Chapter 2
Financial Regulation, Political Context, and Technology in the European Union

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Abstract Three decades after the establishment of the European Single Market, the ongoing digital transformation of its core socioeconomic pillars generates regulatory shifts. These shifts are also initiated by geopolitical pressures. Within its data-driven economy, innovative financial solutions and technologies strive to unfold against the backdrop of what is now a multilayered, complex regulatory environment. This chapter dismantles this complexity by outlining the main regulatory building blocks relevant to the European Union's financial industry vis-à-vis the policy goals of digital and economic sovereignty. Given the focus of this book on decentralization technologies in the financial industry, it then contextualizes the impact of such policy on these and discusses the present dynamics between regulation and innovative technology.

2.1 Introduction

In 2023, the European Union (EU) celebrated the 30th anniversary of the Single Market. This key pillar of European integration was complemented in 2014 by the Capital Markets Union, to facilitate the movement of capital (Véron & Wolff, 2016), and in 2015 by the Digital Single Market, whereby the EU set out to

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digitize the core tenants of its fundamental freedoms. This was pursued by providing digital services with trustworthy infrastructures and an appropriate regulatory environment (e.g., standardized rules for telecommunications, copyright, and data protection) (European Commission, 2024). Early achievements included the cross-border portability of digital services, the end of roaming charges, and the end of unjustified geo-blocking (European Council, 2024).

Going forward, the protection of the data and privacy of European citizens, as well as the competitiveness of EU businesses within the digital economy, were increasingly in the limelight. With the adoption of the General Data Protection Regulation (GDPR) in 2016, EU institutions addressed a wide range of issues, including the data economy, artificial intelligence, and digital platforms. Further related legislative initiatives were put forward (European Council, 2020). While the GDPR represents a response to online scandals, breaches, and the practice of data mass aggregation without restrictions (Hoofnagle et al., 2019), the recently adopted Digital Services Act (DSA) and Digital Markets Act (DMA) respond to market dominance abuses and anticompetitive behavior by multinational companies (Larouche & de Streel, 2021).

In the aftermath of the 2008 financial crisis, the EU's regulatory approach also significantly evolved (Leonard et al., 2019). Such legislative activism in times of perceived threats or uncertainties is indeed no abnormal pattern (Codagnone & Weigl, 2023). At that time, many jurisdictions implemented preventative reforms for the sake of stability, and the previously permissive approach toward digital transformation, known as "deregulation," was replaced by a more stringent framework. In the field of digital finance, complexity was also introduced with the advent of FinTech and its new opportunities and risks (Zetzsche et al., 2017; European Commission, 2018). In particular, the emergence of financial applications on top of decentralized architectures—above all, blockchains and distributed ledger technologies (DLTs), but also technologies for digital identity management—testified to the existence of novel methods to manage data with substantial consequences in terms of sociopolitical analysis and regulatory methodology (Barbereau & Bodó, 2023; Pocher & Veneris, 2022).

Typically, information system (IS) literature focusing on information technology (IT)-enabled solutions (Benbasat & Zmud, 2003) that are characteristically decentralized or distributed by design follows a well-known 'script' (Grover & Lyytinen, 2015) of mapping regulatory requirements against technical design principles and identifying patterns of emergence, acceptance, or adoption. Notwithstanding the value of such approaches, this chapter aims to provide an overview of the regulatory 'state of play'. In addition, it contextualizes the ambitions of the EU's policy and regulatory strategy within the scope of application of these technologies in the financial domain, their impacts, and the alternative solutions they enable.

Accordingly, this chapter is structured as follows: Sect. 2.2 positions the European Single Market within the global context; Sect. 2.3 introduces regulation with direct impact on the financial industry; Sect. 2.4 discusses the interplay between decentralization and regulatory approaches; and Sect. 2.5 concludes.

2.2 The European (Digital) Single Market

The history of European integration is long and complex. It started after World War II to promote economic cooperation and prevent another deadly conflict. The first steps were taken with the establishment of European Coal and Steel Community (ECSC) in 1951. This was followed by the European Economic Community (EEC) and the European Atomic Energy Community (Euratom) in 1957. Over the years, the organization has expanded to include more Member States, and its focus has expanded beyond economic cooperation to include political and security issues.

After the 1992 Maastricht Treaty established the European Union (EU) as we know it today, the European Single Market was inaugurated in 1993 and has since expanded to additional policy areas—e.g., the single currency (the euro, €) and the Schengen Agreement which allows for the free movement of people within a designated area of the EU. The establishment and continued development of the Single Market has had a significant impact on the economic prosperity and financial integration of the EU (Underhill, 1997) (the reader can also refer to the vast literature on the history of the EU and its single market (e.g., Dedman, 2006; Laursen, 2012)). Indeed, the single market is seen to have "transformed a number of relatively closed and restricted domestic financial markets into a de-segmented, transnational financial space contiguous with global market" (Underhill, 1997, p. 101).

2.2.1 European Union's Approach Between the USA and China

The financial crisis of 2008 shocked the world, and financial turmoils offer insights into the interconnection of global markets. After the collapse of Lehman Brothers, the domino effect rapidly reached the EU, starting with the Republic of Ireland. The crisis demonstrated that the EU's financial sector was deeply interwoven with that of the United States of America (USA) and, thus, dependent on it (Navaretti et al., 2010). Meanwhile, the emergence of China as "an economic competitor in the pursuit of technological leadership, and a systemic rival promoting alternative models of governance" (European Commission, 2019, p.1) was observed in a state of shock by EU policymakers (Leonard et al., 2019). The Vice President of the European Commission (EC), Josep Borrell (2020), acknowledged that:

> "US-China strategic rivalry will probably be the dominant organizing principle for global politics, regardless who wins the next presidential US elections. In that context, we need to hold our nerve and frame our own EU approach."

On the global diplomatic stage, the EU has important ties to both the USA and China (Christiansen & Maher, 2017; Defraigne, 2017). In terms of trade and investment, the Union is one of China's largest partners, and China is the EU's second-largest partner after the USA. The EU is also a major destination for Chinese foreign direct investment (FDI), and vice versa (WITS, 2024). These indicators are

the result of the EU's and China's shared and long history of cooperation on a range of issues, including climate change, energy, and sustainable development. However, the relationship is not without challenges. The EU has continuously expressed concerns on issues such as market access, intellectual property protection, and human rights (Christensen, 2015). The EU also has a close and strategic relationship with the USA—not least, through member states' memberships at the North Atlantic Treaty Organization (NATO) and the Transatlantic Economic Council. The two have a large and growing economic connection, being their respective largest trading partner. The EU and USA cooperate closely on a range of issues, including security, defense, and foreign policy (Wang & Song, 2016).

Despite these ties, since its foundation, the EU has developed a sensible position between the pressures USA and China exert on the global stage. The European think tank Bruegel argues that while "the EU does not send armies all around the world, its leaders like to believe that the EU has the collective economic size and capacity to determine its own economic destiny, to set its own rules for economic life, to negotiate on an equal footing with partner economies, to tame would-be monopolies and even to set economic standards and regulations for the rest of the world" (Leonard et al., 2019). This tendency is, for example, reflected in the EU's regulatory approach to the Digital Single Market.

2.2.2 The "EU Approach"

The way in which the "EU approach," as termed by Josep Borrell, was deployed for the Digital Single Market and contrasts the policies of the USA and China. The key notion for the EU is that of "sovereignty" (European Commission, 2020c). Sovereignty refers here to the ability to "act independently in the digital world" and is understood in terms of "protective mechanisms and offensive tools to foster digital innovation (including in cooperation with non-EU companies)" (Madiega, 2020). Several scholars have analyzed how the concept of digital sovereignty is discussed by EU institutions both in official communications, research reports, and academic literature (Roberts et al., 2021) and in legislative and nonlegislative texts (Codagnone & Weigl, 2023). Results suggest that the pursuit of technological sovereignty is a shared motivation and objective in various EU policy files. As such, sovereignty "is an idea formed not simply around practices of individual data self-care maintained through combinations of network applications and the assertion of rights, but encompasses a whole range of economic, political and social concerns and motivations" (Herian, 2020).

Admittedly, given its multiple meanings and the lack of a commonly agreed upon definition (Bellanova & Glouftsios, 2022), the concept ought to be dissected in more detail. Economic sovereignty carries a geopolitical dimension. It encompasses "the EU's ability to participate in defining the rules of the game for the global economy—what Chancellor Merkel calls *Handlungsfähigkeit* and the French call *puissance* [européenne]" (Leonard et al., 2019). Doing so underlines the provision

of "value" to citizens. Here, the achievement of sovereignty is a common "belief," an objective the EU actively pursues. These values and objectives are also reflected in the contemporary meaning of digital sovereignty (see also the discussion around *value amplification* through European sovereignty (Codagnone & Weigl, 2023)). In the digital sphere, this paradigm ought to address rising user demands and increasing security risks and privacy violations by foreign governments and multinational technology corporations.

The (then) President of the European Central Bank (ECB), Mario Draghi, rightfully denotes a conflation of *independence* with *sovereignty* in beliefs around economic integration and political cooperation (Draghi, 2019). Economic sovereignty refers to "the collective capacity of EU countries working together to preserve their economic *independence*." Doing so is of strategic relevance because it "underpins the argument that the European integration process provides value" to citizens (Leonard et al., 2019). Again, parallels can be drawn to the digital sphere, where global players, like China, the USA, and ultimately also the EU, are engaging in a fierce tech rivalry. The EU decided to navigate this race (Metakides, 2022) via a constitutional approach (Floridi, 2020; Codagnone & Weigl, 2023) with a self-imposed mandate to regulate the digital in order to achieve digital sovereignty.

The exerted effects, however, are not necessarily limited to the EU. Indeed, the notion of the "Brussels Effect" was coined to describe a process of regulatory globalization by the hands of EU law. For a more extensive analysis of the "Brussels Effect" of the GDPR, see Bradford (2020); Goddard (2017).

2.3 Regulatory Developments for the European Financial Industry

EU regulatory mechanisms are strongly tied to the (perceived) need to respond to socioeconomic issues or threats. These "reactive" dynamics are defined by Rhinard (2019) as "crisisification" in EU policy-making. When it comes to the regulation of financial services and their digitization, the 2008 financial crisis represented a turning point (Leonard et al., 2019). The crisis had a substantial impact on the global economy by undermining trust in the overall stability of the financial system, leading to a decline in citizens' systemic trust in centralized institutions and their governments (Roth, 2022). Financial stability, as such, is constructed by the complex interaction between financial products, services, and the governance of financial institutions and actors through regulation. However, the emergence of decentralization technology embedded in the financial sphere was soon to be seen as an important distinctive feature and alternative to the perceived instability of traditional financial systems. Next to techno-solutionist responses, among the crisis' far-reaching and long-term effects on the regulatory side, the emerging macroprudential concerns urged regulators to balance core principles such as financial stability, consumer protection, and inclusion, with growth and

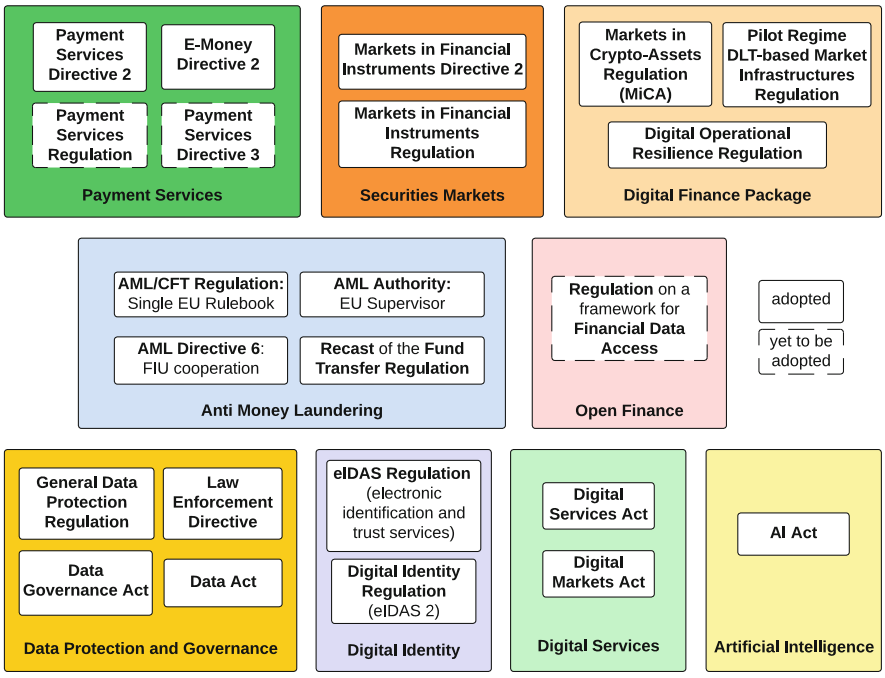

Fig. 2.1 Selected overview of the regulatory frameworks relevant to the provision of payment and financial services in the EU and of those concerning the digital space. Updated to August 2024

innovation (in financial regulation, the "macroprudential" perspective focuses on the overall impact of interrelationships between financial institutions and pinpoints those that exert systemic influence). In Sect. 2.3.1, after accounting for the interplay of international financial regulation and EU law, we dedicate a section to the general regulatory building blocks for the European data economy and the digital financial space—as testified by the FinTech Action Plan: "FinTech sits at the crossroads of financial services and the digital single market" (European Commission, 2018, p.2). Thereafter, in Sect. 2.3.2, we turn to the EU frameworks specifically regulating payment and financial services. We also provide an overview of frameworks relevant to the European Financial Industry in Fig. 2.1. Note that the list of regulatory building blocks and ongoing EU reforms does not provide an exhaustive record but a selected and context-specific overview.

2.3.1 The EU and Global Financial Regulation

Any effort to provide an overview of the EU framework for digital finance is met by two major challenges: (i) EU financial regulation is far from a singular stand-

alone framework and is tightly interwoven with global financial regulation, and (ii) the latter is not a clear-cut legal area and consists of a compound of rules, standards, and best practices. At the global level, financial regulation largely relies on so-called "voluntary compliance" and features low levels of institutionalization (Newman & Bach, 2014). It mostly consists of global rules adopted as nonbinding agreements by regulatory agencies or institutions with undefined legal identities (Brummer, 2015). In this context, the concept of "soft law" was defined as a compendium of "instruments or agreements that are not directly enforceable like treaties, but that nevertheless create powerful expectations" (Marchant & Allenby, 2017, p.1).

The development of global financial regulation started in the late 1980s, when the increasing integration and cross-border capital flows began to urge regulatory cooperation to protect stability and consumers (Brummer, 2015). The risk of market participants escaping national supervision—so-called "regulatory/forum shopping" (Mevorach, 2013)—was mitigated by setting global standards and prudential guidelines through international forums (Brummer, 2015). While these policy forums enshrine models of technocratic cooperation, they also belong to a hierarchical system of influence and power, with sophisticated internal designs. Indeed, there are various categories of "agenda setters" (primarily, the G-20 and the Financial Stability Board (FSB)), sector-specific "standard setters" (e.g., the International Organization of Securities Commissions (IOSCO), the Basel Committee of Banking Supervision (BCBS), and the Financial Action Task Force (FATF)), and supporting organizations, such as the Bank for International Settlements (BIS) and the Committee on Payments and Markets Infrastructure (CPMI).

It is in the context of the growing distrust in these technocratic frameworks that the increasing importance of EU law must be analyzed. In particular, academic literature points out four different resources that strengthen the "Brussels Effect" in international financial regulation: first, the sheer size of the EU internal market and its resulting market power (Damro, 2012; Dür, 2011). Second, the EU's "regulatory capacity" to "formulate, monitor, and enforce a set of market rules" (Bach & Newman, 2007). Third, its external representation in international financial forums, which arguably makes a significant difference in the external influence of the EU (Mügge, 2011). Fourth, the high degree of EU cohesiveness (Quaglia, 2014) (supporters of this rationale argue that the higher the cohesiveness of the EU position (meaning that Member States' preferences are reconciled), the higher its influence in standard setting).

In parallel, it is widely acknowledged that the evolution of financial regulation tends to mirror the evolution of the industry, and the EU is no exception. In particular, there is typically a first phase in which self-regulation arises out of necessity in a situation of minimal regulation (e.g., industry members self-regulate in the form of standardization, for the sake of growth and survival) (Finck, 2019). This is followed by a second phase in which oversight regulation is generally driven by flaws of self-regulation (Johnstone, 2021). The notion of self-regulation, however, is debated, notably for what concerns the relationship between "self-regulation" and "co-regulation" (see Borrás & Edler, 2020; Hofmann et al., 2017; Pagallo et al., 2019; Trubek & Trubek, 2007). In brief, regulation requires the

involvement of public institutions and regulatory actions within market systems—e.g., industry standards, if agnostically viewed by the law, are excluded (Marsden, 2012). In this sense, self-regulation consists of nonbinding norms for which formal sanctions play no part. By contrast, if there is a formal institutional involvement, there is co-regulation, which displays interactions between general legislation and a self-regulatory entity (Marsden, 2012; Pagallo et al., 2019). In these cases, self-regulatory efforts are granted legitimacy by being framed within regulation.

The interactions between these regulatory forces may occur at various intensities. Further, the institutional intervention may be indirect, as in the case of sanctions for failures to adopt standards (i.e., enforced self-regulation) (Bennett & Raab, 2020). The legislator may also lay out principles to be implemented by the private actors, under the assumption it is best positioned to give them practical application. This is the case of principles-based regulation (Bennett & Raab, 2020). This is often the case when it comes to the digitization of the financial sphere. At the EU level, examples of principle-based regulation are both the anti-money laundering (AML) and combating the financing of terrorism (CFT) regime and the GDPR.

2.3.2 Regulatory Building Blocks

The array of legal frameworks relevant to financial activities performed in the digital space has been under constant expansion in recent years (Codagnone & Weigl, 2023). Regarding the relevant types of EU legislation, they can primarily take the form of "regulations" or "directives." In the first case, the instrument is adopted in such a way to be binding and directly applicable at Member State level in its entirety. Indeed, as per Article 288 of the Treaty on the Functioning of the European Union (2012), "[a] *regulation* shall have general application. It shall be binding in its entirety and directly applicable in all Member States." This is because it pursues an EU-level regulatory "uniformity" in a certain (sub)field. A regulation-based regime may give rise to implementing acts or the issuance of further details for its application, but in principle, it does not require a specific transposition action at Member State level (Blom-Hansen et al., 2023).

In the case of directives, their principle-based nature pursues a "harmonization" of the various Member State approaches in a specific legal (sub)field. As per Article 288 of the Treaty on the Functioning of the European Union (2012), "[a] *directive* shall be binding, as to the result to be achieved, upon each Member State to which it is addressed, but shall leave to the national authorities the choice of form and methods." Hence, a directive sets out a goal that EU Member States must achieve, but they will decide how to reach these goals. Due to the nature of the directive instrument, Member States are required to transpose the framework into their national laws. (There are forms of "minimum" and "maximum" harmonization. In the first case, Member States can adopt higher standards if they wish. In the second case, the directive provides for minimum and maximum standards. Dougan (2000) addresses some of the issues of minimum harmonization.)

2.3.2.1 Frameworks Regulating the Digital Space

In recent years, European policy-makers and legislators have been considerably active in their attempts to regulate the digital space. Although the scope of application of these initiatives goes beyond the provisioning of payment and financial services, we select and summarize some key initiatives below to outline the context of the more targeted regulatory reforms that we address afterward.

Data Protection and Data Governance The GDPR (Regulation (EU) 2016/679) is a key regulatory building block, because it regulates the collection and processing of personal data by organizations for individuals residing in the EU (for an extensive overview, see Hoofnagle et al., 2019). Hence, the framework is also of critical importance for the proper use of data-driven financial services. The same is true for Regulation (EU) 2018/1807, establishing a framework for the free flow of nonpersonal data in the EU. The GDPR is a prime example of the mentioned "Brussels Effect," and it is hailed as the "gold standard" in data protection (Buttarelli, 2016; Cervi, 2022; Gunst & Ville, 2021). Yet, the global impact of EU legislation in the field of data protection is not new: the 1995 Privacy Directive had already inspired regulatory change outside Europe (Greenleaf, 2012; Heisenberg & Fandel, 2004). Meanwhile, the Data Protection Law Enforcement Directive (LED) (Directive (EU) 2016/680) lays out a framework that is parallel to that of the GDPR. In particular, it deals with the processing of personal data by data controllers for "law enforcement purposes"—i.e., for the purposes of the prevention, investigation, detection, or prosecution of criminal offenses or the execution of criminal penalties. Accordingly, these fall outside the scope of the GDPR.

In parallel, the Data Governance Act (DGA), adopted as Regulation EU (2022/868), is part of the "European Strategy for Data" and represents a cross-sectoral instrument that aims to enhance the availability of data by regulating the reuse of publicly held, protected data. It does so by boosting data sharing through regulating novel data intermediaries and by encouraging the sharing of data for altruistic purposes. Further, the Data Act laid out rules on fair access to and use of data, thereby complementing the DGA (Regulation (EU) 2023/2854).

Digital Identity and Trust Services The electronic Identification, Authentication and Trust Services (eIDAS) regulation Regulation (EU) 910/2014) provides the basis for trust services and remote cross-border identification within the EU (Negreiro, 2021; Tuominen & Festor, 2021). To enable electronic identity (eID)-related processes between different jurisdictions—i.e., people and businesses can use their national eIDs to access online public services in other Member States—eIDAS relies on voluntary, notified national eID schemes (Weigl et al., 2022). Hence, eIDAS creates a single market for trust services by ensuring they will work cross-border and have the same legal status as the paper-based equivalents. Importantly, for identification and authentication purposes, eIDAS is limited to public sector services (Tuominen & Festor, 2021).

The eIDAS framework was criticized for the lack of incentive for Member States and private identity providers to connect to the infrastructure due to its

limitation to public sector services. For private services, individuals mainly rely on identity solutions offered by for-profit companies and intermediaries, which raise concerns about data privacy and security (Weigl et al., 2022; Negreiro, 2021). The recently adopted European Digital Identity Regulation (eIDAS2) addresses these shortcomings (Regulation (EU) 2024/1183). In particular, it aims to enhance the coverage of eID schemes, their cross-border acceptance and use, and the quality of user experience. The Regulation introduces the adoption of a free-of-charge "European Digital Identity Wallet" as a means to store, manage, and validate identity data and electronic attestations of attributes (Negreiro, 2021; Tuominen & Festor, 2021; Sedlmeir et al., 2022). It marks one step toward living up to the ideal of "user-centricity"—a design philosophy that is set out to center around users' needs and preferences, whereby it prioritizes performance-based values such as convenience, efficiency, and simplicity. In the same vein, the introduction of a digital wallet also aims at the "decentralization" of digital identity management systems by empowering individual users and disempowering centralized infrastructures and institutions (Giannopoulou, 2023; Sartor et al., 2022; Weigl et al., 2023a). Member States are required to issue at least one wallet within 24 months from the adoption of the Implementing Acts t Regulation (EU) 2024/1183.

Digital Services The DSA and DMA aim to create a safer digital space where the fundamental rights of users are protected and a level playing field for businesses is enabled. The concept of "digital services" comprises a large category of online services, from simple websites to internet infrastructure services and online platforms. The framework laid out by the DSA primarily concerns online intermediaries and platforms (Regulation (EU) 2022/2065), while the DMA specifically targets digital platforms with a systemic role that function as gatekeepers between businesses and consumers for important digital services (Regulation (EU) 2022/1925). The core ambition of both regulations is to break up the power held by centralized big platforms (Cabral et al., 2021; Weigl et al., 2023b).

Artificial Intelligence In 2021, the EC put forward a proposal for a Regulation on artificial intelligence (AI), recently adopted as Regulation (EU) 2024/1689. The approach in regulating AI is horizontal, meaning the framework will apply to all applications of AI across all domains. The framework adopts a risk-based approach and classifies AI systems into four risk categories: (1) unacceptable-risk (these AI practices are prohibited), (2) high-risk, (3) limited-risk, (4) minimal/no-risk (European Commission, 2021d; Regulation (EU) 2024/1689). For what concerns the financial sector, two use cases are considered as high-risk, namely, AI-based creditworthiness assessments, as well as pricing and risk assessments in life and health insurance. This means the relevant applications will have to comply with stricter requirements—notably in terms of risk and data management and technical documentation, but also for what concerns transparency and information to be provided to users (Chapter 2 of Regulation (EU) 2024/1689).

Overall, the contemporary technological developments have enabled governments worldwide, and the EU in particular, to produce legal approaches that aim

to reshuffle the balance of power in a global economy dominated by algorithmic technologies and large centralized commercial platforms (see, e.g., also Napirata et al., 2023). The selected initiatives outlined in the previous section illustrate this dynamic. They show that EU policy-makers worked on a voluminous body of frameworks within a short and dense period of time. Although the policy areas are very diverse—ranging from data protection, digital identity, the platform economy, and much more—they share one common political narrative. This narrative appeals to the idea of "digital sovereignty" (Csernatoni, 2022; Herian, 2020; Floridi, 2020; Metakides, 2022). While terms such as "data sovereignty" still lack a broadly agreed-on definition (Ernstberger et al., 2023), the political pursuit of digital sovereignty has unfolded in two overarching ways: (1) by ensuring Europe's competitiveness in the data economy and (2) by empowering its citizens with control over their data and thereby offering users an exit strategy from the commercial mass proliferation of personal data online.

While the EU has demonstrated significant regulatory activity in the digital realm, the framing of policies around digital sovereignty has fueled this activity beyond mere policy pragmatism. This has led to a proliferation of intricate policies and regulations that exhibit a lack of coherence and consistency (Codagnone & Weigl, 2023). The pursuit of real digital sovereignty necessitates the development of capabilities and innovation across various digital sectors (ibid.). While initiatives such as the AI Act aim to regulate high-risk systems and safeguard individuals (European Commission, 2021d), they alone do not guarantee the advancement or proliferation of European AI firms to achieve a leading position. The EU's production of digital policy initiatives carries the potential downside of amplifying administrative burdens, particularly for small- and medium-sized enterprises, hampering innovation, and exacerbating uncertainty due to regulatory inconsistencies and lack of cohesion (Codagnone et al., 2022). In addition, there is also the looming concern of an "antagonistic" Brussels Effect, with both market and legal reactions, where Big Tech companies, for instance, adjust their services offered to consumers in Europe (Satariano & Mickle, 2024) or take legal action against the EC for the obligatory provisions imposed on them (Bodoni, 2024). It remains questionable whether the current wave of digital policies can thus be seen as a purely public-interventionist intention and not instead as a tool for the sake of keeping up its reputation as a standard-setter, ethical pioneer, and regulatory powerhouse.

There is undoubtedly a very reassuring spirit in the EU's approach to innovation regulation. The current array of proposals and new frameworks are commendable for establishing a stable foundation to safeguard consumers and ensure fair competition for European enterprises. Yet, rather than solely reacting to the dominance of foreign private entities, the pursuit of digital sovereignty should be viewed as a means rather than an end, in EU policy-making, aiming to attract investments, stimulate innovation, advance the Digital Single Market, and promote the adoption of standardized practices.

2.3.2.2 Frameworks Regulating Payment and Financial Services

Some of the most profound regulatory changes in the EU's modern financial history can be found in a legislative trio composed of (a) the Revised Payment Services Directive (PSD2), (b) the Electronic Money Directive 2 (EMD2), and (c) the Second Markets in Financial Instruments Directive (MiFID II) together with the Markets in Financial Instruments Regulation (MiFIR). Alongside these backbones, other legislative initiatives—in some cases adopted, in others under negotiation—pertain to (d) digital finance and crypto-assets, and (e) open finance. Further, the picture is completed by the evolving framework regarding (f) AML and CFT. We provide an overview of these dimensions below. The analysis of the PSD2 must be accompanied by the recent proposal for a Payment Services Regulation (PSR) and a Payment Services Directive 3 (PSD3).

Payment Services Addressed to the European banking and payment sector, the PSD2 is responsible for the implementation of open banking to ensure a competitive and innovative European financial ecosystem (Directive (EU) 2015/2366). Under its framework, financial institutions and providers of payment services are required to offer application programming interfaces (APIs) to be able, at the request of their customers, to share their financial data for account aggregation and initiation of payment transactions. In June 2023, the EC proposed a thorough reform of the regime through a financial data access and payments package (European Commission, 2023a). In particular, the EC proposed to amend the PSD2 into a PSD3 (European Commission, 2023b), accompanied by a PSR (European Commission, 2023d).

Electronic Money The EMD2 sets out the rules for the business practices and supervision of e-money institutions, to lay the foundations for a Single Market for e-money services in the EU. "E-money" is defined as "electronically, including magnetically, stored monetary value as represented by a claim on the issuer which is issued on receipt of funds for the purpose of making payment transactions" (Article 2, Directive 2009/110/EC). The mentioned payments package acts upon the European Banking Authority (2022), which suggested the merge of the PSD2 and the EMD2. Hence, in an effort to streamline the overall regulatory framework while leaving space for the specifics of each subfield (European Commission, 2023e), the proposed PSD3 integrates and repeals the EMD2 (European Commission, 2023b).

Financial Instruments MiFID II and MiFIR regulate the provisioning of investment services in a wide range of financial instruments on regulated trading venues and over-the-counter in the EU. MiFID II created a new framework for investment and trading activities on financial markets and enhanced investor protection (Directive 2014/65/EU). MiFIR covers aspects such as disclosure of trade data to the public, transaction reporting, derivatives trading, and the powers of national and supranational authorities (Regulation (EU) 600/2014).

Digital Finance and Crypto-Assets With the rise of digital finance triggered by a continuous evolution in service delivery due to the digital transformation, further

regulatory adaptations and reforms were deemed necessary. "Digital finance" encloses a variety of novel financial information technology, including products, businesses, software, and customer communication provided by FinTech companies (Gomber et al., 2017). Although this evolution ought to improve inclusion and expand organizations' and individuals' access to financial services and products, policy-makers are confronted with the challenges and the risks entailed in the digitization process and use of data, as well as with the potential disruption and disintermediation of the traditional financial industry. In September 2020, the EC presented a "Digital Finance Package" (European Commission, 2020b) comprising an overarching strategy for a digital financial market in Europe (European Commission, 2020a), and a set of proposals for three regulations adopted in the following years and giving rise to substantial interest among industry and academics alike (Zetzsche et al., 2023).

First and foremost, the Markets in Crypto Assets Regulation (MiCAR), adopted as Regulation (EU) 2023/1114, has generated a considerable hype both in the EU and abroad and is expected to generate a significant "Brussels effect." It focuses on certain categories of crypto-assets—i.e., asset-referenced tokens, e-money tokens, and other types of tokens—which currently fall outside the scope of existing regulations. MiCAR establishes a framework for providers of certain crypto-asset services to safeguard consumers and investors, and its purpose is similar to that of MiFID II, which regulates securities, investment intermediaries, and trading venues.

Secondly, the Regulation (EU) 2022/858 established a Pilot Regime—i.e., a so-called "regulatory sandbox"—for market infrastructures based on DLT, thereby creating conditions for obtaining a license to operate, defining which instruments are tradable on these platforms. This regime applies to instruments that qualify as financial within the meaning of MiFID II and provides the possibility to develop and test DLT-based infrastructures and business models in a controlled environment under a condition of temporary (up to 6 years) exemptions from a portion of the existing, and otherwise applicable, rules (Zetzsche & Woxholth, 2022).

Lastly, Regulation (EU) 2022/2554, the Digital Operational Resilience Act (DORA), aims to strengthen the IT security of financial entities positioned in the EU by ensuring that they can withstand severe operational disruptions and information and communication technology (ICT)-related threats, thereby strengthening. Its efforts are complemented by the Directive (EU) 2022/2556, which provided for the necessary amendments to existing legislation in the area of financial services.

Open Finance In the same legislative package that included the proposals for a PSR and a PSD3, in June 2023, the EC put forward a proposal for a Regulation on Financial Data Access (FiDAR) (European Commission, 2023a). The framework aims to introduce the shift from the principles of "open banking" introduced by PSD2 to the so-called "open finance." This is done by establishing rights and obligations to manage customer (financial) data sharing beyond payment accounts, through a proposed European Commission (2023c). This framework aims to stimulate competition in the financial sector, which currently features uneven data-sharing practices and very high stakeholder reluctance in this regard, to the

detriment of the creation of personalized financial services (Recital 6). In turn, open finance should drive the development of more innovative financial products and services—e.g., in the areas of insurance, savings accounts, loans, investments, and pension products. The proposed regime also introduces the new category of "financial information service providers."

Anti-money Laundering and Counter-Terrorist Financing Since 1991, the EU has drafted legislation to harmonize the responses of the Member States for what concerns AML/CFT, including know-your-customer (KYC). The process toward a common EU approach has long relied on directives of minimum harmonization, where domestic provisions can be stricter than those laid out by the EU. This is the case of the framework laid out in Directive (EU) 2015/849 as modified by Directive (EU) 2018/843. The framework largely consists of incorporating into Union law the Recommendations adopted by the AML/CFT standard-setter, the FATF (Financial Action Task Force, 2012). Also in this domain, the regime has evolved according to the increasing socioeconomic interconnections as well as to keep track of the digitization of financial services.

In 2021, the EC put forward the so-called AML Package (European Commission, 2021a), with the goal to overcome the fragmentation caused by the national transposition of a directive-based regime. The AML Package comprised four proposals. Firstly, the proposal for an AML/CFT Single Rulebook was adopted as Regulation (EU) 2024/1624. The EU AML/CFT regime is not disrupted in terms of content, but the framework becomes regulation-based and, as such, binding in its entirety. The main changes concern the expansion of regulated entities to include providers of crypto-asset services, the clarification of the specifics of the internal policies and procedures, the granularization of the measures concerning customer due diligence, and the streamlining of beneficial ownership requirements. The regulation also clarifies anomaly indicators, strengthens the measures to mitigate the misuse of bearer instruments, and includes a limit to the use of cash for large transactions (European Commission, 2021e; Regulation (EU) 2024/1624).

Secondly, Regulation (EU) 2024/1620 introduces a EU-level supervisor. The tasks attributed to the Anti-Money Laundering Authority (AMLA) include direct supervision of selected entities, assistance to financial supervisors, the coordination of information exchange and peer reviews of standards and practices of nonfinancial supervisors, and the provision of training and assistance. The AMLA will adopt regulatory technical standards, guidelines, or recommendations for regulated entities, supervisors, or financial intelligence units (FIUs) to ensure consistency with global standards and promote supervisory convergence (European Commission, 2021c; Regulation (EU) 2024/1620).

Thirdly, a portion of the new framework remains outlined in a directive, namely Directive (EU) 2024/1640. This is because it chiefly concerns activities to be performed at the national level, such as a definition of the responsibilities and tasks of FIUs. Accordingly, the proposal lays out the responsibilities and tasks of bodies involved in the supervision of obliged entities and addresses cooperation

mechanisms between competent authorities and with authorities covered by the other acts (European Commission, 2021b; Directive (EU) 2024/1640).

Fourthly, the Regulation (EU) 2023/1113 recast Regulation (EU) 2015/847 to expand traceability obligations beyond wire transfers, according to which financial institutions are required to provide certain information to one another for certain electronic transfers. In brief, the regulation implements the so-called crypto travel rule, as required by the FATF recommendations. The new framework targets providers of payment services and crypto-asset services and introduces the obligation to collect and make accessible to the authorities specific data on originators and beneficiaries of crypto-asset transfers.

From our analysis of the regulatory landscape affecting the provisioning of digital financial and payment services in the EU and often beyond, several key lessons emerge. Firstly, the importance of adaptability and evolution within the individual regulatory frameworks is evident, as demonstrated by the proposed amendments such as PSD3 and PSR to keep pace with changes in financial services. In this context, a shift from closed systems to a higher degree of openness can be observed. This is realized in the implementation of open banking, facilitating the sharing of financial data through APIs to enable account aggregation and payment initiation, and by a further trend toward open finance, to promote competition and innovation. Secondly, the interplay between harmonization attempts across different directives and regulations highlights the necessity for consistency and collaboration among regulatory instruments to effectively govern complex financial ecosystems from various regulatory angles. As an example, it remains to be seen whether the FiDAR initiative will leverage possible synergies with the upcoming eIDAS2, notably in terms of user-centricity. Thirdly, the emergence of regulations targeting digital finance and crypto-assets underscores the need for policy-makers to address the challenges and opportunities presented by technological advancements in the financial sector. Finally, the focus on enhancing AML and CFT measures emphasizes the critical role of updating regulatory frameworks in safeguarding financial systems against illicit activities. However, despite these efforts, there are still a number of innovation-induced unprecedented areas and risks that are, as of now, not covered by any legislative framework.

2.4 Discussion

In this chapter, we addressed the efforts to establish the European Single Market and to regulate payment and financial services to mitigate the risks emerging from an innovation driven by a vast array of new technologies. At the same time, we outlined how the action of EU policy-makers and regulators is situated within the preexisting and multilayered framework of global financial regulation, intertwined with the macroeconomic rules governing the data economy.

In recent initiatives, one can clearly notice a shift from a long-established directive-based approach of minimum harmonization to a regulation-based law-making that aims to achieve a stricter and more uniform approach. Despite the

apparent strength of such an approach, however, there are vast areas of the application of decentralization technologies that keep posing pressing questions to the EU legislator. Paradigmatic of this observation is the space of decentralized finance (DeFi) (Zetzsche et al., 2020) and the ubiquitous noncustodial software used to hold and trade crypto-asset (Barbereau & Bodó, 2023). After a discussion thereof, we shall turn to a more general discussion on the recent regulatory trends for digital finance in the European Union.

2.4.1 Introducing Decentralization Technologies to the Regulatory Mix

Decentralization can be seen as a shift from concentrated to distributed modes of production and consumption of goods and services (de Filippi & Loveluck, 2016). For technologies, the Internet serves as the most paradigmatic example of that shift—moving the distribution of information from centralized siloes to distributed nodes such that "no one is in charge, everyone is" (the consequence is increased access as price drops (Wigand, 2020)). One can observe a clear trend: building on the Internet, other decentralization technologies reached prominence in response to systematic failures and crisis.

Blockchain, and more specifically Bitcoin, emerged in response to the 2008 failures of the reserve banking system to propose a distributed system for the transfer of value on the Internet (de Filippi & Loveluck, 2016). In the first, *Genesis* block of Bitcoin, the developer added, along with normal data, the message "The Times 03/Jan/2009 Chancellor on brink of second bailout for banks" to the coinbase parameter. Bitcoin went on to inspire millions of users and developers to adopt this technology (Schneider, 2019). While regulation certainly lagged behind, the EU eventually responded with MiCAR and other packages that would see the space evolve.

Federated learning, a machine learning method developed by Google to train models locally (i.e., in a distributed manner) (Konečný et al., 2016), is seen as a paradigmatic case to break data siloes and address regulatory privacy requirements face on. In particular, it allows to reduce the amount of personal data transferred and processed by third parties. Hence, it now finds applications in sectors where applying machine learning was, until now, contentious if not impossible (Lee et al., 2023; Fernández et al., 2022). The mass adoption of AI and related risks have led the EU to respond with the AI Act.

In the field of electronic identification, digital identity wallets storing cryptographic keys and digital attestation place the holder of an identity credential at the center of digital identification, giving individuals control over their identity attributes. As such, it is more decentralized and designed to provide more autonomy and privacy to holders (Sedlmeir et al., 2021). These types of credentials are now, for better or worse, associated with notions of individual sovereignty, data control, and autonomy (Giannopoulou, 2023; Smethurst, 2023; Weigl et al., 2023a).

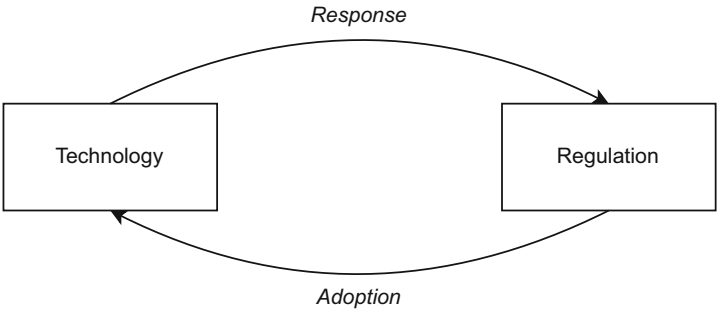

Fig. 2.2 Figurative representation of the symbiotic relationship between regulation and technology

Their emergence and regulation appear symbiotic: In response to the changing digital identity space, regulation was developed and vice versa, and with changing regulation, the adopted identity models changed (Sedlmeir et al., 2022).

While regulation is by no means the sole driver of technological trends, it would be wrong to discredit or detach it entirely. In the IS literature, repeatedly the match was made between regulatory requirements and features of decentralization technologies (Rieger et al., 2019; Schlatt et al., 2022; Roth et al., 2023). However, as wrong as it would be to generalize observations in a "scripted" manner (Grover & Lyytinen, 2015), it would seem incorrect to associate the emergence of the technologies above with regulatory developments alone. Likewise, it is certain that regulation comes as a response to technological trends. As some of the subsequent chapters of this book elaborate, the adoption of decentralization technologies is contingent on regulatory requirements. In sum, we observe that regulation drives technological trends in terms of adoption; and technological trends, in turn, drive regulation in terms of a response (see Fig. 2.2). Note that the relationship between law, regulation, and technology is more complex than figuratively represented here. Given the scope of this chapter, however, this is permissible. We wish to redirect the interested readers to the book of Brownsword et al. (2016) which unpacks that complexity with utmost accuracy.

2.4.2 Decentralized Finance and Its Regulatory Challenges

Following the "same activity, same risk, same rules" approach as per Financial Stability Board (2023), but also endorsed by Recital 9 of MiCAR, in principle DeFi would fall within the scope of application of various EU legislations for financial services on the grounds of their activities. In practice, however, they often run the risk of remaining unregulated. This is because they are offered by unregistered entities that make use of noncustodial smart contracts as "information providers," or

because they operate from jurisdictions that allow them to either entirely circumvent regulation or that do not properly enforce it (Barbereau & Bodó, 2023; Pocher, 2023; Zetzsche et al., 2023).

While this "unregulated" state may align with definitions that see DeFi as representing "a whole ecosystem of financial services realized through smart contracts deployed on public distributed ledgers" (Eikmanns et al., 2023, p. 1), where "the role of the financial intermediary is taken over by the self-executing computer code" (Katona, 2021, p. 78), and the ambiguous legal status of individual DeFi projects is both a blessing and a curse. (Consider that use cases vary significantly in nature. They include stablecoin projects (e.g., DAI), lending platforms (e.g., Aave, Compound), exchanges (e.g., Bancor, Kyber, Uniswap, Sushiswap, Pancakeswap), and derivative services/DEXes (e.g., Synthetix, dYdx) (Amler et al., 2023).) Legal decentralization, or more accurately legal "disintermediation" (Becker, 2022), is to be understood as the "elusion of centralized authorities and detachment from legal legitimacy" (Barbereau et al., 2023, p. 2). Disintermediation can also be understood in economic terms and alludes to the reduction of parties involved in transactions and a consequent reduction of cost (Wigand, 2020). The value of disintermediation and the lack of compliance make these systems a libertarian dream (Lichti & Tumasjan, 2023): They are favorable to users attracted to peer-to-peer systems over trusted third parties—be they innocent advocates or criminals.

The weight and relevance of the DeFi area are represented by the total value of DeFi projects, which amounted to USD one billion in January 2020, USD 27 billion in January 2021, USD 60 billion in April 2021, and USD 40 billion in November 2022 (Chainalysis Team, 2022). Given that scale, the lack of applicable regulation is not to be underestimated. The vast scale collapses and financial turmoil caused is commonly known as "Crypto Winter." This culminated in the diversion of some USD 14 billion of crypto-asset worth and total losses amounting to almost USD 50 billion (Zetzsche et al., 2023; Woxholth et al., 2024).

Zetzsche et al. (2023) provides an overview of the current remaining challenges of regulating the DeFi space. MiCAR does not regulate the provisioning of services that are fully decentralized, but the distinction between "partially decentralized" services (in scope) and "fully decentralized platforms" (i.e., when there is no intermediary) (exempted) is far from clear. In addition, the application of many rules laid out by MiCAR will depend on implementing legislation and raises questions regarding their relation to other neighboring regulatory frameworks (van der Linden & Shirazi, 2023; Zetzsche et al., 2023). Overall, these complexities and shortcomings are likely to stifle the effectiveness of existing legislation.

Thus, while it has been demonstrated earlier that significant legislative efforts are directed toward fostering innovation and technological advancements within the financial sector, regulators often find themselves trailing behind in the complex and rapidly evolving landscape of decentralization technologies such as DeFi. This lag could be attributed to several factors, including the relative novelty of these systems, the challenges in understanding and effectively regulating emerging technologies, and the nature of DeFi as a algorithmic and protocol-driven network detached from any control by a central authority.

2.4.3 Ambitions of Proactive Regulation

As noted above, EU regulatory dynamics appear strongly "reactive" to technology and dependent on responding to socioeconomic issues or threats (see the concept of "crisisification" of EU policy-making by Rhinard, 2019). It is also widely acknowledged that "reactive" and "crisis-inspired" rules should not become a dogma (Zetzsche et al., 2017), as they show vulnerabilities to perceptive distortions and arguments backed by ideologies. Hence, the regulatory process may overlook trade-offs and empirical differences, which may possibly lead to regimes that are overfitting and structured in such a way that they are not adaptable and cannot evolve if not by breaking their own boundaries (Pocher, 2023). In this context, even if a sandbox regime such as the DLT Pilot may provide valuable insights, it cannot replace regulatory reforms (Zetzsche et al., 2017). The faith in hasty regulation of innovative technology may come with undesired outcomes (Barbereau & Bodó, 2023), some of which may even go as far as hedging regulatory loopholes.

Whenever "proactive" regulation is pursued, however, there is a substantial need for cross-disciplinary understanding and cooperation. Typically, when policy-makers and regulators are asked to focus on their broader mandate, instead of deploying an "overly rule-based approach" that can hinder innovation and "overly stretch regulatory resources" (Zetzsche et al., 2017), they are asked to develop a deep understanding of the process enabled by the given technology, which needs access to different types of expertise (Pocher, 2023). Indeed, one of the goals of establishing cross-disciplinary collaboration mechanisms is to bridge the gap between the dynamism of innovative technologies and stringent rules-based approaches.

To grasp the meaning of innovative approaches to the interplay between technology and regulation, the interested reader is referred to the literature on "regulation/compliance by/through design" (Casanovas et al., 2018; Hashmi et al., 2018; Goldbarsht & de Koker, 2022) as well as "embedded regulation, " 'embedded compliance," and "embedded supervision" (Auer, 2019; Zetzsche et al., 2020). In the face of decentralization technologies offered by unregistered parties—eponymous in DeFi—alternative regulatory frameworks may prove of greater value than those traditionally applicable (Barbereau & Bodó, 2023). These alternative regulatory frameworks may require multilayered analyses of the techno-legal specifics so as to properly situate regulatory considerations from a normative perspective (Barbereau & Bodó, 2023) or design perspective (Pocher & Veneris, 2022).

It follows that decentralization technologies inspire a new way of reasoning about legal constructs and compliance frameworks, where technology and the law can pursue joint compliance objectives going well beyond the well-known "code is/as law" approaches such as the concept advocated for by Lessig (2019). (On this topic, the reader is referred to Filippi and Wright (2018) and Werbach (2019).) It remains to be seen whether technical decentralization, equipped with suitable governance layers able to satisfy the regulatory demand for accountability (Pocher, 2023), will

also display the potential to mitigate some of the current shortcomings arising from a possible overregulation tendency in the EU.

2.5 Conclusion

Situating the EU's regulatory and sociopolitical character in the field of digital finance paints a complex picture marked by deregulation, followed by the implementation of preventative reforms and more stringent legal frameworks for the sake of stability. In the field of digital finance, innovation, notably with the introduction of FinTech, decentralization technologies, and the increasing overlap between the financial sector and Big Tech companies, reshuffled the EU's regulatory approach even more.

In order to understand these dynamics, this chapter provides a historical and geopolitical context for the digital financial sector in the EU. Moreover, it summarizes the regulatory state of play, which admittedly presents a rapidly evolving environment. The EU's inclination toward intensive regulatory activity in the digital realm reflects a commitment to digital sovereignty but risks creating intricate policies lacking coherence and consistency. While commendable for consumer protection and fair competition, the pursuit of digital sovereignty should be viewed as a means to stimulate innovation and advance the Digital Single Market rather than an end in itself. An overview of the current regulatory frameworks further highlights that challenges persist, particularly in regulating emerging spaces such as that of DeFi. Despite significant legislative efforts aimed at fostering innovation, regulators often struggle to keep pace due to its novelty and complexity, highlighting the need for enhanced understanding and collaboration among regulatory bodies.

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