial relationships, the data intermediary operates on lower platform layers. The capability to scale platform services to an undetermined number of actors brings the platform on the Ecosystem layer aiming for commerce.

In the European regulation, these kinds of data intermediaries are placed under special control with strict boundaries in order to create a European way for data sharing. In case an organization falls under the definition of data intermediation services, the DGA sets out numerous requirements for such actors. Perhaps, the most drastic requirements are set out in DGA art 12(a), which prohibits the data intermediation service provider from using the data that it intermediates (neutrality requirement) and requires that data intermediation services are provided only through a separate legal entity (separation requirement).

The reason behind setting strict boundaries for the data intermediation service providers can be observed from the DGA recitals 27, 32 and 33. These describe the data intermediation services as a key player in the future data economy. Their role is in the support and promotion of voluntary data sharing practices and in the facilitation of data sharing. According to DGA recital 27, they can contribute to:

“the emergence of new data-driven ecosystems independent from any player with a significant degree of market power, while allowing non-discriminatory access to the data economy for undertakings of all sizes, in particular SMEs and start-ups with limited financial, legal or administrative means”.

With setting out strict rules (e.g., the requirements of neutrality and separation) on the orchestrators operating on the ecosystem layer, the EU aims to increase trust in data sharing, ensure that data holders and data users can benefit from the value of their data, and give better control to the access and use for the actors (European Commission, 2024b), in terms of DGA recital 32:

”data intermediation services providers should offer a novel, ‘European’ way of data governance, by providing a separation in the data economy between data provision, intermediation and use”.

5 Findings

Our study gives indication that the regulatory frameworks of the DGA and DA may indeed support innovation activities towards business in the European data economy and

business of data platforms. The purpose of the DGA has been to help to establish and accelerate the development of data economy by illustrating and defining new roles and mechanisms (both business and governance) within data economy. Our research supports this possibility of the regulative acts to fuel data economy and illustrates the effects of the regulations, especially in the higher layers of value creation opportunities.

The effects related to different roles and mechanisms embedded in the analyzed data regulations, become apparent in second, third and fourth levels of value creation opportunities. This is illustrated below in figure 8.

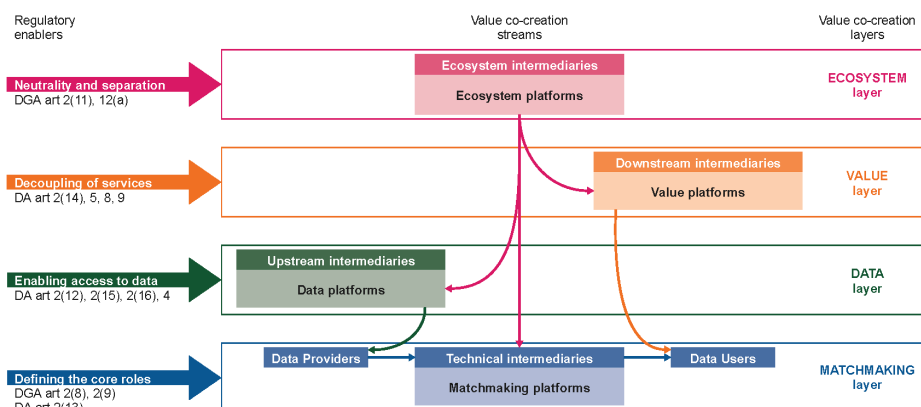


Figure 8 Regulatory enablers for the value co-creation layers

On the first layer (Matchmaking layer), both analyzed regulations, the DGA and the DA, help to define the roles related to basic transactions of data exchange. The definitions of the roles of data providers and data users and the recognition of a spectrum of intermediaries are needed to build-up the value creation opportunities in the next layers.

On the second layer (Data layer), the availability of data is increased, e.g., by the DA, and this supports value creation opportunities. The DA helps to guarantee that data is available from a wide range of sensors for the purchaser of the sensor, therefore making data available for use.

On the third layer (Value layer), the DGA and the DA can also be seen to alleviate the risk of lock-ins. Decoupling of services ensures the possibility to switch between service providers and aims to eliminate lock-in-effects as no single organization can take full control of both types of services. This aims for a level-playing-field for all data sharing actors and creates new value creation opportunities as well as ensures that data can be further shared to a wide range of service providers. The purpose for the separation of the roles of data intermediation services and data-based service providers starts to become visible on this layer.

On the fourth layer (Ecosystem layer), the DGA helps to ensure the neutrality of data intermediation services and separates their operations in such a way that monolithic platform giants are exposed to functioning competition. This advances multiple actors

with different business roles to emerge, while also ensuring the sovereignty of data holders.

6 Conclusions & Implications

The roles and mechanisms in the regulations examined in our study seem to support the value creation opportunities related to data sharing. During our research both regulations, the DGA and the DA, were still considered as emerging legal frameworks and data ecosystems as emerging concepts, partly due to gradual start of the implementation of the regulations and their uptake. The new roles and mechanisms envisioned in said regulations, like the data intermediation services under the neutrality and separation requirements, could also support the business of smaller companies by ensuring that the data used in different digital services is accessible, findable, usable and of good quality. Indeed, the increase of trust related to data sharing, supported by the regulative frameworks, can increase innovation aspects related to digital platforms. The new value creation opportunities seem to be emerging especially in the service and ecosystemic value co-creation layers.

Even though the regulative frameworks did seem to boost innovation activities in our research, there were also downsides. Smaller companies did acknowledge that larger data infrastructure providers would need to adjust their operations in order to comply with the regulative frameworks. Such a market environment would ensure the smaller companies can trust that the data infrastructure will be based on fair European principles. Also, the envisioned novel roles and mechanisms in the regulations were still considered unclear and not complete as no major market players have yet emerged to act in these roles. Increase in trust among data sharing actors on all layers and clarity on the boundaries of regulatory requirements could enable value co-creation.

Based on the regulative frameworks, it became clear that the data ecosystems envisioned as the result of our research cycles would benefit from commonly agreed building blocks. These include pre-agreed rules and standards for data sharing to ensure the trust within a data ecosystem. We notice that for instance the emergence of common European data spaces can reply to this by providing common technical and governance building blocks based on which data ecosystems may thrive.

Fully functioning data economy requires platforms to evolve from simple technical infrastructure enabling data transfers, towards true data transaction platforms and value driven ecosystems supporting the idea of data sovereignty. In addition to technical infrastructure, this requires mechanisms to increase access to data, the amount of value adding service providers and ecosystem orchestrators and related, so-called soft infrastructure, e.g., governance mechanisms, contractual frameworks, and business creation capabilities.

Managerial implications include the potential new roles within the data economy – related to data-based services and ecosystem orchestration – as well as novel boundaries set by the regulatory frameworks for the data sharing actors and roles. For organizations interested in business model innovation related to digital platforms and data, the new roles envisioned in the regulatory frameworks are worth exploring as Europe is starting to

fully adopt the regulation. These roles seem to arise especially for orchestrators of data sharing actors and for diverse service providers either in the upstream or downstream of the data transactions. Another managerial implication is related to the value creation opportunities with data: the value is often co-created with other participants in the data ecosystem and is reciprocal in nature, which means that the businesses need to open their business models to accept the co-creation of value. The regulative acts also support this kind of approach by for example de-coupling the data-based services from data.

We acknowledge the limitations of our study. The empirical part of our study is limited to the context of urban, built environment and the analysis covers only two of multiple regulations, and thus, the results cannot be generalized. Further limitations include the selected research method, qualitative approach of our study and lack of longitudinal data. These limitations support the need for further study on the topic. Further research could focus on how the regulative frameworks affect the business model innovation, what kind of sectorial or domain specificities exist and how they affect value co-creation, or how the interlinking regulations affect the identified value creation mechanisms.

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