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THE REGULATION OF DIGITAL PLATFORMS: THE CASE OF PAGOPA

PROF. GUSTAVO OLIVIERI

SUPERVISOR

ELISA ARBIA

CANDIDATE

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INTRODUCTION

The relationship between innovation and regulation has long been the subject of study and analysis in academic literature. After providing a general overview of the theoretical debate on the topic (Chapter I), this thesis will investigate this relationship in the context of two of the main innovations that have disrupted companies' business models, fostering the debate over "to regulate or not to regulate" and "to intervene or not to intervene": Big data and Distributed Ledger Technologies. Then, the thesis will focus on the specific sector of digital payments analyzing the case of PagoPA.

Firstly, the thesis will illustrate how in the case of big data there has been gradual awareness with respect to their economic impact under the perspective of digital platforms (Chapter II). This has led to a slow adjustment of European legislation.

In particular, the thesis will show how at first the European regulator preferred a cautious approach aimed at encouraging the emergence of new ICT-related businesses and intended to regulate specific cases that were "easy" to address: the European legislature was more concerned as to what was happening *within* the markets where digital platforms were active rather than the behavior of those enterprises themselves. This approach has been followed by European antitrust enforcers in their decision-making practice in early cases involving big data and digital platforms.

However, it soon became clear that both the regulatory and enforcement systems were unsuitable and did not properly address market dynamics. As a matter of fact, in recent years, the initially cautious approach has been reversed, from both the enforcement and regulatory perspectives.

Taking enforcement first: of particular importance is the new grip on data exploitation both at the European and national levels in order to limit

(principally through the use of privacy tools) the overwhelming power of Big Tech. From the regulatory standpoint, the new regulatory trend culminated in the drafting of the Digital Market Act (“DMA”) and Digital Service Act (“DSA”). Mindful of the "Brussels effect" the DMA and DSA attempt to identify versatile definitions that are designed to encompass the jagged regulatory landscape of different online platforms in different jurisdictions (Chapter III).

Secondly, the thesis will analyze the topic under the standpoint of distributed ledger technology (“DLT”). To this regard, the thesis will show how, while the path of regulatory adjustment is still ongoing, it is possible to identify a pattern similar to that of big data: A cautious approach aimed at a deeper understanding of the phenomenon. In fact, to date there is still room for interpretive analysis in light of current legislative tools (Chapter IV).

Finally, the analysis will focus on a specific sector: Digital payments. After a brief analysis of the regulatory landscape in the digital payments sector, the thesis will illustrate how - specifically in this sector - there is a dichotomy between "enabling" regulation and "protective" regulation.

The thesis will argue that the case of PagoPA s.p.a. is an example of an “enabling" regulation (Chapter V). Indeed, the main digital platform operated by PagoPA *i.e*, pagoPA platform, is the result of regulatory initiatives that enabled the opening of markets - first and foremost the Payment Service Directive by means of a data sharing obligation.

Against this background, the thesis will show how burdensome regulations that are accompanied by unclear and often difficult-to-understand rules risk nullifying the benefits of opening up new markets and leaving compliance officers with the burden of understanding how fast to go in order to stay under the limits but not slow down.

Given the challenges highlighted, in the balance between regulation and innovation, the thesis will conclude that the role of the compliance officer, as a steering function for risk strategy, as well as an interpreter of the

regulations and the overall framework emerging from the decision-making policy, appears to be strengthened and more important than ever (Conclusions).

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Chapter I

How can EU regulation affect innovation

1. Regulation and innovation

Depending on the conditions, regulation is a decisive factor to foster or disrupt innovation. While the need to produce new regulation has derived from the dynamic and globalized context in which we live, attention has been directed towards the better conditions to ensure that regulations result fully responsive to innovation. Considering the general feared risk that regulation could become instead an obstacle to innovation, this chapter wants to picture the heterogenous and often positive impact that regulation has on innovation.

Regulation is a distinctive mode of policy with a "single normative justification: improving the efficiency of the economy by correcting specific forms of market failure such as monopoly, imperfect information and negative externality".[1] Regulation influences market rules and economic actors' behavior with the aim to maximize collective wellness.[2] The interface amongst regulation-innovation has the goal to reach the market and stimulate technological development.

However, the complex and wide scope that characterize the regulatory reform (diversified by different fields, ways of action, methodology etc.) makes it challenging to give a univocal answer to the positive or negative effect that regulation has on innovation generally. The ambivalent scenario presents criticalities as well as merits, strictly depending on the case at stake. Reform can range from deregulation, privatization or opening of

[1] G. Majone, *The rise of the regulatory state in Europe*, West European Politics, 17: 3, 77-101, 1994 (:79).

[2] OECD, *The OECD Report on Regulatory Reform: Synthesis*, Paris, 1997.

markets, aiming at cost-effective and streamline efficiency.[3] Regulation could generate costs for innovation or otherwise stimulate it, depending on several variables and the consideration of the regulatory actors.

Some authors observe that a limited number of regulations is more immediate in the promotion of innovation, while a vast majority doesn't have proper innovation goals but eventually finishes to promote it.[4]

The main complexity encountered by policy makers in deciphering innovation is related to the complexity of developing case-specific, compound and multi-faceted phenomena, where every context refers to a different regulatory framework in specific degrees and ways to trigger innovation. In order to be less burdensome, to eliminate barriers of development, and to fix distortions, regulators should move cautiously. Regulators should be forming a proposal which takes into account several factors. Amongst these factors, the main ones concern the information available to those who will be involved in the changes, imposition of standards and the stringency to comply with regulation, in addition to the degree of uncertainty, temporality and flexibility of the implementation.[5]

Accordingly, a document presented by the OECD presents a the results of a survey conducted among 2500 European companies, agreeing on the same key factors that the most impact innovation in the regulatory process: to minimize costs related to the size of the entreprise, the flexibility of organization, time of implementation, and uncertainty.[6] Those factors heavily complicate the life of stakeholders (mostly smaller and younger ones), who are asked to significantly adapt their behavior to new contexts.

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[3] *Ibid.*

[4] K. Blind, *The impact of Regulation on Innovation*, in «Nesta Working Paper», 12/02, January 2012, available at: www.nesta.org.uk/wp12-02.

[5] European Commission, *How can EU legislation Enable and/or Disable Innovation?*, 2014 at: https://ec.europa.eu/futurium/en/system/files/ged/39-how_can_eu_legislation_enable_and-or_disable_innovation.pdf.

[6] UNICE 1995 in OECD, *The OECD Report on Regulatory Reform: Synthesis*, Paris, 1997.

Regulators must consider the kind of impact for different stakeholders and the related circumstances, if they wish to enable innovation: replicative or inadequate regulation is inadmissible for contemporary market needs, and the policy makers are responsible for effectiveness and concrete impact-assessment of their decisions.

However, as it will be illustrated in chapter 4, regulation in the digital area encounters, as one of the biggest obstacles, the inability to define by means of generally applicable standards rules that correctly capture the phenomenon of all players in digital markets.

As to the size of the enterprise, on the one hand, bigger entities have been found to lower the difficulty to comply with new rules, and to bring positive innovative outcomes. Thus regulation of larger stakeholders doesn't have to limit but contribute to production: they accelerate product innovation and develop and diffuse new technologies. On the other hand, young and new-born companies are more flexible to react to the implementation of new regulation.[7]

However, the lack of expertise or time needed by regulators creates compliance stringency issues for those who can't handle this technically or financially, which normally concerns smaller stakeholders. An answer to weaker entrepreneurs for administrative burdens and heavy bureaucracy is, for instance, ad hoc legislation for newcomers, as a point of departure for innovative regulation.

Regarding standardization, standards might be perceived as obstacles to innovation, if the capacity to guide the producer helping to identify criteria or objectives of innovation, control quality of the products and transparency of the operations are not considered. The imposition of standards allows the

[7] K. Blind, *The impact of Regulation on Innovation*, in «Nesta Working Paper», 12/02, January 2012, available at: www.nesta.org.uk/wp12-02.

regulator to direct and monitor the market in order to prove the basis for smart innovation.[8]

As to the time of implementation, awarding tight timeframes or too long-spanning deadlines normally discourages innovation for companies unable to solve the burdens rapidly, or otherwise to crystallize adaptation due to the lack of pressure. Further, as it has been emphasized in literature, the impact of regulation on innovation could lie in between short-term compliance costs charged to the economic actor and incentives given to innovative activities, which have an impact in the long run.[9] Thus, despite some theories sustaining the high-costs obstacles theory, others affirm that regulation represents a favorable stimulus to innovation, being input of competitiveness and social-related principles.[10]

Regarding uncertainty, this has been described as a burden for innovation, mining stakeholders' capacity to develop a strategy and to enter a market.[11] However, a countering viewpoint points out that in a completely certain and secure environment, actors would not investigate alternatives to current policies and technologies already at their disposal.[12]

Additional factors have been found crucial to investigate the impact of regulation on innovation, namely management of privatization, deregulation and the impact that results on competition in the market.

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[8] European Commission, *How can EU legislation Enable and/or Disable Innovation?*, 2014, Available at: https://ec.europa.eu/futurium/en/system/files/ged/39-how_can_eu_legislation_enable_and-or_disable_innovation.pdf,

[9] W. Carlin & D. Soskice, *Macroeconomics: Imperfections, Institutions, & Policies*, Oxford University Press, 2006.

[10] C. Ranocchia & L. Lambertini, *Porter Hypothesis vs Pollution Haven Hypothesis: Can There Be Environmental Policies Getting Two Eggs in One Basket?*, Environ Resource Econ 78, 177-199, 2021.

[11] K. Blind, *The impact of Regulation on Innovation*, Nesta Working Paper No. 12/02, January 2012, available at: www.nesta.org.uk/wp12-02.

[12] European Commission, *How can EU legislation Enable and/or Disable Innovation?*, 2014, Available at: https://ec.europa.eu/futurium/en/system/files/ged/39-how_can_eu_legislation_enable_and-or_disable_innovation.pdf.

Above all, competitiveness is an economic measure aimed at regulating market production supplied to consumers at the highest efficiency and lowest price possible.In this regard, opposing theories have been developed: in the reasoning of Schumpeter, concentrated markets are keener to innovation thanks to their less-restrictive financial capacity and the no need of indulgence related to the lower number of competitors.[13] In contrast to that, the monopolistic control on the market means absence of incentives to innovate, according to other economists.[14]

Moreover, regulators must consider competitive pressure in order to maintain the intensity favorable for innovation, such as imitative behavior less convenient than innovative one and cooperation between companies.[15] Following the argument set out by Aghion and other scholars on the topic, the impact of market entry regulations is heterogeneous: it could keep the market exclusive, thus less competitive, encouraging companies to invest in risky innovation, or being a burden for innovative attitude.[16] Prescriptive and generalized dispositions will target some stakeholders without giving them room to perform therefore increasing competition and innovation.[17] Whether for knowledge distribution or market control, competition-uplifting intervention can be flagged as beneficial for innovation.

It needs to be mentioned that some sectors require more interference from the regulatory leaders than others. To mention a few, transports, telecommunications, banking and chemical fields require stricter control on access, prices, and efficiency. However, the eventual mismanagement of some governments due to lack of expertise – as happened for the German

[13] George Symeonidis Innovation, *Firm Size and Market Structure: Schumpeterian Hypotheses and Some New Themes*, OECD Economics Department Working Paper No. 161, 1996.

[14] OECD, *The OECD Report on Regulatory Reform: Synthesis,* Paris, 1997.

[15] K. Blind, *The impact of Regulation on Innovation*, Nesta Working Paper No. 12/02, January 2012, available at: www.nesta.org.uk/wp12-02.

[16] P. Aghion, R. Blundell, R. Griffith, P. Howitt and S. Prantl, *The effects on Entry on Incumbent Innovation and Productivity*, in «Review of Economics & Statistics», 91 (1): 20-32.

[17] OECD, *The OECD Report on Regulatory Reform: Synthesis,* Paris, 1997.

Bundenspost or France Telecom – has demonstrated to be a cause of accidental restraint of innovation.[18] These fields have lately been privatized, deregulated and technologized, leading to increase of competition and thus, innovation.

Likewise, the financial and banking system has experienced a liberalization and larger actors retain broad power to implement innovations and develop new services and technologies. It's a vicious circle: technology acts on competition and costs of production, demanding regulatory reform, while it "may lead to abuses of new monopoly positions as in the case of new computer software or financial products; to different ecological hazards as in the case of larger shopping formats and their contribution to "urban sprawl"; or to possible unforeseen safety hazards. In some cases, supplementary government oversight will be needed to ensure the success of regulatory reform. In all cases, regulations must be ever vigilant to the effects of technical change."[19]

Moreover, considering such a heavily regulated field as the chemical industry is, even if it is recognized for being easier for bigger and more established firms due to financial and expertise costs, this has a domino effect on other fields in terms of innovation, such as the environmental sector. Ollinger and Fernandez-Cornejo bring evidence of this in their study on pesticides, finding that increasing regulation decreases the production of this type of product in the market.[20] In addition to that, Porter and Van der Linde[21] describe how environmental regulation triggers innovation in the chemical field, as it attracts new entrants in the market of innovation. Prieger agrees that, in general terms, stricter regulation is unhealthy for innovation, but regulatory strategy is mandatory to handle competitiveness and to

[18] *Ibid*.

[19] *Ibid.* (:34).

[20] M. Ollinger & J. Fernandez-Cornejo, *Innovation and Regulation in the Pesticide Industry*, in «Agricultural and Resource Economics Review», 27:15-27.

[21] M. E. Porter & C. van der Linde, *Toward a new conception of the environment-competitiveness relationship*, in «Journal of Economic Perspectives», 9/4: 97-118.

compensate for monopoly effects that some markets suffer,[22] as is the case for the telecommunication sector.

It is important to mention the perspective pictured in the publication by the Organization for Economic Cooperation and Development (OECD), to better illustrate the linkages between the factors investigated until now, where regulation is divided between economic, social and administrative regulation, depending on the intention to improve the efficiency of markets, safeguard a healthy society, or manage the operationality of public and private sectors. Furthermore, the investigation brings a reverse perspective: not only regulation affects innovation and technology development, but also technology influences regulation, making it inadequate or obsolete[23]. To consider the case of telecommunications, where technology develops new multimedia products to exponential transformation of the sector year by year; and financial services, where "the prospects of electronic money or digital cash and electronic data interchange are further transforming financial markets at the national as well as international level."[24]

Although the overall picture is heterogeneous, some considerations can be summed up. Ad hoc redesign of regulatory approaches could reduce cumulative burdens by emphasizing prevention instead of control. Flexibility and incentive-based regulation have been demonstrated to trigger innovative outcomes by being more solution-oriented and strategy-specific. Third, vigilant, competitive, an-onerous, and cooperative regulatory processes positively affect innovation.

[22] J. PRIEGER, *Regulation, innovation and the introduction of new telecommunications services*, in «Review of Economics and Statistics», 84 (4): 704-715, 2012.

[23] OECD, *The OECD Report on Regulatory Reform: Synthesis,* Paris, 1997.

[24] *Ibid.* (:15).

2. EU REGULATION POLICY

In the past decades, the European strategy concentrated on regulating competition policy to encourage companies to offer goods and services at the most efficient, innovative, and controlled prices possible.

From the beginning, it was aimed to maintain market competition by regulating anti-competitive conduct by companies, therefore is primarily focused on preventing cartels, the abuse of dominant trading positions, anti-competitive mergers, and non-approved State aid in the internal market.

While standardization and liberalization procedures can be very effective in the EU context, cooperation is also a key feature for economic efficiency in such a context. Stakeholders and governments should aim at the best regulatory conditions in a collaborative environment, taking into account national cultures' preferences and guarantee of competition. To open markets to smaller operators, for instance, it has been planned to allow commercial users to offer the same products or services to end users through the intermediation of large platforms at different prices or conditions. Also, in the interest of small operators, the provision obliges large platforms to allow commercial users to promote offers to end users acquired through the platform's services and to enter contracts regardless of whether they use the services of the gatekeepers.

At the same time, the European regulator is aware of the magmatic complexity of the market and the services involved: therefore, it has foreseen possible constraints, subject to further specifications depending on the type of platform and services offered.

The transformation of the digital market in the last twenty years has pushed the EU to go deeper in the matter at stake, if "regulation is beneficial for innovation", finalized to contain the position of bigger enterprises. The Single Market Act I and II in 2011-2012 were focused on pursuing networking

industries and utilities liberalization, digital services, encouraging mobility of people and businesses.

Until today, the Commission produces an Annual Internal Market Scoreboard[25], and continuously draft documents to set strategies and priorities for the Internal Market. Among the others, the Priorities 2003-2006, the Commission fostered a supplementary approach to the system by setting benchmarks, creating a problem-solving system (SOLVIT), a pre-infringement procedure (EU Pilot) and infringement procedures on a tighter basis than had been the case in the past.[26] These strategies and programs were organized into an internal market "governance cycle": Adopt, monitor, inform, enable, connect, solve, evaluate, adopt. A particularly important stage is "monitor", which deals with the transposition of internal market legislation.

3. How Eu regulation is affecting the rest of the world: the "Brussels effect"

In this framework an interesting interpretation of the impact of European regulations is the one underlying the unprecedented and deeply underestimated global power that the European Union is exercising through its legal institutions and standards, and how it successfully exports that influence to the rest of the world. According to this Author,[27] without the need to use international institutions or seek other nations' cooperation, the EU has a strong and growing ability to promulgate regulations that become entrenched in the legal frameworks of developed and developing markets alike, leading to a notable "Europeanization" of many important aspects of global commerce.

[25] To read more: https://ec.europa.eu/internal_market/score/index_en.htm.

[26] J. Pelkmans, *Economic Approaches of the Internal Market*, in «Bruges European Economic Research paper», BEER paper 13, 2008.

[27] A. Bradford, *The Brussels Effect: How the European Union Rules the World*, Oxford University Press, 2019.

For many observers, the European Union is in a deep crisis. Between slow growth, political turmoil following a period of austerity policies, Brexit and the rise of Asian influence, the EU is seen as a declining power on the world stage.

By promulgating regulations that shape the international business environment, elevating standards worldwide, and leading to a notable Europeanization of many important aspects of global commerce, the EU has managed to shape policy in areas such as data privacy, consumer health and safety, environmental protection, antitrust, and online hate speech. In a decidedly different way how superpowers wield their global influence, the Brussels Effect absolves the EU from playing a direct role in imposing standards, as market forces alone are often sufficient as multinational companies voluntarily extend the EU rule to govern their global operations.

In particular the author notes that EU regulations have a tangible impact on the everyday lives of citizens around the world: Europe has an unilateral power to regulate global markets.

Unilateral regulatory globalization occurs when a single state is able to externalize its laws and regulations outside its borders through market mechanisms, leading to the globalization of standards. It is a situation where a law of one jurisdiction migrates into another without the former voluntarily imposing it and the latter accepting it. This process is remarkably different from that resulting from negotiated standards and from that deriving from unilateral coercion (e.g.trough sanctions or threats), which are a more “conscious” process.

The author claims that the conditions that allow a jurisdiction to dictate rules for global commerce are: a large domestic market, significant regulatory capacity, propensity to enforce strict rules over inelastic targets (e.g., consumer markets) as opposed to elastic targets (e.g., capital).

In addition, unilateral regulatory globalization presumes that the benefits of adopting a uniform global standard exceed the benefits of adhering to multiple, notwithstanding laxer, regulatory standards. This occurs when the firms’ conduct

or production is non-divisible, i.e., not legally or technically feasible, or economically viable, for the firm to maintain different standards in different markets.

The EU started as a marketplace and has a huge domestic market. Setting rules is its own identity. Trade and regulation are largely, the most effective foreign policy the EU has so Europe meets all the conditions necessary to externalize its Regulation in other markets.

In this way, a mild-mannered economic superpower is shaping the world economy through the dark work of anonymous technical compliance officers. The author maintains that one of the reasons Europe has become such a potent regulator is that it has not politicized regulation. In the old-economy industries like chemicals and cars, the “Brussels effect” is well known. For instance, the REACH Regulation, entered into force on 1 June 2007, was adopted to improve the protection of human health and the environment from the risks that can be posed by chemicals, it applies to all chemical substances; not only those used in industrial processes but also in our day-to-day lives (e.g.cleaning products, paints as well as in articles such as clothes, furniture and electrical appliances). To comply with the regulation, companies must identify and manage the risks of the substances they manufacture and sell in the EU. If the risks cannot be managed, authorities can restrict the use of substances in different ways.

It often spreads through market force because the companies accept the rules in order to participate in the vast EU market and then apply them in the global market to minimize the cost of running different compliance regimes. Sometimes this process also leads other countries to codify the same rules thanks also to the action of domestic lobbies that push their country to adopt rules and standards similar to those in Europe.

This phenomenon occurs because large exporting firms try to level the playing field against their non-export oriented domestic competitors. In any case,

the explicit adoption of the European rules by other countries is not indispensable for the diffusion of the rule which also occurs with market mechanisms.

The author traces the historical progress of the Brussels effect which started in the first half of the 2000s with traditional industries, continues with the environment and food safety legislation and reaches the present day in the digital age: European legislation on the subject of protection of personal data is the most advanced that exists in the world.

The European personal data protection system (GDPR) has induced global giants such as Apple to adopt it all over the world and has provided a model for Countries that have felt the need to adopt such legislation.

This system, although imperfect, primarily due to its excessive bureaucracy, has become a general standard for privacy and data governance with the same mechanisms with which REACH Regulation (which was also a very bureaucratic system of registers and authorizations) had done it.

Some European policymakers proudly argue that Europe exports not only technical rules and standards but also its own values on the environment, consumer protection, and monopoly control.

The author also explored the concepts of regulatory race and regulatory convergence, underlining that it is not true that the disagreement between the great powers leads to the emergence of rival standards as, certain conditions are given, the most stringent standard always ends up prevailing.

All in all, it is important to underline that the “Brussel effect” is very powerful but not always positive: for example the GDPR legislation ends up favoring large companies, like Google, that have money, human resources and capability to adapt to the complexity of the legislation against smaller firms that do not have these possibilities.

4. Regulation and digital markets

4.1. Regulation of digital markets

The reflection by antitrust authorities of their role in digital markets started in 2018 and 2019 and materialized in a flurry of digital reports written or commissioned by the authorities. The reports aim at giving a better understanding of digital markets, identifying market failures, and proposing ex-ante regulatory or ex-post market interventions to address those market failures.[28]

[28] Joint Memorandum Of The Belgian, Dutch And Luxembourg Competition Authorities On Challenges Faced By Competition Authorities In A Digital World (2019), Https://Www.Belgiancompetition.Be/Sites/Default/Files/Content/Download/Files/Bma_acm_cdlcl.Joint_mem Orandum_191002.Pdf; Japan Fair Trade Comm'n., Report Regarding Trade Practices On Digital Platforms (2019), Https://Www.Jftc.Go.Jp/En/Pressreleases/Yearly-2019/October/191031.Html; Mexican Competition Authority (Cofece), Rethinking Competition In The Digital Economy (2018), Https://Www.Cofece.Mx/Wp-Content/Uploads/2018/03/Ec-Economiadigital_web_eng_letter.Pdf; It. Competition Authority (Agcm), Big Data Interim Report In The Context Of The Joint Inquiry On 'big Data' (2018), Https://Www.Agcom.It/Documents/10179/10875949/Allegato+4-9-2018/F9befcb1-4706-4daa-Ad38-C0d767add5fd?Version=1.0; Stigler Comm. On Dig Platforms Stigler Ctr., Final Report (2019), Https://Research.Chicagobooth.Edu/-/Media/Research/Stigler/Pdfs/Digital-Platforms---Committeereport---Stigler-Center.Pdf; Austl. Competition & Consumer Comm'n , Digital Platforms Inquiry Final Report (2019), Https://Www.Accc.Gov.Au/System/Files/Digital%20platforms%20inquiry%20-%20final%20report.Pdf; Brics Competition Law And Policy Centre, Digital Era Competition: A Brics View, (2019), Http://Bricscompetition.Org/Upload/Iblock/6a1/Brics%20book%20full.Pdf; Competition Authorities Working Group On Dig. Econ., Brics In The Digital Economy: Competition Policy In Practice 1st Report (2019), Http://Www.Cade.Gov.Br/Acesso-A-Informacao/Publicacoesinstitucionais/Brics_report.Pdf; Competition Bureau Can., Big Data And Innovation: Key Themes For Competition Policy In Canada, (2018), Https://Www.Competitionbureau.Gc.Ca/Eic/Site/Cbbc.Nsf/Vwapj/Cb-Report-Bigdata-Eng.Pdf/$File/Cb-Report-Bigdata-Eng.Pdf; Autorite De La Concurrence And Bundeskartellamt, Algorithms And Competition, (2019), Https://Www.Bundeskartellamt.De/Shareddocs/Publikation/En/Berichte/Algorithms_and_competition_Working-Paper.Pdf?__blob=Publicationfile&V=5; Oecd, Rethinking Antitrust Tools For Multi-Sided Platforms (2018), Https://Www.Oecd.Org/Daf/Competition/Rethinking-Antitrust-Tools-For-Multi-Sidedplatforms.Htm; Dig. Competition Expert Panel, Unlocking Digital Competition, Uk (2019), Https://Assets.Publishing.Service.Gov.Uk/Government/Uploads/System/Uploads/Attachment_data/File/78554 7/Unlocking_digital_competition_furman_review_web.Pdf [Hereinafter Furman Report]; Competition & Markets Authority, Online Platforms And Digital Advertising, Market Study Interim Report (2019).

According to an author, there are two key trends in the digital economy in terms of European competition law.[29]

The first view argues that competition authorities should reduce their intervention in the fast-growing technology industries. The main argument of its supporters is that the negative effects of intense intervention may be much more serious than the positive ones. To this regard it has been noted that “heteronomous” regulatory power suffers from several orders of limitations.

First, technical ones: the extremely dynamic nature of digital platforms and the need to adopt highly innovative technical solutions require regulatory strategies based on the combination of legal principles and rules and technical specifications.[30]

In addition, the heterogeneity of business models adopted, the vastness of services and goods offered in digital markets for cia- cial sectors, the relocation of activities, and the use of innovative ways of using content make rules not always "normatively standardizable". This implies that regulation must necessarily have elements of flexibility, as to content but especially to the criteria of applicability, both objective and subjective, of the rules themselves.

In fact, the main difficulty concerns precisely the attempts to combine the positivity of specific - and sometimes "targetized" - rules with the need to ensure the operationalization of the general principles of the sector, through, for example, the use of open clauses or the recognition of margins of evaluative discretion case by case.[31]

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[29] A. M. Strowel & W. Vergote, *Digital Platforms: To Regulate or Not To Regulate? Message to Regulators: Fix the Economics First, Then Focus on the Right Regulation*, (2018).

[30] F. Di Porto, A. Signorelli, *Regolare attraverso l'intelligenza artificiale. In corso di pubblicazione* in A. Pajno, F. Donati, A. Perrucci, *La rivoluzione dell'IA: profili giuridici*, Bologna, Il Mulino, 2022, p. 617-655.

[31] A. Gawer, *Online Platforms: Contrasting perceptions of European stakeholders: a qualitative analysis of the European Commission’s public consultation on the regulatory environment for*

Second, the difficult compliance with the principle of proportionality, which requires that different solutions be adopted for different situations, graduated also according to the peculiarities of the recipients of the rules. But the recipients of regulation are varied in terms of legal and economic nature, functions performed in digital markets, which requires gradual adjustment and "targetization," albeit by sectors of intervention.

Finally, it is necessary to consider the operating methods of the platforms, which work not on simple personal data of users, but mainly on so-called behavioral data. Data related to digital users' online behavior represent the main operating resource of platforms, which are able - thanks to sophisticated data analysis techniques - to process huge amounts of information related to the habits and preferences of consumers and business users in market choices. Classical regulatory intervention that is not sufficiently integrated with behavioral data-not only from the side of end users, but also of the platforms' operating mechanisms-is likely to be inadequate as it is severely lacking in terms of investigation. For example, in the area of cookies, the use of A/B testing techniques (data analysis) shows strong manipulative tendencies on the part of some platforms, which would be difficult to prosecute with classical ex ante intervention.

Such limits on regulatory power risk creating a gap between the regulation and self-regulation of the platform and the governance of the digital ecosystem.[32]

The second view is diametrically opposed. According to this view, the intervention of the competition authorities is not only necessary but must be made even more intrusive. Many of its supporters believe that competition policy is not enough to deal effectively with the technology giants, proposing

platforms: executive summary, in «European Commission DG Communications Networks, Content & Technology» (2015).

[32] F. Di Porto, A. Signorelli, *Regolare attraverso l'intelligenza artificiale*, *ibid.*

ex ante regulation of the digital market.[33] The inter- mediate third view, which is also supported by the author, is that an ex ante regulation is not necessary at the moment and will probably be detrimental to innovation. The right approach is through competition policy, after reassessing the current legal framework, in order to meet the challenges of the digital economy.[34]

4.2. Self-regulation in digital markets

Central to the current debate on regulation and innovation is the "regulatory function" of platforms, which is exercised through the use of algorithms, and how it should be framed. Increasingly, in fact, platforms do not limit themselves to intermediating economic transactions, but play an active role of determining rules of conduct: not only, therefore, simple matchmakers between different users, but also centers of rule production3, thanks to their ability to influence users' behavior, to control and monitor their activities, as well as to discipli- nate them within predetermined frameworks, making use of the huge information flows of data at their disposal. This aptitude of platforms to influence and transform the conduct of individuals and operators in the network leads back to the idea that technology is increasingly being used with lato sensu "normative" intent.[35]

In this regard, there has been talk of forms of "meta-regulation" or "self-regulation" on the part of platforms, which arise from the need to escape the meshes of paternalistic ab externo regulatory interventions, which are excessively invasive and capable of constituting a possible obstacle to the

[33] See D. Geradin, T. Karanikioti & D. Katsifis, *GDPR Myopia: how a well-intended regulation ended up favouring large online platforms - the case of ad tech*, in «European Competition Journal», 2021, 17:1, 47-92, where the authors underline that while the GDPR has played a major role in strengthening data protection in the EU, it seems to have had unintended consequences, such as further strengthening Google to the detriment of small and medium-size market players in the ad tech ecosystem.

[34] See G. Niels, H. Jenkins and J. Kavanagh, *Economics for Competition Lawyers* (2nd edn, Oxford University Press, 2016) in Stavros Aravantinos (2021) *Competition law and the digital economy: the framework of remedies in the digital era in the EU*, in «European Competition Journal», 17:1, 134-155.

[35] *Ibid*.

speed of innovation and legal trafficking in the digital e- cosystem, and which give an account of how today technology can intervene in a complementary or even substitutive function for public regulation[36]. The direct and immediate effect of the changing role of platforms is a shift in the perspective of the regulatory function: from a bilateral (regulator-recipient) to a trilateral (regulator-intermediary-recipient) system of governance.[37]

The general idea is essentially based on two orders of practical factors. First, on the consideration that platforms have access to user data and thus enjoy a significant information advantage over traditional regulators. Second, they are able to ensure the enforcement of rules through their own algorithms, as they leverage big data, artifi- cial intelligence and self-learning algorithmic techniques that give them the ability to regulate and monitor what is happening on the platforms themselves. So, even with respect to rule enforcement, they have a significant advantage over traditional systems.[38]

If, as of today, digital platforms are not only inter-market mediators between different user groups, but also providers of governance mechanisms that are essential to the functioning of digital markets, the characteristics of regulation, understood as a function, need to be reconsidered, as to the actors involved, governance principles, and systemic implications.[39]

All in all, emblematic is the case of the "Oversight Board" created as an independent body by Facebook itself for the purpose of "helping Facebook address some of the most difficult issues around the topic of freedom of

[36] See D. Geradin, D. Katsifis & T. Karanikioti, *Google as a de facto privacy regulator: analyzing the Privacy Sandbox from an antitrust perspective*, in «European Competition Journal», 2021, where the authors underline that while recognizing some users' benefit, Chrome's policy does nothing to limit tracking by Google and Facebook.

[37] F. Di Porto, A. Signorelli, *Regolare attraverso l'intelligenza artificiale*, *ibid*.

[38] C. Busch, *Self-regulation and regulatory intermediation in the plat- form economy*, in M. Cantero Gamito e H.W. Micklitz, *The Role of the EU in Transnational Legal Ordering. Standards, Contracts and Codes*, Cheltenham, 2019, 115-134.

[39] M. Finck, *Digital Regulation: Designing a Supranational Legal Framework for the Platform Economy*, in «LSE Law, Society and Economy Working Papers», 2017, n. 15.

expression online: what to remove, what to leave up, and why." Indeed, as the Oversight Board's mission statement states, "the Board uses its independent judgment to support people's right to freedom of expression and ensure that those rights are properly respected. The Board's decisions to uphold or overrule Facebook's content decisions will be binding in the sense that Facebook must implement them, as long as such enforcement does not violate the law".[40]

[40] https://www.oversightboard.com/

Chapter II

Digital revolution: How big data have changed the world and the legal landscape

1. Introduction

In Chapter I it has been provided a general and theoretical overview of the complex relationship between regulation and innovation by providing different interpretation in the framework of digital platforms.

In the following chapters the thesis will investigate further this relationship through the lenses of the two main innovations that have disrupted companies' business models triggering the debate on the role of regulation: Big Data and Distributed Ledger Technologies.

The thesis will illustrate how in the case of big data there has been a gradual awareness with respect to its economic impact with particular reference to the emergence of business models attributable to the phenomenon of digital platforms. This has led to a slow adjustment of European legislation that has most recently culminated in the adoption of the Digital Service Act and the Digital Markets Act (Chapter III).

In the case of blockchain technologies, however, this path of regulatory adjustment and legal understanding is still ongoing. In the absence of legislation, to date there is still room for interpretive analysis in light of current tools (Chapter IV).

In order to reach a complete understanding of the phenomenon the thesis will provide a technical background of these innovations in order to understand their critical impact on businesses - digital platforms first and foremost - and understand the foundations of the approaches adopted by policy-makers and enforcers.

In particular, this chapter presents the phenomenon of big data as it has emerged in the last years in the form of an unprecedented explosion of data availability. This has occurred on a large scale as a consequence of the increased human ability to acquire detailed information through sophisticated technical tools and to store them in dedicated Information Systems.

Indeed, often unconsciously, our routine daily activities give way to an immense amount of data. The trajectory of our daily data production is well summarized by some authors[41] who underlines that from the moment we wake up (when a smartwatch records the time we wake up and tracks our health data) until the moment we go to sleep (when we watch movies or shows on Youtube, thus recording our preferences) our life is constantly characterized by the collection of big data.

However, this pattern is nothing new. Humankind has always sought to make decisions based upon the information available. But never before has information moved with such a velocity as it does nowadays. This situation has been described as the data deluge.[42]

These data that we continuously produce can take the form of numbers, texts, images, sounds, videos and more, and has the potential to radically alter the way in which we take our decisions as individuals, enterprises, public administrations and as society in all fields of human action. Taking this together, this is what one refers to as big data.

Let us start with some definitions. We call big data "*A collection of data so extensive in terms of volume, speed and variety that specific technologies and analytical methods are required for the extraction of value*".[43]

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[41] C. Racca, L. Camiciotti, *Creare valore con I Big Data. Gli strumenti i processi le applicazioni pratiche*, LSWR Editore, 2015.

[42] A. Bevan, *The data deluge*, in «Antiquity», 89.348: 1473-1484 doi:10.15184/aqy.2015.102.

[43] G. Arbia, *Statistics, New Empiricism and Society in the Era of Big Data,* Springer Cham (2018).

The increase in the size of the datasets is linked to the need for analysis on a single set of data. This is with the aim of extracting additional information compared to what could be obtained by analyzing small series, with the same total amount of data. For example, the analysis to probe the "moods" of the markets and trade and therefore of the overall trend of the company.

We speak about big data when we have a dataset so large that it requires unconventional tools to extract, manage and process information within a reasonable time. There is no reference dimension, but this is always changing, as machines are getting faster, and datasets are getting bigger.

As we will clarify later, big data is not merely linked to the quantity of data available. However, it is useful to take this as a starting point. In order to understand the dramatic increase in the volume that we have observed recently in the available data, in the essay "How much information",[44] a group of economists from Berkeley University calculated that the total production of data at a world level in the year 2000 amounted to about 1.5 Exabytes (or 1.5 billion Gigabytes) about 37,000 times the Library of Congress of the United States. Three years later, the same researchers repeated the calculation, estimating that the volume had increased to 5 Exabytes with a growth of 66% per year over the period considered.[45]

Therefore, 5 billion Gigabytes (referring to a unit we are familiar with) were generated only in 2003.

However, in the last decades the evolution of the volume of data has been exponential: in 1986 the data produced were estimated at 281

[44] P. Lyman, H. R. Varian , K. Swearingen, P. Charles (2000), *How much information? Library of Congress*, Washington, D.C., 20540 USA, https://www.loc.gov/item/lcwaN0003790/.

[45] P. Lyman and Hal R. Varian (2003), *How much information 2003?*, School of Information Management and Systems at the University of California at Berkeley, accessed online: https://groups.ischool.berkeley.edu/archive/how-much-info-2003.

Petabytes, in 1993 they exploded to 471 Petabytes, in 2000 they increased to 2.2 Exabytes, in 2007 65 Exabytes, in 2012 they reached 650 Exabytes.

With the aim of quantifying the explosion in data production in the last decades, in 2010 Google's CEO, Eric Schmidt, stated: "There were 5 Exabytes of information created between the dawn of civilization through 2003, but that much information is now created every 2 days. (Schmidt, 2010). Schmidt's forecast, although shocking, proved to underestimate the phenomenon. Indeed, in 2013 we produced 4,400 Exabytes, while following the calculations of Schmidt we should have accumulated only 3,000. In 2020, we produced about 44,000 Exabytes".

To measure these quantities, it is necessary to introduce a further unit: the Zettabyte which corresponds to 1000 Exabytes.[46] The international Data Corporation (IDC) predicts the world's data will grow to 175 zettabytes in 2025. We cannot even imagine such quantities. Just to have an idea, if I have to store 175 zettabytes on DVDs, the stack of DVDs would cover the Earth's circle 222 times and it would take you 1.8 billion years to download them at the current internet connection speed. For these quantities we will soon need another unit: the Yottabyte corresponding to a thousand Zettabytes.

2. A SHORT HISTORY OF BIG DATA

Before we go on in the presentation of big data, I will first briefly summarize the main historical steps in the development of this phenomenon.

It is fair to say that the first important step can be dated back to 1887 with the invention of the Electromechanical tabulating machine: an electromechanical machine designed to assist in summarizing information

[46] For clarity we summarize here the various units of measurement discussed in this chapter. Kilobytes (one thousand bytes), Megabytes (one million bytes), Gigabyte (one billion bytes), Terabytes (one thousand Gigabytes), Petabyte (one million Gigabytes), Exabyte (one billion Gigabytes), Zettabyte (one thousand Exabytes), Yottabyte (one million Exabytes).

stored on punched cards. This device was introduced by H. Hollerith for the purpose of the census in the US. In 1937 again in the US we observed the first important data-based project: financial information of more than 26 million US citizens was collected by IBM for government purposes. A further step includes the introduction in 1943 of the first electronic computer by the British to decipher the Nazi codes during World War II. Between 1952 to 1963 more than 12000 cryptologists were employed for the creation of an automatic system of analysis of the information broadcasted during the Cold War. At the end of this period, in 1965 we observed a first attempt to create a center for sensitive data collection. The project was abandoned for the fear of the Big Brother effect.[47] The year 1987 is an important one given that the World Wide Web was invented, following which in the nineties, we observe a sensible increase of the data collected due to the increase of the web-connected devices. In 1995, the first super-computer was introduced with the ability to treat previously inconceivable quantities of data.

Eventually in 2005, the term big data was coined by Mougalas of O'Really media.[48] In the same year, the software of choice for big data, called Hadoop, was created (Yahoo!) as an evolution of the product Mapreduce by Google. In 2009, the Indian government collected the iris scan, the digital prints and the pictures of all its inhabitants thus creating the largest biometric database. In 2010, Google's CEO E. Schmit affirmed at the Technomy Conference that the quantity of data produced from the birth of civilization until 2003 was now produced in only two days. In 2011 McKinsely published the first report on big data.

The impact in everyday life of this quick development can be well described through the Gartner curve reported in Figure 1: a graphical

[47] That is the effect of the individuals being controlled in any situations with an automated system controlled by political power. The term derives from the popular book "1984", by George Orwell.

[48] http://strata.oreilly.com/2010/01/roger-magoulas-on-big-data.html.

presentation developed by the American research, Gartner, to represent the maturity of specific technologies.[49]

In particular, if applied, to big data, it shows an immediate increase in visibility following the introduction of the innovation, until it reaches the mediatic peak following which it starts a decline until it reaches the trough of disillusionment, which is in turn followed by a slope of enlightenment and by the achievement of the so-called plateau of productivity. Currently, we are still in a disillusioned state where we start considering not only the advantages but also the many problematic aspects connected to the use of big data, and we are slowly moving towards a more conscious use of them and of exploitation of their big potentialities.

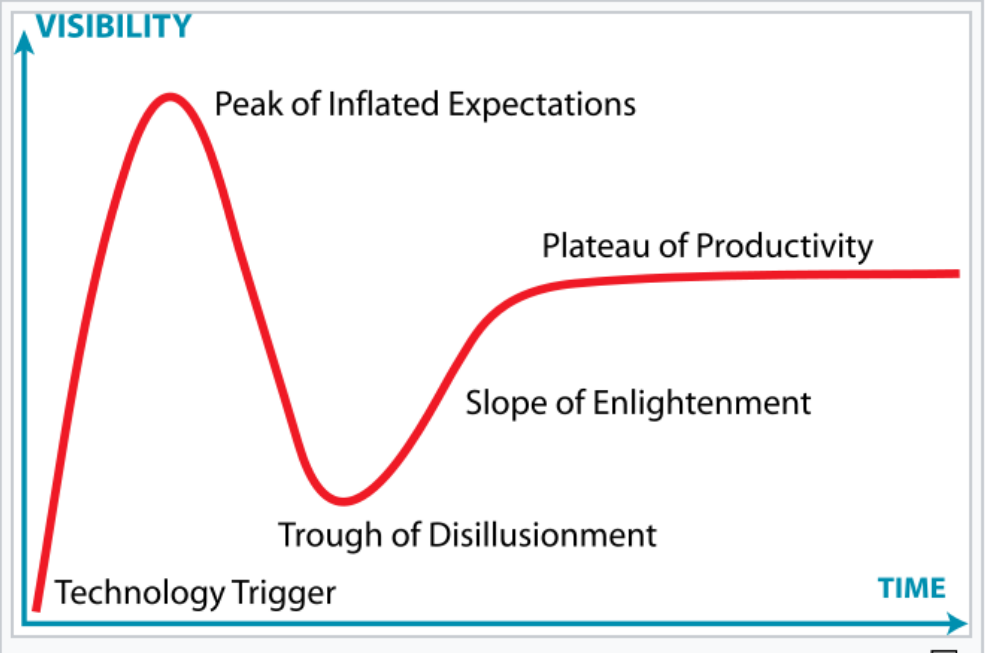

Figure 1: Gartner curve

[49] M. Steinert, *Scrutinizing Gartner's hype cycle approach*, ResearchGate, IEEE Xplore. Retrieved 29 September 2021.

Perhaps the most important thing to consider in approaching the study of big data is a clear distinction between data and information.[50]

Indeed, there is an ambiguity in the use of the two terms which in some sense can be attributed to the use we currently make of the word “informatics”. This term, introduced by Dreyfus in 1962, by the contraction of the French terms informat(ion) (automat)ique, and independently, also by Bauer who co-founded a software company called Informatics Inc. Indeed, informatics is the science of data, not necessarily the science of information.

The distinction between the two terms is well expressed by Daniel Keys Moran, the popular science fiction author, who said: "We can have data without information, but you cannot have information without data". In fact, we currently amass a huge quantity of data, but many of these are deceptive, incomplete, contain errors or are anyway irrelevant to increase the knowledge about the phenomena we are interested in. Before we could use them, we need to be able to extract reliable information content from them.

3. The many V’s big data

Before moving on to analyze the aspects of big data revolution relevant to our specific analysis, we can now attempt a further definition of big data that goes beyond a mere reference to their quantity. Indeed, in 2001, Doug Laney, then Vice President and Service Director of the Meta Group company, described in a report the 3V Model relating to the 3Vs of big data,

[50] The ambiguity in the use of the two terms can be attributed to the use we currently make of the word “informatics”. The term informatic was introduced by Philippe Dreyfus in 1962, by the contraction of the French terms informat(ion) (automat)ique. It was also introduced independently by Walter F. Bauer and associates who co-founded a software company called *Informatics Inc*.

namely: Volume, Velocity and Variety.[51] A simple and concise model to define new data, generated by the increase in information sources and more generally by the evolution of technologies.

3.1. Volume

The first and more evident characteristic is Volume. It represents the actual size of the dataset; the large volume of data that can be collected today could apparently pose a problem. However, the volume of big data is a false problem, as cloud and virtualization help in the management of the large volume of data available, simplifying the processes of collecting, storing and accessing data.

The large volume of data currently available is certainly the most obvious feature of big data, but not the only one. In many applications, in fact, the speed of data generation creates more problems than its volume and the ability to treat this feature is more challenging. Indeed, not only do we accumulate data creating problems of storage, but also data travel at a speed which itself poses previously unknown problems of collection, storage and analysis.[52]

3.2. Velocity

The second, less evident characteristic is represented by Velocity. Since there is a tendency to carry out data analysis in real time, this can

[51] D. Laney (2001) *3-D data management: Controlling data volume, velocity and variety*, in «Application Delivery Strategies» by META Group Inc. (2001, February 6), p. 949. http://blogs.gartner.com/doug-laney/files/2012/01/ad949-3D-Data-Management-Controlling-Data-Volume-Velocity-and-Variety.pdf.. See also M.A. Beyer e D. Laney, The importance of Big data: a Definition", Gartner Analysis Report, ID: G00235055, 2012 e M.A. Beyer, Gartner says solving big data challenge involves more than just managing volumes of data, Gartner Report, 2011, http://www.gartner.com/it/page.jsp; J. Gantz, D. Reinsel, "Extracting value from chaos" IDC Report, 2011.

[52] D. Laney (2001) *3-D data management: Controlling data volume, velocity and variety*, in «Application Delivery Strategies» by META Group Inc. (2001, February 6), p. 949. Available online: http://blogs.gartner.com/doug-laney/files/2012/01/ad949-3D-Data-Management-Controlling-Data-Volume-Velocity-and-Variety.pdf.

become an important bottleneck. Indeed, if it is true that the availability of data at the speed of light opens up new perspectives in very different fields, on the other hand, the increasing speed of data collection also raises new computational problems which need adequate hardware structures and software to be solved. We mentioned before the sharp increase in the volume of data that are collected and stored nowadays.

If it is certainly true that the availability of data at the speed of light opens up new perspectives in very different fields, on the other hand, likewise the volume, the increasing speed of data collection also raises new computational problems which need adequate hardware structures and software codes to be solved.

In the same way in which technological evolution has tried to cope with the increased needs producing computers with larger and larger memories, the growing speed with which data is generated also requires evolution.[53]

A big problem that emerges in the continuous production of ever-faster processors is that modern processors have now reached the

[53] A computer processor is made of various logic circuits, which are responsible for carrying out various operations and which interact with each other to exchange information. The calculation speed refers to the number of elementary operations that circuits can execute within one second. This defines the unit of measurement called Hertz (Hz) a term deriving from after Heinrich Rudolf Hertz, the German physicist who discovered the existence of the electromagnetic waves. The more Hertz's a computer is endowed, the greater are the number of operations that can be performed at the same time. One of the first computers, which used electromechanical technology (the famous Z1 built by Konrad Zuse in 1938) had a speed that reached a maximum of 1 Hertz. The speed of the first modern electronic microprocessor, the pioneering Intel 4004 designed by Federico Faggin in 1971, was working at a speed of around 740 *Kilohertz* (that is 740 thousands of Hertz) that is 740,000 operations per second. This processor has evolved over the years into increasingly faster machines (the models 4040, 8008, 8080 and 8085), progressively reaching in the mid-70s, a speed of the order of 2 Megahertz (*MHz,* for short), which made it possible to perform 2 million operations each second. The first home computers were equipped with the processors 8086 to 80486 and were working at a speed that could reach 50 Megahertz in the mid-90s. In more recent years make use of a further unit of measurement: the *Gigahertz* (GHz) corresponding to one billion logical operations in one second. The advanced Pentium III 'Coppermine" processor was the first to overcome the threshold of 1 Gigahertz: something that was inconceivable only until a few years ago. On this topic see, e. g. https://www.tomshardware.com/reviews/intel-cpu-history,1986-9.html.

maximum speed allowed by the current technologies and above this speed the heat produced during processing can no longer be disposed of and can damage the processor. To overcome both problems, the technical solution consists in distributing the most demanding calculations on different processing units, which is the idea of parallel computing. The technique called “parallelism” has long been used with large supercomputers, but it has received a wider interest recently also with smaller ones and it has become the dominant paradigm. This enhances computer performance when dealing with very large and ever increasing datasets.[54]

3.3. Variety

The third V of big data is represented by Variety. Indeed, in recent years, the explosion of the big data phenomenon has increasingly brought to the attention of analysts. New data is coming from heterogeneous sources, which cannot be stored in the simple structured databases used so far. Sources of data can now derive from satellite and aerial photographs, images, information obtained through drones, GPS data, webscraping, crowdsourcing, cell phones, web scraping, internet of things (IOT), WhatsApp texts, tweets or other messages, video or audio clips, text data, information taken from social networks (posts, likes, comments, pokes), multimedia content and many others. These are what we nowadays refer to as “unstructured data".[55] The greater the complexity of data, the more difficult

[54] Computer parallelism is needed for two major reasons. First, the calculation speed is limited by the slowest logic circuit and so it may happen that some very complex calculations significantly reduce the overall performance of the whole system. Second, modern processors have now reached the practical maximum at the current technologies and above this speed the heat produced during processing can cause damages to the processor. To overcome both problems, waiting for more satisfactory technical solutions, we can distribute the most demanding calculations on different computers. This is what we call *parallel* (or distributed) *computing* or simply *parallelism* . This technique has long been used with large supercomputers, but it has now received a wider interest due to the physical constraints connected with heat generation so that recently it has become the dominant paradigm especially in the form of multi-core processors also for personal computers that is processors on a single integrated circuit which is endowed with two or more separate processing units.

[55] Structured data are those stored in a relational database or RDBMS, and are sometimes referred to also as relational data. Data that conforms to RDBMS structure are easy to search, both

becomes the task of storing them, managing them into databases, linking them together and obtaining interesting information from them.

According to an IBM estimate that appeared on the big data & Analytics Hub website, unstructured data currently account for 80% of the data and only the remaining 20% is represented by the more traditional structured data.[56]

The availability of unstructured data of very different varieties has constituted a discontinuity break with respect to the past even more than the volume and the speed with which they are collected. Indeed, the variety of the data, even more than their volume and their speed, requires a radical revision not only of the collection and storage procedures, but also of the methodologies of analysis. In particular, from the point of view of data collection and management, traditional relational databases are inadequate and do not allow to collect and manage them at the required speed. This led researchers to look for alternatives which make storage and subsequent operations more agile, by preferring those that are now referred to as NoSQL (Not Only Structured Query Language) systems. The elective tool among these unstructured systems is the software called "Hadoop", a program designed for the storage and processing of big data which can deal with distributed operations with a high level of data accessibility. Doug Cutting, an engineer of the Apache Software Foundation, in 2003 was working on a project to build a search engine, when he encountered some difficulties arising from the variety of information that he had to manage. To solve the problem, he had to invent a completely new product. Hadoop nowadays

with human-defined queries and with software. In contrast, unstructured data, do not fit into these sorts of pre-defined data models. They can't be stored in an RDBMS aand because they come in so many different formats, they represent a challenge for conventional software to ingest, process, and analyze.

[56]http://www.ibmbigdatahub.com/infographic/big-data-healthcare-tapping-new-insight-save-lives.

allows us to carry out operations that were intractable until a few years ago employing the old structured databases.[57]

In more recent years, the three V's system originally proposed by Laney,[58] have been enriched by three more characteristics, aiming at defining how the new data should be used.

3.4. Veridicity

The fourth V is represented by Veridicity. Among the sector insiders, some use to say: "Bad data is worse than no data". Data must be reliable; they have to tell the truth. With big data, this challenge is difficult to face. However, the quality and integrity of information is essential to create analyzes that are useful and reliable.

The fifth V is represented by Variability which substantiates into much more data, appearing in different formats and from different contexts. The changeability of their meaning is an aspect to be taken into consideration when the data is interpreted, even more so, if it is a user who works in a line of business and not just the data scientist.

3.5. Value

Finally, the sixth "V" is of paramount importance and refers to the Value. big data has been defined in recent years as the new oil, as it represents an invaluable source of value[59]. This is certainly true. However, simply collecting data, while exploiting the best technologies available on the

[57] Hadoop nowadays allows us to carry out operations that were intractable until a few years ago, by employing the structured databases we were used to.

[58] D. Laney (2001) *3-D data management: Controlling data volume, velocity and variety*, in «Application Delivery Strategies» by META Group Inc. (2001, February 6), p. 949. http://blogs.gartner.com/doug-laney/files/2012/01/ad949-3D-Data-Management-Controlling-Data-Volume-Velocity-and-Variety.pdf.

[59] See *Is data the new oil? Competition issues in the digital economy*, European Parliament, https://www.europarl.europa.eu/RegData/etudes/BRIE/2020/646117/EPRS_BRI(2020)646117_EN.pdf.

market, does not guarantee to have information and above all to extract knowledge.

Talking about data, information and knowledge means taking into account interrelated, but different aspects. By definition, a datum is a codified representation of an entity, a phenomenon, an event. Information is the result of a data analysis process, and it often acquires a meaning only for those who work in the data generation domain. Knowledge is obtained when a person uses information to make decisions and carry out actions, when information is put "into practice".

To implement this process and ensure that big data can be transformed into information to be used in business processes by building knowledge to improve performance, analytics tools are necessary. Therefore, to conclude the V model, it is necessary to consider the further V of the Value. To extract value from data, big data Analytics methodologies have been developed through which companies can make more informed, timely and aware decisions, from the vast world of big data.[60]

3.6. The new frontier of innovation using big data: big data as a productive factor

In the last few years, big data has been recognized as a productive factor and a creator of value. The special issue of Harvard Business Review in 2013 was entirely devoted to a collection of articles on the analysis of big data and on the way they affect now (and could affect more in the future) business. In particular, in one of the contributions entitled “big data: the managerial revolution” by Andrew McAfee and Erik Brynjolfsson[61] the authors observe that Big data takes the form of messages, updates, images posted

[60] See, *e. g.*, https://www.ibm.com/analytics/business-analytics?utm_content=SRCWW&p1=Search&p4=43700068105937107&p5=e&gclid=CjwKCAjw5s6WBhA4EiwACGncZT34rWEQmoWtow6yOHtC4Onqb5JRFSDAJuUBkzTjdm6SnMBMiFqY2xoCh4QQAvD_BwE&gclsrc=aw.ds.

[61] A.McAfee, E. Brynjolfsson, *Big data: the management revolution*, Harvard Business review, (2012).

on social networks, readings from sensors, GPS signals from mobile phones and more and with the ease of availability of these new typologies of data, previously extremely expensive data-intensive approaches have quickly become extremely inexpensive.

For example, the authors report the initiative of the MIT Media Lab which used cell phone data location to predict how many people would occupy Macy's parking lots on Black Friday (the start of Christmas shopping in the US). This analysis made it possible to estimate the store's sales before the expenses had even been made.

McAfee and Brynjolfsson also analyze the performance of data-driven companies who make extensive use of big data, compared with more traditional enterprises. In their paper, they report the results of an analysis led by a team of researchers from the MIT Center for Digital Business, McKinsey and Wharton School on a set of data-driven companies so as to verify the benefits of big data usage.[62] The analysis involved a survey on executive manager interviews of 330 North American companies. The results showed with no doubt better performances of the data-driven companies with respect to the more traditional ones in all sectors ranging from supply-chain management to finance, from marketing to hotels and gambling halls, from human resource management to machinery repair. Their analysis shows that this is not just something connected to a few examples, but it represents a radical transformation of the economy. The authors conclude that no business sphere in the future will remain unaffected by this phenomenon.

They conclude their analysis by clearly stating that: “the evidence is clear: Data-driven decisions tend to be better decisions. Business leaders either embrace this novelty or they will be replaced by others who will”.[63]

[62] A. McAfee and E. Brynjolfsson (2012) *Big data: the management revolution*, Harvard Business review.

[63] A. McAfee and E. Brynjolfsson (2012) *Big data: the management revolution*, Harvard Business review.

Indeed, in recent years, many companies have realized the importance of big data from the business point of view. McAfee and Brynjolfsson [64] report that companies have invested more than 15 billion dollars in big data, financing the development of software for data management and analysis. This happened because the strongest economies are very motivated to analyze huge amounts of data: there are over 4.6 billion active smartphones and about 2 billion people have access to the internet.[65]

There is no doubt that data is becoming part of the business plan of a company. This is not something totally new. The forefathers of modern operational management and managerial economics, Edward Deming and Peter Druker, in the sixties used to say. “You Can't Handle What You Don't Measure”.[66] But now the possibilities are so much more than they used to be at the times of the two economists. Because of big data, managers can measure and therefore know much more about their business and directly translate that knowledge into better decisions and better performances.

Businesses today use data to obtain all types of information. For instance, data on user comments, reviews and preferences posted on social networks are used to better predict consumer decisions. Furthermore, banks collect and study customer transactions to target their campaigns, credit scoring or for fraud detection.

[64] A. McAfee and E. Brynjolfsson (2012) *Big data: the management revolution*, Harvard Business review.

[65] Indeed, the evolution of the volume of data in circulation has been exponential. In 1986 the data generated were 281 PetaBytes, but this increased to 471 PetaBytes in 1993; in 2000 they reached 2.2 ExaBytes; 65 ExaBytes in 2007 and over 650 ExaBytes in 2014.

[66] The phrase “you can’t manage what you can’t measure” is often attributed to W. Edwards Deming, the statistician and quality-control expert credited for having launched the Total Quality Management (TQM) strategy. It is also attributed to Peter Drucker, one of the most famous management consultant.

As mentioned already, data have no value *per se*, but only when combined with other data and if read through a model. To achieve this aim, companies are making large investments.[67]

Indeed, in order to create value from data it is necessary to implement advanced analytical models, to train managers and employees to read analytical outputs and to equip themselves with advanced technological tools to transform analysis outputs into business decisions.[68]

All in all, as clearly stated in the *OCSE Report on Digital Economy Outlook 2020* "the use of data – whether sold to third parties or used by firms to advertise or tailor their own products – has become integral to business models. On average, 12% of businesses in the OECD performed big data analytics in 2017 – and up to 33% among large firms. Social media were the main source with their data used by half of businesses performing big data analytics in the OECD.[69]

4. Different big data method implementation strategies

According to McKinsey many companies in 2013 still did not have any plans to integrate the various elements, but they also underline the importance of such a plan which would help managers, technicians and data scientists identify where the greatest profits could come from. A good strategic plan should focus on the critical decisions, trade-offs and priorities of the companies and should choose between different alternative big data method implementation strategies.[70] We will review some of the most important strategies in what follows.

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[67] McKinsey, *McKinsey quarterly Big Data, what is your plan?*, By *S*. Biesdorf, D. Court, and P. Willmott, March 2013.

[68] D. Q. Chen, D. S. Preston and M. Swink (2015), *How the Use of Big Data Analytics Affects Value Creation in Supply Chain Management*, in «Journal of Management Information Systems»,32, 4.

[69] OECD (2020), *OECD Digital Economy Outlook 2020*, OECD Publishing, Paris, https://doi.org/10.1787/bb167041-en.

[70] McKinsey (2013), *McKinsey quarterly Big Data, what is your plan?*, By S. Biesdorf, D. Court, and P. Willmott, March 2013.

4.1. Executive dashboards

A first business strategy to exploit big data are Executive dashboards[71]. Executive dashboard are a sort of management information system that shows, through simple graphical representations, the trends and performances of the company, provides the manager with a concise idea of the company's trends, take advantage of some specific reports that record different data such as customers, sales areas or other and requires an intelligent use of statistical summaries.

We find this tool implemented in many sectors of a company. For instance: manufacturing dashboards are used to monitor the level of productivity of the company while in human resources they are employed to monitor employee performances.

Executive dashboards are usually linked to the database in order to have real-time updates. The data stored in the Dashboards provide various benefits to the manager because they allow you to monitor different departments simultaneously. Visual representation allows them to identify in real time negative trends, inefficiencies, to analyze correlations between events and possible cause-and-effect relationships.

4.2. Predictive analytics

A second business strategy is called predictive analytics – a tool that can be applied in almost all contexts. Predictive analytics makes use of statistical techniques that help managers to suggest future regularities and trends. To realize this tool, in addition to the big data present within the company, other elements are considered (e. g. Socio-demographic, psychological, geographical characteristics of the population that summarize different purchasing attitudes).

[71] https://www.qlik.com/us/dashboard-examples/executive-dashboards.

Junque 'de Fortuny, Mertens & Provost[72] argue that if the predictive model is built on very detailed granular data, we will continue to see marginal increases in predictive performance.

Companies with large amounts of data, therefore, will have a competitive advantage over those with more limited data because they will make better predictions.

Businesses can easily obtain data, but at the same time they need to know how to use it to make predictions. The most complicated part in analyzing large amounts of data is the ability to select the granular data we are looking for. Modern information systems are refining this ability to extract specific behaviors from large datasets.

4.3. "Social" indicators

A third business strategy can be described as social indicators. Companies currently collect data not only about production and profits, but also the so-called "social data".

Most of these refer to data obtained from platforms such as Facebook, Twitter or Linkedin currently used by 4.62 billion users in the world, a number that will reach 5 billion people in 2022, which is about two third of the total world population.[73] Only in the last 12 months 424 million new users have come with an average daily time spent using social media which is calculated to be about 2h 27m.

Businesses can benefit from noting what their customers write, share or post about their products. These social indicators are useful for managers who thus inform themselves of the successes or failures of their activities.

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[72] Enric Junqué de Fortuny, David Martens, and Foster Provost (2014) *Predictive Modeling With Big Data: Is Bigger Really Better?* https://www.liebertpub.com/doi/full/10.1089/big.2013.0037.

[73]https://www.smartinsights.com/social-media-marketing/social-media-strategy/new-global-social-media-research/#:~:text=More%20than%20half%20of%20the,within%20the%20last%2012%20months.

Social indicators can be used at three different levels of depth.

The first step is what we call *Brand awareness or brand consciousness*, through which the presence in the main social media can increase and strengthen brand associations in the customer's mind. Brand awareness refers to the exposure that a brand has in the "social" environment and is usually calculated with several parameters such as, e. g., the number of visits to the company site, the number of likes per post of the brand and the number of reviews posted for the product.

The second level is what we can call *Brand engagement-involvement* which measures the level of interaction between the company and its customers that can be improved through the use of social media in different ways, e. g. by prompting customers to participate in online advertisements. The conscious and engaged customer can communicate positive or negative ideas to other customers.

The third level is called word of mouth, a term with which we refer to content that spreads on the web. For example, if we are loyal customers to the brand and we read a post on its official blog, we probably share it on Facebook. In this way we automatically promote the products or services. This social metric helps managers to analyze the social activity of their company and highlight positive or negative performances.

5. Potential applications of Big Data in business

5.1. Healthcare industry

In recent years we have seen enormous advances in the use of large amounts of data that are generated in healthcare with routine operations.[74] Our increased ability to manage powerful technologies and the ability to

[74] See https://healthcaretransformers.com/healthcare-industry-trends/?gclid=CjwKCAjw5s6WBhA4EiwACGncZTt4ZSfY0126uDwJ7ZiIX_5G3eHsTBGpIWUx9fF1PuglENGDaH8NlRoCa6sQAvD_BwE.

analyze and understand their outputs will benefit many industries, but healthcare is perhaps the sector that will benefit the most.

In this case, the big data approach can bring collective benefits and therefore have an important social impact and improve profits by cutting redundant information by aggregating data on patients into a single platform that can be shared by doctors, hospitals and private clinics.

As a first example, let us consider the case of TELUS: "Health Integration Platform": a technological structure that connects pharmacists, doctors and other health professionals by treating non-isolated patient data but instead making comparisons with similar patterns.[75] In this example, the use of big data in medicine goes far beyond the use of online platforms or health apps. According to the 2015 IBM report,[76] 80% of data useful for public health purposes consists of unstructured data such as medical images, medical items and fitness tools. These data can help the physician to allocate the patient to the correct clinical analyzes, or to the right health office to make the right decisions (IBM annual report, 2015). The large mass of unstructured data is a serious challenge for the health professions which may encounter difficulties in their collection and analysis. However, there are already developments in the direction of overcoming this challenge.

For instance, IBM Watson Health Cognitive Computing Technology (HCCT)[77] can be defined as “a technological platform that uses a natural programming language and machine learning methods to reveal hidden features in vast amounts of unstructured data”. Watson HCCT, therefore, can easily extract information from structured data and does not use a natural language to understand the context, evaluates the possible meanings and presents answers and solutions.

[75] https://www.telus.com/en/personal-health/my-care.
[76] https://www.ibm.com/annualreport/assets/past-reports/2015-ibm-annual-report.pdf.
[77] https://www.ibm.com/uk-en/watson-health.

Another example is in the use of data mining tools for safety in hospitals.

Nel 2014 il Center for Disease Control and Prevention (CDC)[78] in Atlanta published the results of a project called the “HAI Prevalence Survey” which was tasked with investigating the spread of Healthcare Associated Infection (HAI) in US hospitals.

It has been estimated that in 2011 there were 722,000 HAI's in US hospitals. For the investigation, analytical software was used by the hospitals to detect the HAI's emergency. This data-driven software uses data mining, segmentation, cluster analysis techniques to identify trends that the hospital had not defined a priori.[79]

Further examples that can make a fundamental contribution to public health activities are “MedMined”, a product that includes “Infection Prevention Surveillance”[80] which helps in the prevention of infections through surveillance conducted with data mining; and the Medication Stewardship Surveillance which “helps streamline the management of anti-microbiotic efforts and monitor potential adverse clinical events, through alerts, measurements and reports”.

5.2. Sports

The use of big data in sport is growing continuously. The obstacle in this field is the interaction with the "human variable" which in sport is often independent of other factors. On the other hand, the analyzes are becoming more and more accurate and sophisticated.

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[78] https://www.cdc.gov/.

[79] Kobielus (2014), *Healthcare Analytics And The Mysterious Statistical Signatures Of Mental Health*, https://www.linkedin.com/pulse/healthcare-analytics-mysterious-statistical-mental-health-kobielus/.

[80] https://www.bd.com/en-us/products-and-solutions/products/product-page.1126-00#product-tabs-item-d335c68327-tab.

In this respect there are two interesting aspects. The first concerns improvements in the athlete's performances, the second the possibility of developing more powerful and efficient predictive models applicable to the betting market.

Recent studies showed how a predictive model based on the collection of long series of past observations can predict the results in such a way as to equalize the odds of the bets. A small model improvement would lead to beating bets!

We can find many examples of current applications. Among them, the Spanish basketball championship in 2014 which led to the development of an app based on the use of big data. A second example is constituted by the app Myagonism,[81] developed by 8 Italian researchers, a tool that can be used by coaches of all sports. Myagonism offers a free smartphone app that tracks all the statistics of a match. It works as a web platform where all the data of each player is stored. Furthermore, Myagonism wants to launch the use of a sensor connected to the platform that automatically records every move, acceleration and speed in real time. This tool is designed to save time and costs, but also to give the possibility to store data in order to be analyzed by the coach.

A third example is the website PredictWise[82] developed by the Microsoft economist David Rothschild in New York. It is a project that studies data collection at the individual level for prediction, data aggregation and the use of forecasts: it focuses on domains public such as: politics, sport, finance and entertainment. Rotschield showed the results of his analyzes in real time and considered his results informative and interesting to understand the events. On the website there are graphs that reflect the trends of the different teams and the percentages that indicate with what probability they will win

[81] http://www.myagonism.com/.
[82] https://www.predictwise.com/.

the next match. These predictions concern all kinds of sports including the 2022 FIFA World Cup with the odds of each national team winning.

5.3. Finance

In 2012, the MIT Sloan Management Review together with the IBM Institute for Value carried out a survey of 3,000 executives, managers and analysts operating in more than 30 industries in 100 countries to find out how organizations use information and how useful advanced analysis can be. The conclusion was that "Organizations with the best performances use analytics 5 times more data than those with the worst performances". In the same survey they noticed a prevalence of the "Financial management and budgeting" sector. Furthermore, half of the respondents stated that: "Improving the analysis is one of the priorities of our organization" and that "Organizations are under significant pressure to adopt analytically advanced approaches".

It is clear how financial companies have to manage their information to understand the markets, customers, products, competitors and more.[83]

In the financial sectors most of the applications are concentrated in four areas, namely: fraud detection, customer information, risk management and marketing.

5.4. Fraud detection

According to the Global Economic Crime Survey[84] more than a third of organizations have experienced economic crimes in the past 24 months. The financial sector is the most affected with credit card theft, forgery of accounts, hacked operations and many others.

[83] P. Mikalef, M. Boura, G. Lekakos, J. Krogstie (2019) *Big data analytics and firm performance: Findings from a mixed-method approach*, in «Journal of Business Research», Volume 98, May 2019, 261-276.

[84] Adjusting the lens on economic crime: Preparation brings opportunity back into focus Global Economic Crime Survey 2016.
https://www.pwc.com/gx/en/economic-crime-survey/pdf/GlobalEconomicCrimeSurvey2016.pdf.

These criminal events have important impacts on the activity of financial companies which therefore seek methods to identify and anticipate fraud. Using the predictive power of big data, it is possible to anticipate activities that can lead to fraud.

In this area different methods are used ranging from Digital analysis using Benford's law which identifies unusual events, Validating Entry Dates, which recognizes if there are suspected repetitions of posts or data entries, Duplicate testing, which checks when certain transactions are duplicated[85]

5.5. Customer information

Using the power of Data Mining tools, banks can easily extract customer information and adapt their strategies by customizing customer offers based on previous activities and preferences. The banks use structured and unstructured data such as social media activities to customize promotional campaigns and preserve customer loyalty.

5.6. Risk management

Financial institutions are very exposed to risks (credit, market) and so they have to invest time and money in risk management. Again, big data and Data Mining can help reduce market uncertainty and control risk exposure. Toos Daruval (McKinsey) says banks have the rare privilege of using big data and that "any decision to grow profits, control costs or mitigate risks can be made using data and data analytics."

[85] Benford's law, or Newcomb–Benford law, is the law of anomalous numbers, or *the first-digit law*. It is an observation that in many real-life sets of numerical data, the leading digit is likely to be small. If we observe a set of numbers that obey the law, the value 1 appears as the leading digit about 30 % of the time and the value 9 appears as the leading digit less than 5 % of the time. If the digits were distributed uniformly, each of them would occur about 11.1 % of the time (1 divided by 9). Benford's law makes predictions also related to the distribution of second and the third digits, and of digit combinations.

A good example in this area is that of Pathwise predict.[86] Indeed, while the computer age has delivered petabytes of all kinds of data to us, the most important data of all is that which reveals how a person internalizes and processes everything he does, something that has remained a mystery as long as the fundamental instinct he was locked up in the non-verbal part of the brain. We all had to rely on demographics, psychographics, focus groups, to proxy user behavior. PathSight Predictive allows us to understand how an individual will respond to images, messages and experiences, based on instincts hidden in the brain. Through a scientific approach to the art of communication, the solutions suggested by Pathsight are based on brain research and millions of data collected and analyzed in collaboration with data scientists at the ISI Foundation.

5.7. Marketing

Marketing analytics is slowly revolutionizing the market thanks to the use of analytical methods on big data. An example in this area is "Mixpanel"[87] developed by Suhail Doshi. Mixpanel analyzes every online action (clicks, likes) and creates sets of useful information that can be used to improve products.

Examples of questions you can answer are: which photo filters do users mainly use to exchange images? Or who is the most popular artist among young users?

According to SAS,[88] the leader in market analytics: "Marketing analytics encompasses the process and technologies that allow marketing operators to evaluate the success of their initiatives by measuring

[86] https://pathsight.com.

[87] https://mixpanel.com.

[88]https://www.sas.com/it_it/home.html?utm_source=google&utm_medium=cpc&utm_campaign=brand-global&utm_content=GMS-88251&gclid=CjwKCAjwrNmWBhA4EiwAHbjEQO-r5FkOXm9XHnFqQQ1HywPgwFjNM5KSrTxKDVjatmIz_ccVwVwRBRoCdwMQAvD_BwE.

performance, using business metrics such as ROI, marketing attribution and effectiveness. total marketing ".

According to a Duke University survey, marketing managers of top companies are currently investing 9% of their marketing budget in social media and the percentage will grow to 21% in 2019.[89] The benefits of adopting an integrated marketing analytics approach are significant: in a sample of more than 400 industries, this approach can reduce marketing costs by 15-20%.[90]

The most common model is marketing-mix modeling, which uses big data to analyze the efficiency of each channel in terms of costs, taking into account the promotional activities of competitors and the interaction between variables. The "attribution" method (used to measure the influence that each advertisement has on the consumer) is applied with an algorithm that converts sales traffic into online activities (e. g. Social networking) and helps managers to calculate the profit from each online investment.

5.8. Tourism

Every airline, hotel agency, car rental company produces huge amounts of data. Structured data is relatively simple to store and manage, but it is only about 25% of the total. The remaining 75% consists of unstructured data derived from social media and user-generated content. This is a problem for agencies that have conventional databases and servers that cannot handle large amounts of data.

Another aspect is the online activities such as online booking sites for apartments, hotels, flights, etc. that generate millions of data daily. The ability to use these data together to capture consumer preferences provides the

[89] CMO Survey: Spending on Social Media Outpaces Measurement, https://www.fuqua.duke.edu/duke-fuqua-insights/cmo-survey-feb-2014.

[90] McKinsey (2013), *McKinsey quarterly Big Data, what is your plan?* By S. Biesdorf, D. Court, and P. Willmott, March 2013.

opportunity to offer services built on individual tastes. An example of this kind is the website www.Kayak.com: a search engine that offers the possibility of finding hotels, flights and combinations along with entire prepackaged packages. They manage huge amounts of data by cooperating with hotels, car rental companies and airlines. The service has integrated forecasting capabilities because through an algorithm based on price fluctuations over the past years, it is able to calculate whether the price of a flight, for example, will increase or decrease in the coming weeks.

Another example is represented by the website Smart Tourism,[91] which aims to analyze the origin and quantity of tourists in each Italian region. It revealed that Switzerland, France and Germany are the most represented countries in Italy between May and October each year.

Connected to tourism applications is the concept of augmented reality (or computer-mediated reality in English augmented reality, abbreviated "AR"), a concept with which we mean the enrichment of human sensory perception by means of information, generally manipulated and conveyed electronically, which would not be perceptible with the five senses. The dashboard of the car, the exploration of the city by pointing the smartphone or remote robotic surgery are all examples of augmented reality.[92]

5.9. Crime prevention

Another important application of big data analytics is crime prevention. In this respect a paradigmatic example is constituted by the project keycrime.[93]

Defined as “The New Frontier of Predictive Policing based on the study of criminal behavior”, KeyCrime is a software developed by the Milan

[91] https://interreg-maritime.eu/web/smart-tourism.

[92] C. Kounavis, D. Kasimati, A. E. Efpraxia and D. Zamani (2012) Enhancing the Tourism Experience through Mobile Augmented Reality: Challenges and Prospects, International Journal of Engineering Business Management. https://doi.org/10.5772/51644.

[93] https://keycrime.com.

Police Headquarters which since 2007 has led to dozens of arrests of serial robbers. The starting point is the detailed analysis of the crime scene: date, time, place, traces left by bandits, plus all the apparently negligible details of their modus operandi that can help identify them. The information is then collected within the system, which studies and processes the acquired elements. All the information provided to the agents allows the implementation of a targeted territorial control service, with a twofold objective: to name those responsible for thefts and robberies and to prevent future criminal actions.

5.10. Smart cities

The smart city in urban planning and architecture is a set of planning strategies aimed at optimizing and innovating public services so as to relate the material infrastructures of cities with the human, intellectual and social capital of those who it inhabits them thanks to the widespread use of new technologies of communication, mobility, the environment and energy efficiency, in order to improve the quality of life and meet the needs of citizens, businesses and institutions.

A remarkable example in this respect is that of Smart Seoul: an ambitious project that should transform before 2024 the capital of South Korea into a Smart City.[94]

The project is focused on a collaborative relationship between city and citizens and on the implementation and dissemination, in all aspects of daily life, of technological innovation and ICT to create a digital and always connected metropolis. The purpose is to do in the most technologies advanced be of service the well-being of citizens and allow you to optimize all processes in one key environmental sustainability and better quality of life.

[94] Myunggu Kang (2020), *How is Seoul, Korea transforming into a smart city?*, World Bank Blogs.

Today at the center of the evolution of social values are information technologies, which are transforming not only economic scenarios, but also and above all relations within human society.

According to the mayor of Seoul, the key to becoming an intelligent society is 'communication'. A smart city involves communication between person and person, between people and agencies, between citizens and municipal spaces. A smart city should therefore facilitate the sharing of knowledge, information, experiences, placing the most advanced technologies at the center.

5.11. Further potential applications

The previous examples are only a subset of the possible business applications of big data. Other applications are, e. g., Logistics, Production, IT security, Social phenomena, Climatic, Environmental, Transportation and many others.

6. Big data and digital markets

Digital marketplaces have several common features[95] leading to positive impacts both for consumers and corporations. Such marketplaces allow greater choice and easier comparison for consumers, who can enjoy innovative products; marketplaces help businesses by facilitating intra- and cross-border trade; marketplaces also facilitate market entry for new entrants. However, it is indeed these features that raise concerns from a competition and consumer protection perspective.

These are highly concentrated and transparent markets in which it is easier to monitor the conduct of competitors. This leads to tacit collusion and

[95] For an in-depth analysis of the characteristics of online platforms, see European Commission, *Staff Working Document on Online Platforms, accompanying the document "Communication on Online Platforms and the Digital Single Market"* (COM(2016) 288), available online: https://ec.europa.eu/digital-single-market/en/news/commission-staff-working-document-online-platforms.

other forms of coordination, easily facilitated through the extensive use of algorithms that allow adaptation to the conduct of competitors, additionally through automatic price readjustment mechanisms.

At the same time, digital market players can enjoy strong economies of scale and network effects fueled by the exploitation of data collected through so-called 'free' services. These mechanisms, which we cannot go into here, are at the basis of the so-called '*winner takes it all*' or '*winner takes the most'* scenarios, in which once market power or, often, dominance has been acquired. This strong market position makes it very difficult for other players to counter.

The positive *loop* is well known. Digital platforms connect many companies with many consumers through their services. In return, these services give the platform access to large amounts of data, which can be exploited to further improve its services or develop new services in adjacent markets.[96]

In this scenario, the success of any attempt to challenge an established operator in the market (so-called *incumbent*), will depend on the ability of a potential rival to attract a critical mass of users and generate its own positive network effects.

In the light of the framework outlined so far, it is legitimate to question how online platforms can be cleansed of the distorting effects on the market, ensuring a level playing field of competition both *in* digital markets (in order to ensure that dominant platforms compete on the merits) and in *the* digital market (in order to ensure that within these platforms operators do not suffer discrimination or other limitations).

[96] D. Mandrescu, *Applying (EU) competition law to online platforms: Reflections on the definition of the relevant market(s),* (2018).

Chapter III

The regulation of digital platforms in europe

1. Introduction

In Chapter II the thesis has provided a detailed overview of big data from a business perspective with the aim of reaching a better understanding of the issues faced by policymakers and enforcers.

In this Chapter the thesis will illustrate how regulation of big data is strongly linked to the upheaval of digital platforms.

Firstly, the following paragraphs will illustrate how the production, collection and commercial value derived from the use of big data is particularly significant in the context of digital platforms. Users access free services offered by search engines, social networks and e-commerce platforms by providing a whole range of information that are now seen as the new currency of the internet.

Secondly, the following paragraphs will demonstrate how at first, the European regulator preferred a cautious approach. In the first European regulatory acts, in fact, no reference is made to "online platforms" as a business in itself. Instead, the European legislature was more concerned as to what was happening *within* the markets where online platforms were active, rather than the behavior of those enterprises themselves. European antitrust enforcers also followed this cautious approach in their decision-making practice in early cases involving the phenomenon of big data and online platforms. However, it soon became clear that both the regulatory and enforcement systems were unsuitable and did not properly address market dynamics.

Finally, it will show how in recent years, the initially cautious approach has been reversed, from both the enforcement and regulatory perspectives.

2. From the anarchy of the internet to first regulations attempts

Since the beginning of the 21st century, we have witnessed the development and spread of large online platforms as powerful means to make full use of the Internet technology. Today, more than one million European businesses reach their customers through these online platforms, and it is estimated that around 60% of private consumption and 30 % of public consumption of goods and services related to the overall digital economy are processed through online intermediaries.[97]

On the one hand, as is always the case in market economies, pioneering companies have been rewarded with the acquisition of solid market power and related profits. On the other hand, the digital world presents characteristics that make such power difficult to counteract. In general, the main characteristics of these online platforms is that they create, from their core competencies, entire ecosystems in which they are able to control the access and permanence of companies in the market and dictate the choices of consumers.

The increasing intermediation in commercial transactions by these digital platforms, as will be explained in the following, combined with strong indirect network effects and the competitive advantages extracted from the exploitation of data, leads to an increased dependence of businesses on such online platforms, which end up acting almost as *gatekeepers* of markets and consumers.[98]

It is indeed no coincidence that online platforms have been referred to in discourse not only as *gatekeepers* but also as veritable 'nation states': *"In*

[97] See *Proposal for a regulation of the European Parliament and of the Council on promoting fairness and transparency for business users of online intermediation services* COM/2018/238, available online https://ec.europa.eu/commission/sites/beta-political/files/soteu2018-preventing-terrorist-content-onlineregulation-640_en.pdf.

[98] Andreangeli A., Platform markets, dominance issues and single- and multi-homing of merchants: a real or hypothetical choice?, European Competition Journal, 2021

the complexity of the governance problems they face, large platforms resemble nation states. With over 1.5 billion users, Facebook oversees a 'population' larger than that of China. Google handles 64% of online searches in the US and 90% of those in Europe, while Alibaba handles more than 1 trillion yuan ($162 billion) of transactions per year and accounts for 70% of all commercial shipments in China. Online platforms of this size control economic systems larger than many national economies (...)". [99]

2.1. Big data and digital platforms

We can refer to big data, as described and analyzed in Chapter II, as the main common feature of digital platforms.[100] As we have seen in paragraph 6, digital market players can enjoy strong economies of scale and network effects fueled by the exploitation of data collected through so-called 'free' services. These mechanisms are at the basis of the so-called '*winner takes it all*' or '*winner takes the most'* scenarios, in which once market power or, often, dominance has been acquired, this strong market position makes it very difficult for other players to counter.

The positive loop is well known. Digital platforms connect many companies with many consumers through their services. In return, these services give the platform access to large amounts of data, which can be exploited to further improve its services or develop new services in adjacent markets.[101]

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[99] Parker, Van Alstyne and Choudary, *Platform Revolution*, cited in Crémer Yves, Montjoye, Schweitzer, *Competition policy for the digital era*, page 60 available online https://ec.europa.eu/competition/publications/reports/kd0419345enn.pdf

[100] For an in-depth analysis of the characteristics of online platforms, see European Commission*, Staff Working Document on Online Platforms, accompanying the document "Communication on Online Platforms and the Digital Single Market"* (COM(2016) 288), available online:
https://ec.europa.eu/digital-single-market/en/news/commission-staff-working-document-online-platforms.

[101] D. Mandrescu, *Applying (EU) competition law to online platforms: Reflections on the definition of the relevant market(s),* (2018).

In this scenario, the success of any attempt to challenge an established operator in the market (so-called *incumbent*), will depend on the ability of a potential rival to attract a critical mass of users and generate its own positive network effects.

In practice, users access free services offered by search engines, social networks and e-commerce platforms by providing the relevant providers a whole range of information. In this perspective, the collection of user data by the providers represents the consideration aimed at compensating them for the services they offer and the cost (information cost) that users are required to bear in order to take advantage of the features of the said services, together with that of being exposed to the sending of dedicated advertising messages (attention cost). Such information becomes, therefore, the currency of exchange for a good that, instead, is perceived as free, and the increasing prevalence of zero-price products and services is stimulated by the low weight attached by many consumers to privacy.

As enphasised in litterature, in addition to freely accessible public data and information provided voluntarily by users in accessing the recalled services (volunteered data), providers also collect those derived from tracking or crawling the actions held online by users (observed data) as well as metadata, that is, data inferred through automated analysis of already available data (inferred data). The ammount information acquired is functional for profiling of users, enabling an analysis of their behaviors, habits, interests and preferences of the same, and, therefore, represents for the providers of the platforms digital a production input that is essential to adjust functionality and improve the quality of services offered, as well as provide advertisers with spaces advertisements more suitable for conveying messages tailored to the target user's profile (behavioral targeting). The dataset of information collected

can be sold as a commodity on the aforementioned market for data, thus constituting an additional source of revenue.[102]

2.2. Towards a legal definition of big data

As shown in Chapter II, while there is a clear idea of the definition of big data from a technical viewpoint, a legal definition is still missing. To this regard we can refer to the notion of big data adopted in several reports by national competition authorities i.e., "*the collection, analysis and accumulation of large amounts of data, among which may include data of a personal nature (in the meaning provided by Article 4 of the GDPR), in hypothesis also coming from different sources. The massive nature of processing operations brings with it the need that such sets of information (both stored and streaming) be subject to automated processing, using algorithms and other advanced techniques, in order to identify correlations of a (mostly) probabilistic, trends and/or patterns*".[103]

3. From "information society services provider" to "online platforms"

The first piece of regulation addresses a specific phenomenon "the information society service providers" which back then was only the tip of the iceberg. Indeed, the emphasis of the first regulation attempts is on information society service providers and this is the definition to which all the other texts that follow will refer.

It is a definition that includes a very limited phenomenon - that connected to a mode of service delivery but is unable to understand and include the true scope of the digital phenomenon (which in 1998 was still

[102] G. Colangelo, *Big data piattaforma digitale e antitrust*, in *Mercato Concorrenza e Regole*, vol. 3, 2016.

[103] See AGCM Decision No. 28051 of December 20, 2019.

evolving), namely that of an economic model, such as that of the digital platforms described in previous paragraphs, which subverts and does not merely modify previous business models.

The legislative framework surrounding the "information society service providers", as is typical for European regulations, addressed first of all the need for a leveled European market. This was through means of the internal market clause (Directive 2000/31) but resulted in several gray zones for information society services and local legislation[104].

The first definition of "information society service providers" is included in Directive 98/34/EC of the European Parliament and of the Council of 22 June 1998 (entry into force 10th August 1998) laying down a procedure for the provision of information in the field of technical standards and regulations and of rules on information society services.

This Directive - modifying the Directive 83/189 - highlights the importance of information society services and consequently the need to include them in the verification of the harmonization criteria envisaged for European services the and the need of eliminate or reduce the obstacles to the free movement of goods and services that may result from the adoption of different national technical regulations, also by promoting the transparency of national initiatives vis-à-vis the European Commission, standardization bodies and other Member States.

The scope of the Directive is apparent if one only considers recitals 2 and 19:

[104]The gray zone in the interaction between information society services and local legislation. European Court of Justice criteria laid down in a series of judgments of 20 December 2017, Asociación Profesional Elite Taxi, C-434/15, EU:C:2017:981, and of 10 April 2018, Uber France, C-320/16, EU:C:2018:221. See also C-723/19 - Airbnb Ireland e Airbnb Payments UK , C-390/18 - Airbnb Ireland, C-724/18 - Cali Apartments. Court of Justice of the European Union, 'According to Advocate General Szpunar a service such as that provided by the AIRBNB portal constitutes an information society service', (2019)

" (...) *Whereas a wide variety of services within the meaning of Articles 59 and 60 [TEC, now Articles 46 and 57 TFEU,] will benefit by the opportunities afforded by the Information Society of being provided at a distance, electronically and at the individual request of a recipient of service*s; '(...) *Whereas, under Article 60 [EC, now Article 57 TFEU,] as interpreted by the case-law of the Court of Justice, "services" means those normally provided for remuneration; whereas that characteristic is absent in the case of activities which a State carries out without economic consideration in the context of its duties in particular in the social, cultural, educational and judicial fields* (…)".

Article 1 provides a very specific definition of what is to be termed an "Information society services":

"(...) *For the purposes of this Directive, the following meanings shall apply: (2)"service", any Information Society service, that is to say, any service normally provided for remuneration, at a distance, by electronic means and at the individual request of a recipient of services*".

This definition is the one that the following regulations refer to up until today and it has been recalled in particular in the Directive 2000/31 of the European Parliament and of the Council of 8 June 2000 on certain legal aspects of information society services, in particular electronic commerce, in the Internal Market ("Directive on electronic commerce") entry into force 17th July 2000.[105]

It represents the first attempt to define the phenomenon of emerging economic activities, characterized by a high degree of innovation and digitalization:

[105] COMMISSIONE UE, Europe and the global Information Society – Recommendations to the European Council, documento presentato al Consiglio Europeo di Corfù nel 1994, in http://www.europa.eu.int/ comm/information.society/eeurope/documentation/index_en.htm..

"*Information Society services span a wide range of economic activities which take place online …; Information Society services are not solely restricted to services giving rise to online contracting but also, in so far as they represent an economic activity, extend to services which are not remunerated by those who receive them, such as those offering online information or commercial communications, or those providing tools allowing for search, access and retrieval of data; Information Society services also include services consisting … in providing access to a communication network*".

This Directive seeks to balance the different interests at stake and establishes principles upon which industry agreements and standards can be based.

Online services covered by the Directive include: news services (such as news websites), selling (books, financial services, travel services, etc.), advertising professional services (lawyers, doctors, estate agents), entertainment services, basic intermediary services (internet access, transmission and hosting of information, free services funded by advertising, sponsorship.

The Directive establishes the principle that operators of these services are subject to regulation (related to the taking up and pursuit of the services) only in the EU country where they have their registered headquarters – not in the country where the servers, email addresses or postboxes they use are located.

In particular, according to Article 2 "*For the purpose of this Directive, the following terms shall bear the following meanings: (a) "Information Society services": services within the meaning of Article 1(2) of Directive 98/34; (b) "service provider": any natural or legal person providing an Information Society service;"*

The objective of Directive n. 31/2000/EC is to ensure and allow the development of information society services guaranteeing a harmonized regulatory framework between Member States. The objective of the Directive is indicated in Article 1 as the “promotion of the free movement of information society services between Member States and the freedom to provide such services”.

However, while this need was evident, the need for protection from the risks associated with the exercise of online activities grew. Specifically, the subject in weak position - the consumer - was found to be more vulnerable, and therefore, would have benefit of a series of information. If the network, boundless by nature and definition, offers greater possibilities to businesses and consumers, on the other hand, the regulation of the relationships that will be created could lead to a series of problems.

As a matter of facts, the Directive pays close attention to information and commercial communications. In particular, the provider must make some general information accessible and available for consultation: his/her name and address, the data that allow the recipient to consult it, and the details of the commercial register or order professional. Such information must be provided even if it does not lead to the conclusion of a contract.

Distance bargaining had particular characteristics due to using the same telematic tools. The E-consumer, however, can compare the conditions offered to him/her with those of other E-consumers, obtaining a quantity of information which, if used well, can also place him in a situation of advantage. It is also true that the spatial conditions, the large number of contracts and the ease with which he/she can conclude them, without a well-defined distinction of the various phases, can lead the consumer to conclude the contract without sufficient awareness.

Online service providers who act as a mere conduit, caching, or hosting services providers are not responsible for the information they

transmit or host should they fulfill certain conditions. In the case of hosting service providers, these are exempt from liability as long as they do not have actual knowledge of illegal activity or information. Should they obtain such knowledge or awareness, they [must] act at once to remove or to disable access to the information. National governments cannot impose any general monitoring obligation on these 'intermediaries' over the information they send or store to look for and prevent illegal activity.

Article 12, provides that "*Where an Information Society service is provided that consists of the transmission in a communication network of information provided by a recipient of the service, or the provision of access to a communication network, Member States shall ensure that the service provider is not liable for the information transmitted, on condition that the provider: (a)does not initiate the transmission; (b) does not select the receiver of the transmission, and (c) does not select or modify the information contained in the transmission (...)".*

Article 13 establishes that '*Where an Information Society service is provided that consists of the transmission in a communication network of information provided by a recipient of the service, Member States shall ensure that the service provider is not liable for the automatic, intermediate and temporary storage of that information, performed for the sole purpose of making more efficient the information's onward transmission to other recipients of the service upon their request, on condition that: (a) the provider does not modify the information; (b) the provider complies with conditions on access to the information; (c) the provider complies with rules regarding the updating of the information, specified in a manner widely recognised and used by industry; (d) the provider does not interfere with the lawful use of technology, widely recognised and used by industry, to obtain data on the use of the information; and (e) the provider acts expeditiously to remove or to disable access to the information it has stored upon obtaining actual knowledge of the fact that the information at the initial source of the*

transmission has been removed from the network, or access to it has been disabled, or that a court or an administrative authority has ordered such removal or disablement.'

Finally, Article 15(1) provides that '*Member States shall not impose a general obligation on providers, when providing the services covered by Articles 12, 13 and 14, to monitor the information which they transmit or store, nor a general obligation actively to seek facts or circumstances indicating illegal activity*.'

All in all, it is well woth noticing that the notion of "information society service providers" is subject to several recent decisions of the European Court of Justice.[106]

The following regulations refer in most cases to "information society services provider" and address a wide variety of aspects, by referring sometimes also to online content service or to online ancillary services. However, no reference is made to "online platform" as a business in itself. To this regard, it is apparent that the European legislator is more concerned on what happens *within* the markets where online platforms are active rather than in their behaviors.

It is useful to draw attention to the following, in particular:

Directive 2001/29/EC of the European Parliament and of the Council of 22 May 2001 on the harmonization of certain aspects of copyright and related rights in the information society (entry into force 22 giugno 2001). The Directive explicitly addresses copyrights in the "information society", but it does not provide a definition. However, the wider scope is apparent from Recital 16 whereas it is stated that '*Liability for activities in the network*

[106] European Court of Justice criteria laid down in a series of judgments of 20 December 2017, Asociación Profesional Elite Taxi, C-434/15, EU:C:2017:981, and of 10 April 2018, Uber France, C-320/16, EU:C:2018:221. See also C-723/19 - Airbnb Ireland e Airbnb Payments UK , C-390/18 - Airbnb Ireland, C-724/18 - Cali Apartments.

environment concerns not only copyright and related rights but also other areas, such as defamation, misleading advertising, or infringement of trademarks, and is addressed horizontally in Directive [2000/31], which clarifies and harmonizes various legal issues relating to Information Society services including electronic commerce. This Directive should be implemented within a timescale similar to that for the implementation of the Directive on electronic commerce, since that Directive provides a harmonized framework of principles and provisions relevant inter alia to important parts of this Directive. This Directive is without prejudice to provisions relating to liability in that Directive.'

Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communications networks and services (Framework Directive) (entry into force 7 March 2002), whereas Recital 10 of states: '*The definition of "information society service" in Article 1 of Directive 98/34/EC (…) spans a wide range of economic activities which take place on-line. Most of these activities are not covered by the scope of this Directive because they do not consist wholly or mainly in conveying signals on electronic communications networks. This Directive covers voice telephony and electronic mail conveyance services. The same undertaking, for example, an Internet service provider, can offer both an electronic communications service, such as access to the Internet, and services not covered under this Directive, such as the provision of web-based content.*'

Directive (EU) 2016/1148 of the European Parliament and of the Council of 6 July 2016 (entry into force 26 July 20016) on measures for a high standard level of security of network and information systems across the Union. Art. 4(17)

Regulation (EU) 2017/1128 of the European Parliament and of the Council of 14 June 2017 on cross-border portability of online content services in the internal market (portability Regulation) (entry into force 4 July

2017). Art. 2(5) **"**online content service**"** means a service as defined in Articles 56 and 57 TFEU that a provider lawfully provides to subscribers in their Member State of residence on agreed terms and online, which is portable and which is: (i) an audiovisual media service as defined in point (a) of Article 1 of Directive 2010/13/EU, or (ii) a service the main feature of which is the provision of access to, and the use of, works, other protected subject- matter or transmissions of broadcasting organizations, whether in a linear or an on-demand manner. This definition is not targeted at intermediation, but rather at the resale of licensed audio-visual content, such as the Netflix-model.

Regulation (EU) 2018/302 of the European Parliament and of the Council of 28 February 2018 addressing unjustified online sales discrimination based on customers' nationality, place of residence or establishment within the internal market (entry into force 20 March 2018). The regulation refers to "online interface," and this means any software, including a website or a part thereof, and applications, including mobile applications, operated by or on behalf of a trader, which serves to give customers access to the trader's goods or services to engage in a transaction concerning those goods or services;

Directive (EU) 2019/789 of the European Parliament and of the Council of 17 April 2019 laying down rules on the exercise of copyright and related rights applicable to certain online transmissions of broadcasting organizations and retransmissions of television and radio programs (entry into force 7 May 2019). The Directive refers to a different definition. In particular, article 2 states, "For the purpose of this Directive, the following definitions apply: "**'***ancillary online service' means an online service consisting in the provision to the public, by or under the control and responsibility of a broadcasting organization, of television or radio programs simultaneously with or for a defined period after their broadcast by the*

broadcasting organization, as well as of any material which is ancillary to such broadcast;."

Directive (EU) 2019/790 of the European Parliament and of the Council of 17 April 2019 on copyright and related rights in the Digital Single Market and amending Directives 96/9/EC and 2001/29/EC (entry into force 7 May 2019).

4. Second regulation wave: now we can talk about digital platforms

4.1. Regulations referring to "online marketplace" and "online platforms"

Only with Directive 2013/11/EU the European legislator starts to face the phenomenon of 'online marketplace' in a broader perspective. In particular, the Directive refers to 'online marketplace' as "*a digital service that allows consumers and/or traders as respectively defined in point (a) and in point (b) of Article 4(1) to conclude online sales or service contracts with traders either on the online marketplace's website or on a trader's website that uses computing services provided by the online marketplace*".

4.2. The European Commission working documents analysis digital platforms

Different working documents of the European Commission widen up their scope including different definitions of digital platforms.

Some working documents refer to "Collaborative economy Platforms" providing (i) intermediation services; (ii) ancillary services[107]. According to this

[107] European Commission staff working document accompanying the document: communication from the commission on a european agenda for the collaborative economy- supporting analysis com(2016) 356 final} see in particular paragraph 2 Collaborative platforms are typically transaction-based platforms, similar to peerto-peer e-commerce platforms founded in the early phase of the internet. Collaborative platforms have pushed peer-to-peer commerce into more complex service sectors, such

working document "a *variety of collaborative economy business models are rapidly emerging and growing across Europe, changing the way services are traditionally provided and consumed. They are driven by technological, economic and societal factors. Collaborative platforms enable individuals and other actors such as micro entrepreneurs and (small) businesses to offer services. This creates new employment, flexible working arrangements and new sources of income and helps small businesses reach a wider market and customer base. They also make markets more competitive and efficient by improving matching between demand and supply*". Also, the collaborative business model is based around a digital internet platform, which creates an online marketplace and provides a range of services for buyers and sellers/service providers who are, at least in the initial stages of platform development, typically consumers. Services provided tend to be intermediation services but can also be ancillary services, e.g., facilitation of payments._The market development of a two- or multi-sided platform is dependent on several factors: network effects; scale economies; congestion; platform differentiation; multi-homing. Data collected from about 500 national collaborative and resale peer-to-peer platforms in the EU show that a large majority of platforms set terms and conditions, and a substantial number of platforms fix prices or give guidance on prices.

In line with this, a Communication of the European Commission of 2016[108] refers to the term "collaborative economy", i.e., business models where activities are facilitated by collaborative platforms that create an open marketplace for the temporary usage of goods or services often provided by private individuals. The collaborative economy involves three categories of actors: (i) service providers who share assets, resources, time and/or skills — these can be private individuals offering services on an occasional basis

as transport and accommodation. This enables domestic assets to be used as part of a temporary service, often provided offline.

[108] Communication From The Commission On A European Agenda For The Collaborative Economy {Swd(2016) 184 Final} Of 2.6.2016.

('peers') or service providers acting in their professional capacity ("professional services providers"); (ii) users of these; and (iii) intermediaries that connect — via an online platform — providers with users and that facilitate transactions between them ('collaborative platforms'). Collaborative economy transactions generally do not involve a change of ownership and can be carried out for profit or not-for-profit.

In the same year the European Commission Communication on 'Digitizing European Industry — Reaping the full benefits of a Digital Single Market', provided a detailed definition of platforms clarifying that "*Platforms here are to be understood as multi-sided market gateways creating value by enabling interactions between several groups of economic actors. Among others, platform building requires the development of reference architectures and their gradual implementation, testing and validation in evolving ecosystems that trigger broad value creation*".[109]

Commission Staff Working document accompanying the document "Communication On Online Platforms And The Digital Single Market"[110] offer a very detailed analysis of the business model behind different type of online platform, and it distinguishes among different categories, namely marketplaces and e-commerce platforms; mobile ecosystems and application distribution platforms; internet Search Services, and Social media and content platforms[111].

[109] EUROPEAN COMMISSION Communication on 'Digitizing European Industry — Reaping the full benefits of a Digital Single Market' COM(2016) 180 final of 19.4.2016 see in particular para 4.2.2. In particular, the communication distinguishes among: One group of platform building initiatives aims at combining digital technologies, notably IoT, big data and cloud, autonomous systems and artificial-intelligence, and 3D printing, into integration platforms addressing cross-sector challenges (…) A second group of planned platform building initiatives addresses the integration of converging digital innovations into sectoral platforms and full solutions, such as: The Connected Smart Factory or Connected and automated driving.

[110] EUROPEAN COMMISSION Staff Working Document Accompanying The Document Communication On Online Platforms And The Digital Single Market {Com(2016) 288} Of 25.5.2016.

[111] The paragraph that follows is an abstract of the Commission Staff Working Document Accompanying The Document Communication On Online Platforms And The Digital Single Market {Com(2016) 288} Of 25.5.2016.

(i) Marketplaces and e-commerce platforms: online platforms on which direct transactions between sellers and buyers of goods and/or services can take place. In particular, EU legislation regards online marketplaces as service providers which allow consumers and traders to conclude online sales and service contracts on online marketplaces' website (Regulation 524/2013 on online dispute resolution for consumer disputes).[112]

(ii) Mobile ecosystems and application distribution platforms the key new market ecosystem and led to the development of important marketplaces for software and digital content.[113]

(iii) Internet Search Services: services that help internet users find the relevant answers to their search requests from among tens of billions of web pages on the internet. They facilitate direct interaction between internet users seeking information, website operators seeking an audience for their content, and online advertisers targeting potential customers. The fundamental purpose of a search engine is to make it easier for users to find information on the internet.[114]

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[112] Marketplaces may facilitate transactions not only also B2B but B2C is the most frequent situation. Also sometimes online marketplaces can be difficult to distinguish from online resellers. Online marketplaces also exist where both the vertically-integrated platform operator as well as third-party sellers are active in the sale of goods es. Zalando. Revenues in a variety of ways: principally through fees charged on third-party sales but also through the sale of online advertising space. These platforms compete for customers with bricks-and-mortar retail outlets.

[113] Such as App stores, such as Google Play (Android) and App Store (iOS) are important components of mobile ecosystems enabling users to download apps to mobile devices. There are three main types of mobile operating systems: - Manufacturer-built proprietary operating systems where the operating system developer is also the hardware manufacturer. Examples include Apple's iOS and the BlackBerry OS. - Third-party proprietary operating systems where the operating system developer will license its operating system, usually for a fee, to third-party hardware manufacturers (Original Equipment Manufacturers or OEMs). An example of this model is Microsoft's Windows OS. - Open source operating systems where the operating system developer will release the operating system via the open source license method. Examples include Google Android and Symbian. By connecting users to developers, ecosystems may create network effects.

[114] Most modern search engines typically operate in three steps: crawling, indexing and serving results. When a user enters a search query, which consists of a search algorithm, a set of computer processes and formulas is applied to select the most relevant websites stored in the search index in an appropriate sequence ("ranking"). Besides general search engines that allow users to search for any type of information over the whole web, there are also specialized engines. A definition of "general

As of 2016, most of the main general search services are free of charge and general search services earn money through advertising. In the case of Google, the main search engine used in the EU, advertising has contributed to more than 90 percent of Google's total revenue within the last decade.

In a "pay per click" model adopted by the main general search engines advertisers pay each time a user clicks on the link to their web page. Advertised links can be displayed, for example, above or below organic search on the search results page. The price paid by advertisers in this model is the product of the number of times users click on the ad times the price per click, which is determined in a competitive bidding process.

Strong branding and partnerships with web portals or internet browsers also play an important factor in attracting users. Privacy and data protection has also emerged as a factor influencing users' choice of search engines.[115]

(iv) Social media and content platforms ("SMPs") there are a plethora of definitions used in the literature on online platforms. Gebicka and Heinemann define SMPs as "web-based services that allow individuals to construct a public or semi- public profile within a limited forum, to articulate a list of other users with whom they share a connection ('friends' on Facebook),

search" and "vertical search" can be found below: "General search" engines provide search results covering any category of information on the web. "Vertical search" engines provide search results for specific categories of information on the web. For example, results may be limited to certain type of information (people, weather, news, shopping, flight information etc.) or format (photos, videos, map).

[115] Search engines compete for advertisers by offering them better tools for reaching a large group of potential customers and controlling the parameters of their advertising campaign, allowing them to target their advertisements to a specific keyword, geographic location and demographic group, and providing a superior ROI ("return on investment") on their advertising spend. Search engines give content-providers visibility on the internet. Website operators are encouraged to improve the quality and structure of their websites by applying search engine optimization ("SEO") techniques to make them easier to crawl and index by specific search engines.

and to view and traverse their list of connections and those made by others within the system".[116]

Communication from the Commission on online platforms and the digital single market opportunities and challenges for Europe[117] of 2016, refer to online platforms "as online advertising platforms, marketplaces, search engines, social media and creative content outlets, application distribution platforms, communications services, payment systems, and platforms for the collaborative economy". Even if it does not include a definition of online platforms, it underlines their common features: "Online platforms come in various shapes and sizes and continue to evolve at a pace not seen in any other sector of the economy. Presently, they cover a wide-ranging set of activities including online advertising platforms, marketplaces, search engines, social media and creative content outlets, application distribution platforms, communications services, payment systems, and platforms for the collaborative economy". Online platforms share some important and specific characteristics. In particular*: "*They have the ability to create and shape new markets, to challenge traditional ones, and to organize new forms of participation or conducting business based on collecting, processing, and editing large amounts of data; They operate in multi sided markets but with varying degrees of control over direct interactions between groups of users; They benefit from 'network effects', where, broadly speaking, the value of the service increases with the number of users; They often rely on information and communications technologies to reach their users, instantly and effortlessly; They play a key role in digital value creation, notably by capturing significant value (including through data accumulation), facilitating new business ventures, and creating new strategic dependencies".

[116] Gillespie argues that the capacity to interface and create relevance for a variety of actors and use practices is, in fact, the central characteristic of SMPs. Kietzmann details key characteristics of SMPs, or functional building blocks. These include the notions of identity, conversations, sharing, presence, relationships, reputation and groups.

[117] Communication from the commission on online platforms and the digital single market opportunities and challenges for Europe {swd(2016) 172 final} 25.5.2016

In this Communication, the Commission laid down its overall assessment of online platforms as part of its strategy for the digital single market.

"*While there are some online platforms that reach historic numbers of users across the world, and that expand continuously into new areas of the economy, there are also still many opportunities for competitive European platforms to emerge. Effectively stimulating innovation in these areas, while adequately protecting the legitimate interests of consumers and other users, is perhaps the most important challenge the EU faces today in terms of securing its future competitiveness in the world*".

What is particularly important in this Communication is that it underlines the need to adopt policy and regulatory approaches that respond directly to the challenges, and are flexible and future-proof. However, the Communication underlines that where appropriate, self-regulation and co-regulation can often achieve better outcomes for enabling the development of strong platform ecosystems in Europe and can complement or reinforce the existing legislation that already governs certain activities of online platforms.

The Report on online platforms and the digital single market Committee on Industry, Research and Energy Committee on the Internal Market and Consumer Protection[118] emphasizes some common features of online platforms, in particular it underlines: "*some "important characteristics which may distinguish online platforms from other businesses: Their capacity to facilitate, and extract value, from direct interactions or transactions between users by building networks where "network effects" are at play; the ability to collect, use and process a large amount of data in order to optimize user experience or create and shape new markets. What is more, the combination of data collection and processing capacity with established*

[118] Report on online platforms and the digital single market Committee on Industry, Research and Energy Committee on the Internal Market and Consumer Protection of 31.5.2017, (para 4.2.).

network effects gives online platforms unprecedented scope and scale allowing them to expand into new economic sectors. Therefore, "online platform" is a broad label for numerous types of multi-sided business models. Even at a theoretical level, depending on the definition, online platforms are a flexible concept".

Finally, the final report on the E-commerce Sector Inquiry[119] does not provide a general definition of online marketplaces.

4.3. EU Regulation on platform-to-business relations

As illustrated, the current regulatory framework is characterized by a strong sectoral approach and it falls to adapt ordinary competition instruments to new digital scenarios.

As showed in the previous paragraphs, the discipline of the so-called "information society service" *i.e.*, internet service providers and online intermediaries, revolves around the E-Commerce Directive aiming at strengthening the internal market through laying the foundations for technological innovation by reinforcing consumer confidence in digital services, improving transparency and outlining the limits of liability for information society service providers with regard to any illegal content. [120]

The regulatory framework is, then, completed by a series of legislative instruments, non-binding soft law, and voluntary forms of cooperation. This framework which addresses not only consumer protection but also profiles the use of digital markets as new channels for the commission of unlawful conduct and, in particular, the dissemination of unlawful content, goods and services.[121]

[119] FINAL REPORT on the E-commerce Sector Inquiry COM(2017) 229 final 10.5.2017.

[120] Directive (EU) 2000/31/EC of the European Parliament and of the Council of 8 June 2000 on certain legal aspects of information society services, in particular electronic commerce, in the Internal Market ('Directive on electronic commerce') available online: https://eur-lex.europa.eu/legal-content/IT/TXT/PDF/?uri=CELEX:32000L0031&from=EN

[121] Examples include legislation on illegal goods and content, such as the market surveillance regulation; the directive on audiovisual media services; the directive on the enforcement of intellectual

An important update is the Regulation on Fair Transparency in Relationships between Online Platforms and Businesses, so-called P2B Regulation[122] in force since July 2019. The regulation contributes to the proper functioning of the internal market by establishing rules to ensure that business users of online intermediary services and users of business websites that are in a relationship with online search engines have adequate transparency, fairness and effective redress possibilities.

In particular, the subjective scope of the regulation is the same as that of the aforementioned E-Commerce Directive, since it refers to online intermediation services and online search engines. Instead, platforms that manage online payment services, online advertising tools or online advertising exchanges are excluded from the scope of application. This is, since they do not pursue the objective of facilitating the initiation of direct transactions and do not imply a contractual relationship with consumers[123].

The P2B Regulation provides for transparency and information obligations for users, with particular reference to, inter alia, the manner of access to data, which must be described in the terms and conditions of the contract, any differential treatment applied or applicable, and the formulation of conditions in a transparent and comprehensible manner.[124]

It has been noted that the B2P regulation is of two elements: a regulatory one, which concerns a set of legal transparency obligations for platforms (Articles 3, 4 and 5); plus a self-regulatory one, consisting of a

property rights; the directive on copyright in the digital single market; the regulation on market surveillance and product conformity; the proposal for a regulation on the prevention of the dissemination of terrorist content online; the directive on combating the sexual abuse and sexual exploitation of children and child pornography; and the regulation on the marketing and use of explosives precursors.

[122] Regulation (EU) 2019/1150 of the European Parliament and of the Council of 20 June 2019 promoting fairness and transparency for business users of online brokerage services available online: https://eur-lex.europa.eu/legal-content/IT/TXT/PDF/?uri=CELEX:32019R1150&from=EN

[123] Twigg-Flesner C., *The EU's Proposals for Regulating B2B Relationships on online platforms–Transparency, Fairness and Beyond*, 2018

[124] Hausemer P., Rabuel L., Graux H., *Study on data in platform-to-business relation*, (2017)

"non-binding invitation" to platforms to establish an independent mediation body for out-of-court dispute resolution.[125]

In literature it has been highlighted that the Regulation in question is based on a standardized and generalized prototype of SMEs, which has little adherence to the economic reality-varied and multi-sided digital platforms.[126]

Furthermore, the Directive on Better Enforcement and Modernisation of EU Consumer Protection Rules also added transparency requirements in the area of online marketplaces vis-à-vis consumers. [127]

Among the soft-law instruments worth mentioning include are the European Commission's 2018 Communication and Recommendation to online platforms and Member States on combating illegal content online[128] .

There are several documents analyzing and monitoring the 'platform economy' at the initiative of the European Commission. These are, in particular, the Online Platforms Observatory Expert Group[129] ; the European Commission Communication on online platforms in the single market:

[125] Di Porto F., Signorelli A. ib.

[126] On the topic see Abdollah Dehdashti S., *B2B unfair trade practices and EU competition law*, (2018), de Streel A., *Online Intermediation Platforms and Fairness: An assessment of the recent Commission Proposal University of Namur*, (2018)

[127] Directive (EU) 2019/2161 of the European Parliament and of the Council of 27 November 2019 amending Council Directive 93/13/EU and Directives 98/6/EU, 2005/29/EU AND 2011/83/EU of the European Parliament and of the Council for better enforcement and modernisation of Union rules on consumer protection available online: https://eur-lex.europa.eu/legal-content/IT/TXT/PDF/?uri=CELEX:32019L2161&from=EL

[128] Recommendation on measures to effectively tackle illegal content online; Communication on stepping up efforts to tackle illegal content online, September 2017, available online https://ec.europa.eu/digital-single-market/en/news/commission-recommendation-measures-effectively-tackle-illegal-content-online

[129] Decision on setting up the group of experts for the Observatory on the Online Platform Economy (April 2018) available online https://ec.europa.eu/digital-single-market/en/news/commission-decision-group-experts-observatory-online-platform-economy

opportunities and challenges[130] ; the public consultation launched on regulatory scenarios for online platforms, online intermediaries, cloud *computing* and the *collaborative economy*[131] ; and the *Staff Working Document* on online platforms[132] .

Finally, at the request of the European Parliament, the Commission is carrying out an in-depth analysis of algorithmic transparency and related accountability. These pilot projects will provide an in-depth study on the role of algorithms in the digital economy and society. In particular, how they shape, filter or personalize information flows.[133]

Alongside the outlined legal framework are the decision-making practices of the European competition authorities and the Directorate for Competition of the European Commission as well as the case law of the Court of Justice of the European Union and national courts, which have to adapt the existing instruments for the protection of competition to the changed requirements of digital markets.

One of the most problematic aspects that public enforcers have to deal with is precisely the dominance of these platforms and the social responsibility arising from this social responsibility that, as has been repeatedly proposed at an academic level, could take the form of real

[130] Communication on online platforms and the Digital Single Market opportunities and challenges for Europe (May 2016) available online http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1466514160026&uri=CELEX:52016DC0288

[131] Public consultation on the regulatory environment for platforms, online intermediaries, data and cloud computing and the collaborative economy, September 2015 - January 2016, available online https://ec.europa.eu/digital-single-market/en/news/public-consultation-regulatory-environment-platforms-online-intermediaries-data-and-cloud

[132] European Commission, *Staff Working Document on Online Platforms* (May 2016) available online https://ec.europa.eu/digital-single-market/news-redirect/31576

[133] European Commission , *Algorithmic Awareness-Building*, available online https://ec.europa.eu/digital-single-market/en/algorithmic-awareness-building

obligations of self-regulation within their own microsystem, as is the case, for example, with sports leagues.[134]

5. The regulation gap: competition law enforcement

Notwithstanding the efforts in finding a common meaning to the word "digital platform" and the numerous interventions of the European legislator to frame the phenomenon of the gigital markets, up until now the recent experience has shown how difficult it is for competition authorities to restrict dominant digital companies. That is the case because the original toolkit provided by competition law, as well as the regulatory framework within the hands of public authorities seem to be more and more outdated and unable to analyze the phenomenon with the right lenses.

From the first viewpoint, it has been correctly emphasized that the competition authorities have exploiting different prerogatives to face dominance in the digital market is an effective manner. Along with the fines that constitute the traditional sanction system that accompanies the decision to establish and terminate an infringement, they were enacted by Regulation 1/2003 and are constantly gaining ground as new forms of measures aimed at correcting distortions of competition. These remedies, whether behavioral or structural, are necessary to bring the infringement effectively to an end, having regard to the principle of proportionality. [135]

From the second viewpoint, it is apparent from the European Commission's decisional practice that what actually lacked, especially in the first cases, is a broader and forward-looking perspective of digital markets

[134] *Inter alia* see European Commission, Case AT.39740 - Google Search (Shopping), 27.6.2017, Official Gazette 2018/C-9/08, 12.1.2018, p. 1; Autorità Garante della Concorrenza e del Mercato case A542 - Open investigation against Google for abuse of dominant position in the Italian display advertising market *press release* of 28 October 2020

[135] Aravantinos, S., Competition law and the digital economy: the framework of remedies in the digital era in the EU . European Competition Journal, (2021)

dynamics. This is due to the high level of technicalities underlying these markets, which make it difficult for the European enforcers to understand the businesses under their review, as well as the "the uncertainty" as a typical connotation of innovation.

At EU level, the EC has applied Art. 102 TFEU to the tech companies in several high-profile proceedings such as Google Cases as well as Amazon's eBooks.[136]

5.1. Facebook/WhatsApp merger

The Facebook/WhatsApp merger may constitute an example of the difficulties faced by the European enforcers in truly understanding the phenomenon of big data and online platforms.[137] In fact, some authors refer to the case as an example of failure of the E.U. Merger Regulation (EUMR) to prevent anticompetitive mergers.[138] In the final decision, the Commission cleared the merger on the ground of the absence of possible interrelation between the markets where the two undertaking were active, whereas it found that WhatsApp and Facebook were not close competitors in the market for consumer communication because consumers used both applications on the same device, and one service required the creation of a profile while the other

[136] EU level, the on-going investigations against Google Search (Shopping) (Case AT.39740) Commission Decision, C (2017) 4444 final (27 June 2017).); Case COMP AT.40099 – Google Android, (opening of pro- ceedings: 15 Apr. 2016); Case COMP AT.40411 – Google Search (Add Sense), (opening of proceedings 14 Jul. 2016), Commission Decision of 27.6.2017 relating to proceedings under Article 102 of the Treaty on the Functioning of the European Union and Article 54 of the Agreement on the European Economic Area (AT.39740 – Google Search (Shopping), see on https://ec.europa.eu/competition/index_en.html website.

[137] Case of the European Commission, No COMP/M.7217 - FACEBOOK/ WHATSAPP, 03.10.2014.

[138] Portuese, Aurelien, European Competition Enforcement and the Digital Economy: The Birthplace of Precautionary Antitrust (November 11, 2020). The Global Antitrust Institute Report on the Digital Economy 17, Available at SSRN: https://ssrn.com/abstract=3733715 or http://dx.doi.org/10.2139/ssrn.3733715

was accessed via phone number.[139] By doing so the Commission cleared on the basis of unverified information showing an evident need to increase competition authorities' know-how of the industry, since, as later on realized, it was in fact technically possible, at the time of the merger, to match Facebook and WhatsApp users accounts. [140]

Nevertheless, the real impact of the merger has been faced by national competition authorities in the following years. In its decision of 2019 the Bundenskatellamt, for instance, imposed severe restrictions in cases of data processing involving extrapolation from different sources such as WhatsApp and Instagram.[141] The German Antitrust Authority therefore relied on data protection arguments to find that according to Facebook's terms of use, the processing of user data was limited to web services related to that specific social network, and that therefore the massive ingestion of data not only from the other social networks in Facebook's circuit but also from other third parties constituted an infringement under competition law as an abuse of a dominant position.[142]

The Authority therefore assessed the market share of the social network and concluded that with 23 million active users every day, Facebook had a substantial monopoly.[143]

[139] Maria C. Wasastjerna, *The role of big data and digital privacy in merger review*, European Competition Journal, 2018, 14:2-3, 417-444, where the author analyze the implications of the data-driven economy and how competition law may help in capturing the benefits of big data

[140] Case No COMP/M.7217, Facebook/ WhatsApp, (2014), (Facebook/WhatsApp), https://ec.europa.eu/
competition/mergers/cases/decisions/m7217_20141003_20310_3962132_EN.pdf

[141] Purtova N.,*The law of everything. Broad concept of personal data and future of EU data protection law*, Law, Innovation and Technology, 2018

[142] Bundeskartellamt Case B6-22/16 of 6.02.2019

[143] Ghezzi F., Olivieri G, Diritto antitrust, 2019, pg 234.

5.2. Google cases

5.2.1. Google search (Shopping)

In the following cases the European enforcers have shown a broader understanding not only of the business model underlying digital platforms, but first and foremost the critical impact on the market of Big Tech.

According to the European Commission Google and Alphabet infringed Article 102 TFEU as “positioning and displaying more favorably, in Google Inc’s general search results pages, Google Inc.’s own comparison-shopping service compared to competing comparison shopping services”.

At the heart of the Commission's finding of an abuse of dominance lay the novel theory of harm that Google “had designed the result page of its well-known general internet search engine “Google Search" in a way that favored its own Comparison-Shopping Service (CSS) Google Shopping, while placing rival CSS websites at a competitive disadvantage. According to the Commission, Google's abusive self-preferencing consisted of two elements: Google was found to have i) consistently afforded its own CSS greater visibility on the result pages of its general search engine by displaying it amongst the highest ranked and most visible search results, and ii) simultaneously actively demoted competing CSS on its general search result pages to lower-ranked links and pages. The Commission not only sanctioned Google's conduct and ordered Google to put an end to its self-preferencing conduct and ensure equal access to all third-party providers on its general search website”.[144]

It has been noted that in holding that Google's practice of self-preferencing amounted to a standalone abuse of dominance, the Commission pushed the boundaries of art. 102 TFEU outward.[145] The Google

[144] Höppner T., *Defining Markets for Multi-Sided Platforms: The Case of Search Engines*, (2015)

[145] E., Google Shopping and the Quest for a Legal Test for Self-preferencing Under Article 102 TFEU, European Papers - A Journal on Law and Integration, 22.02.22 available at

Shopping decision sent out the bold message that art. 102 TFEU could be used to interfere in the way in which dominant firms design their products and services and impose a far-reaching obligation of equal treatment on these design choices.[146]

In fact, the Commission argued that it was not required to demonstrate that Google's self-preferencing amounted to a refusal to deal as defined in the Bronner case.[147] However, it failed to articulate any alternative legal test in support of its finding that self-preferencing by a dominant firm may breach art. 102 TFEU.

This decision paved the way for a broader application of self-preferencing theory of harm not only from an enforcement point of view[148], but also from a regulatory point of view by informing recent initiatives, as illustrated in paragraph 5, for new platform regulations in Germany, the EU, and the UK. Indeed, self-preferencing figures prominently as one of the blacklisted practices that are (set to be) outlawed by the new rules for powerful digital platforms.

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https://www.europeanpapers.eu/it/europeanforum/google-shopping-quest-for-legal-test-for-self-preferencing

[146] See Geradin D., Katsifis D.,*Trust me, I'm fair: analysing Google's latest practices in ad tech from the perspective of EU competition law*, European Competition Journal, 2020

[147] Case C-7/97 *Bronner v Mediaprint* ECLI:EU:C:1998:569 paras 41, 44-46.

[148] See Furman J., Coyle D., Fletcher A., McAuley D., Marsden P., *Unlocking digital competition: Report of the Digital Competition Expert Panel* (2019) www.gov.uk para. 2(36); J Crémer, YA de Montjoye and H Schweitzer, *Competition Policy for the Digital Era* (2019) www.op.europa.eu 65–67. Self-preferencing also lies at the core of a number of high-profile antitrust investigations that the Commission and other competition authorities have recently opened against AmazonEuropean Commission, *Press release IP/20/2077 – Antitrust: Commission sends Statement of Objections to Amazon for the use of non-public independent seller data and opens second investigation into its e-commerce business practices* (2020) www.ec.europa.eu; Autorità garante della Concorrenza e del Mercato, *Press release A528 – Antitrust – Amazon fined over € 1,128 billion for abusing its dominant position* (2021) www.en.agcm.it. See also, Autorità garante della Concorrenza e del Mercato, *Provvedimento A528 – Sanzione di oltre 1 miliardo e 128 milioni di euro ad Amazon per abuso di posizione dominante* (9 December 2021) para. 716 www.agcm.it and Facebook. See Competition and Markets Authority (CMA), *Press release – CMA investigates Facebook's use of ad data* (2021) www.gov.uk.

In confirming the Commission's finding that self-preferencing by a dominant firm constitutes a standalone abuse of dominance under art. 102 TFEU, the General Court's Google Shopping judgment provides a major clarification. Most notably, it endorses the Commission's move to expand the prohibitive scope of that article. It also emboldens recent initiatives across Europe to impose ex ante rules on powerful digital platforms that establish a per se prohibition of self-preferencing.

In literature it has been highlighted how the capabilities of algorithms and big data allowed companies to experiment with discriminatory pricing, both in terms of their digital and conventional stores. As a counterbalancing factor for discriminatory pricing strategy, these services promote market transparency and can have a positive effect on consumer welfare. Nevertheless, platforms can gain enormous market power, especially by launching other “free” services to consumers.[149] This results in users relying (and trusting) only one platform and not being interested in multi-homing.

As a result, the market (and its transparency) is not regulated by consumers and other businesses, but by leading platforms. If, for example, a platform is motivated to favor specific businesses (or even its own affiliates) operating on the vendor side, it may deliberately worsen quality on the consumer side. The preferential treatment of the platform is due either to the increase in profits or to the increase of its market power.[150]

Essentially, using algorithms, Google ranked its CSS in user searches higher than its competitors, on the one hand, and on the other hand displayed more elements of the products to the customers (e.g., optics characteristics). This has resulted in a surge increase in the market share of

[149] ARAVANTINOS, S., *Competition law and the digital economy: the framework of remedies in the digital era*, ib.

[150] ARAVANTINOS, S., Competition law and the digital economy: the framework of remedies in the digital era, ib.

its CSS in the relevant market, as users tend to "click" on the first results displayed by the search engine.[151]

It is worth well noticing that in literature it has been claimed that not only has competition in the relevant market not been restored, but it has become even more problematic.[152] Google's rivals on the vertical search markets have voiced their concerns about the offering system set up by the organization. Google has a prominent position in its price comparison service, while at the same time relegating competing price comparison services to its search results: Competitive price comparison services appear in Google search results based on Google's general search algorithms. Google has included several criteria in these algorithms and, as a result, competing price comparison services are being downgraded. Google price comparison service is not subject to Google's general search algorithms, nor is it downgraded.

5.3. Google Android

The Commission found three infringements of Article 102 TFEU.[153] First, under mobile application distribution agreements ("MADAs"), Google tied the Google Search and Chrome apps with the Play Store. Second, under the anti-fragmentation agreements ("AFAs"), Google conditioned its licensing of the Play Store and Google Search app on OEMs committing not to develop or sell devices running a non-compatible version of Android (a so-called "Android fork"). Third, Google entered into revenue sharing agreements ("RSAs") with OEMs and MNOs on the condition that they did not preinstall competing general search applications on any device within an agreed portfolio.

[151] Aravantinos, S., Competition law and the digital economy: the framework of remedies in the digital, ib.

[152] Aravantinos, S., Competition law and the digital economy: the framework of remedies in the digital era, ib.

[153] European commission, CASE AT.40099 Google Android of 18.07.2018.

In October 2018, Google filed an appeal to the General Court seeking the annulment of the Commission's decision. Google raised six pleas, contesting each of the three alleged infringements, as well as the Decision's assessment of market definition and dominance, it's fine calculation, and the Commission's procedure.

As we read in the European Commission's press release the General Court dismisses for the most part the action brought by the two companies and upholds the fine imposed by the Commission.[154] First of all, the General Court considers that an undertaking's dominant position alone, even one on the scale of Google's, is not a ground of criticism of the undertaking concerned, even if it is planning to expand into a neighboring market. However, the General Court finds that, by favoring its own comparison-shopping service on its general results pages through more favorable display and positioning, while relegating the results from competing comparison services in those pages by means of ranking algorithms, Google departed from competition on the merits. On account of three specific circumstances, namely (i) the importance of the traffic generated by Google's general search engine for comparison shopping services; (ii) the behavior of users, who typically concentrate on the first few results; and (iii) the large proportion of 'diverted' traffic in the traffic of comparison shopping services and the fact that it cannot be effectively replaced, the practice at issue was liable to lead to a weakening of competition on the market. The General Court also notes that, given the universal vocation of Google's general search engine, which is designed to index results containing any possible content, the promotion on Google's results pages of only one type of specialized result, namely its own, involves a certain form of abnormality. A general search engine is an infrastructure that is, in principle, open, the rationale and value of which lie in its capacity to be open to results from external (third-party) sources and to display those sources, which enrich and enhance the credibility of the search engine.

[154] General Court of the European Union PRESS RELEASE No 197/21 Luxembourg, 10 November 2021 Judgment in Case T-612/17 Google and Alphabet v Commission (Google Shopping)

Next, the General Court considers that the present case relates to the conditions of supply by Google of its general search service employing access to general results pages for competing for comparison shopping services. It states, in that respect, that the general results page has characteristics akin to those of an essential facility inasmuch as there is currently no actual or potential substitute available that would enable it to be replaced in an economically viable manner on the market. However, the General Court confirms that not every practice relating to access to such a facility necessarily means that it must be assessed in the light of the conditions applicable to the refusal to supply set out in the judgment in Bronner, on which Google relied in support of its arguments. In that context, the General Court considers that the practice at issue is based not on a refusal to supply but on a difference in treatment by Google for the sole benefit of its own comparison service and therefore that the judgment in Bronner is not applicable in this case. Lastly, the General Court finds that Google's differentiated treatment is based on the origin of the results, whether they come from its own comparison-shopping service or competing services. The General Court thus rules that, in reality, Google favors its own comparison-shopping service over competing services, rather than a better result over another result. The General Court notes that even if the results from competing for comparison shopping services were more relevant, they could never receive the same treatment as results from Google's comparison-shopping service in terms of their positioning or their display. While Google did subsequently enable competing comparison-shopping services to enhance the quality of the display of their results by appearing in its 'boxes' in return for payment, the General Court notes that that service depended on the comparison shopping services changing their business model and ceasing to be Google's direct competitors, becoming its customers instead.

5.4. Amazon investigation

Most recently, the European Commission has informed Amazon of its preliminary view that it has breached EU antitrust rules by distorting competition in online retail markets.[155] The Commission takes issue with Amazon systematically relying on non-public business data of independent sellers who sell on its marketplace, to the benefit of Amazon's own retail business, which directly competes with those third-party sellers.

The Commission also opened a second formal antitrust investigation into the possible preferential treatment of Amazon's own retail offers and those of marketplace sellers that use Amazon's logistics and delivery services.

Executive Vice-President Margrethe Vestager, in charge of competition policy, said: "We must ensure that dual role platforms with market power, such as Amazon, do not distort competition. Data on the activity of third-party sellers should not be used to the benefit of Amazon when it acts as a competitor to these sellers. The conditions of competition on the Amazon platform must also be fair. Its rules should not artificially favor Amazon's own retail offers or advantage the offers of retailers using Amazon's logistics and delivery services. With e-commerce booming, and Amazon being the leading e-commerce platform, a fair and undistorted access to consumers online is important for all sellers."

As we read in the European Commission's press release Amazon has a dual role as a platform: (i) it provides a marketplace where independent sellers can sell products directly to consumers; and (ii) it sells products as a retailer on the same marketplace, in competition with those sellers.

[155] Press Release, Commission opens investigation into possible anti-competitive conduct of Amazon, (July 17, 2019), https://ec.europa.eu/commission/presscorner/detail/en/IP_19_4291;Press release, Antitrust: Commission sends Statement of Objections to Amazon for the use of non-public independent seller data and opens second investigation into its e-commerce business practices(10 November 2020), https://ec.europa.eu/commission/presscorner/detail/en/ip_20_2077

As a marketplace service provider, Amazon has access to non-public business data of third party sellers such as the number of ordered and shipped units of products, the sellers' revenues on the marketplace, the number of visits to sellers' offers, data relating to shipping, to sellers' past performance, and other consumer claims on products, including the activated guarantees.

The Commission's preliminary findings show that very large quantities of non-public seller data are available to employees of Amazon's retail business and flow directly into the automated systems of that business, which aggregate these data and use them to calibrate Amazon's retail offers and strategic business decisions to the detriment of the other marketplace sellers. For example, it allows Amazon to focus its offers on the best-selling products across product categories and to adjust its offers in view of non-public data of competing sellers.[156]

The Commission's preliminary view, outlined in its Statement of Objections, is that the use of non-public marketplace seller data allows Amazon to avoid the normal risks of retail competition and to leverage its dominance in the market for the provision of marketplace services in France and Germany- the biggest markets for Amazon in the EU. If confirmed, this would infringe Article 102 of the Treaty on the Functioning of the European Union (TFEU) that prohibits the abuse of a dominant market position.

In addition, the Commission opened a second antitrust investigation into Amazon's business practices that might artificially favor its own retail offers and marketplace sellers that use Amazon's logistics and delivery services.

In particular, the Commission will investigate whether the criteria that Amazon sets to select the winner of the “Buy Box” and to enable sellers to

[156] See Geradin D., *What Should EU Competition Policy do to Address the Concerns Raised by the Digital Platforms' Market Power?* (2018). Mandrescu D., *Applying (EU) competition law to online platforms: Reflections on the definition of the relevant market(s),* (2018) Wiewiórowska-Domagalska A., *Online Platforms: How to Adapt Regulatory Framework to the Digital Age?* (2017)

offer products to Prime users under Amazon's Prime loyalty program, lead to preferential treatment of Amazon's retail business or of the sellers that use Amazon's logistics and delivery services.

The “Buy Box” is displayed prominently on Amazon's websites and allows customers to add items from a specific retailer directly into their shopping carts. Winning the “Buy Box” (i.e., being chosen as the offer that features in this box) is crucial to marketplace sellers as the Buy Box prominently shows the offer of one single seller for a chosen product on Amazon's marketplaces and generates the vast majority of all sales. The other aspect of the investigation focuses on the possibility for marketplace sellers to effectively reach Prime users. Reaching these consumers is important to sellers because the number of Prime users is continuously growing and because they tend to generate more sales on Amazon's marketplaces than non-Prime users.

6. Towards gatekeeper regulation: the Digital Service Package

6.1. The first draft of the Digital Service Package

As stated by Margrethe Vestager, the European Commissioner in charge of competition policy: “The world is changing fast and it is important that the competition rules are fit for that change. Our rules have an inbuilt flexibility which allows us to deal with a broad range of anti-competitive conduct across markets. We see, however, that there are certain structural risks for competition, such as tipping markets, which are not addressed by the current rules. We are seeking the views of stakeholders to explore the need for a possible new competition tool that would allow addressing such structural competition problems, in a timely and effective manner ensuring fair and competitive markets across the economy”.[157]

[157] Press release 2 June 2020 Brussels, *Antitrust: Commission consults stakeholders on a possible new competition tool,* available online https://ec.europa.eu/commission/presscorner/detail/en/ip_20_977

This section provides background to the so-called *Digital Service Act Package*[158] aimed at strengthening the single market for digital services and raising the level of competitive innovation on the European online horizon[159].

There are two cornerstones of the intervention, as shall be elaborated in the below.

An initial focus is to regulate platforms in terms of the dissemination of illicit goods/content/services. In this sense, the proposed legislation is in continuity with the existing regulatory apparatus, setting as its goal greater clarity in the allocation of liability in the area of digital services, as well as the introduction of a mechanism that can ensure better enforcement of rules concerning illegal content. The aim is to provide greater protection of users' fundamental rights and limit the dissemination of illegal goods/content and services.

A second focus, entirely innovative compared to the current regulatory framework, is the identification of an initial regulation on the work of *gatekeepers* for the purpose of protecting competition.

In the first respect, the solutions considered are to update the E-Commerce Directive and make the 2018 Recommendations on illegal content on the web binding, or, alternatively, to adopt an effective system of supervision, enforcement and regulatory cooperation between Member States supported at the EU level.

The aim is to resolve certain shortcomings of the E-Commerce Directive. In particular, the proposal would address issues that, although already existing at the time of the adoption of the E-Commerce Directive, are now spreading to a greater extent. One example is the greater spread of *hate*

[158] *Shaping Europe's digital future - The Digital Services Act package*, available online https://ec.europa.eu/digital-single-market/en/digital-services-act-package

[159] De Streel A., Larouche P., The European Digital Markets Act proposal : How to improve a regulatory revolution, mai 2021, Concurrences N° 2-2021, Art. N° 100432, pp. 46-63

speech, and in general the use of platforms to disseminate illegal content and products. In tandem, there are also new emerging issues, unknown when the E-Commerce Directive was initially drafted. First and foremost is the problem of access to information, and the dissemination of harmful and untruthful information by exploiting algorithms in seeking to amplify the spread of the message. The scale of impact of these problems is particularly important if one only considers the audience reach of online platforms and real public spaces in the digital world.

In this respect, despite the sectoral regulations, some aspects remain uncovered. There is still a certain fragmentation of the single market from the point of view of the rules applicable to online platforms, highlighting the need for greater cooperation, and more uniform protection of users' fundamental online rights. This merits an update of the current rules on product safety, labor law profiles, and codes of conduct to counter disinformation and fake news.

As anticipated, it is ex ante regulation[160] that represents the most novel element of the Commission's proposal, which in the attached '*impact assessment'* documents assessed a number of options for possible regulation of *gatekeeper* platforms.

The introduction of supranational regulation is more necessary given that some European countries have begun to formulate national regulations, with a consequent risk of regulatory fragmentation. Article 114 of the Treaty on the Functioning of the European Union (‘TFEU’) could therefore represent the legal basis on which to base a supranational intervention aimed at addressing in a harmonized manner the problem of regulating online intermediation services that are intrinsically and systematically transnational

[160] Digital Services Act package: Ex ante regulatory instrument for large online platforms with significant network effects acting as gate-keepers in the European Union's internal market, June 2020

in nature, while at the same time safeguarding the contestability of the market for innovative companies and new market entrants.

This pillar of action addresses issues such as: (i) excessive dependence of companies on a limited number of online platforms, resulting in a loss of bargaining power vis-à-vis competitors and users; (ii) difficulty to innovate resulting in reduced competition and choice for consumers; (iii) the ability of platforms to extend their dominance indefinitely into adjacent markets.

There are two ways forward. To opt for detailed regulation aimed at greater control of large technology companies, requiring the separation of their core business line from other activities. In this scenario, *self-preferencing* practices could be banned, and Amazon would no longer be able to sell products under its own brand names in its marketplace, where it presumably gives itself preferential treatment, including better positioning in search results.[161] On the other hand, to give up excessive interventionism and limit itself to an amendment of the existing antitrust laws, which would allow for a readjustment of an ex post and cross-sectoral control mechanism.

In the first profile, to be effective, a regulatory choice must provide for sufficiently elastic instruments to adapt to rapidly evolving and changing markets. Even in the case of adopting a *black-list* of prohibited practices, the approach would therefore be to formulate prohibitions in principle, e.g. the prohibition of *self-preferencing* practices or the refusal to contract with competitors, that can be adapted to even different markets and platforms.

Nevertheless, the Commission is also considering the most appropriate regulatory measures in light of the specificities of individual platforms on a case-by-case basis. Once the risks have been mapped, *ad hoc* solutions could be evaluated. The risk of such a solution, however, could be that of excessive regulatory fragmentation - which is precisely what is to

[161] Ibid.

be avoided - in addition to the risk of not always uniform approaches on the part of *public enforcers*, which could leave room for differing treatment depending on the classification of the platform. In fact, it is challenging to identify unambiguous canons for classifying online platforms, and the risk is to leave regulatory gaps.

In the second respect, the Commission's proposal also includes a possible revision of the competition rules with the aim of addressing structural problems resulting from the absence or distortion of competition.

The solutions considered at this early stage are of two types. The first type of instrument could be aimed exclusively at markets that are particularly prone to distortion of competition. The second type of instrument would instead be aimed at all markets, exactly as is the case today with Articles 101 and 102 TFEU. Additionally debated is whether the instrument should only address abuse of dominance, or identify and address all structural competition problems.

Interestingly, the option explored in the proposal was to empower specific regulatory authorities to collect information from *gatekeepers,* regarding certain commercial practices and their impact on consumers and users. This was in order to ensure a deeper examination of the associated competitive dynamics.

6.2. The final text

In its final release, the Digital Service Act (“DSA”) is a horizontal initiative focusing on issues such as liability of online intermediaries for third-party content, safety of users online or asymmetric due diligence obligations for different providers of information society services depending on the nature of the societal risks such services represent.

On the other hand, the Digital Markets Act (“DMA”) is concerned with economic imbalances, unfair business practices by gatekeepers and their

negative consequences, such as weakened contestability of platform markets. Therefore, it complements, rather than replacing, existing competition rules.

The main objectives are confirmed in the last version, namely: to ensure contestability of digital markets, i.e. markets should remain open to new entrants that may substitute or complement the services already offered by the existing platforms; to ensure fairness of the B2B relationship between the digital gatekeepers and their business users, which is defined as a balance between the rights and obligations of each party and the absence of a disproportionate advantage in favor of the digital gatekeepers; to strengthen the internal market by providing harmonized rules across the European Union.

In literature it has been noted that " the DSA does not seem likely to overcome the decade-long paradox of EU law, in which the same entities that are almost demonized by policy-makers (the so-called "GAFTAM") are also asked to contribute to the enforcement of EU rules through algorithmic take-down in contexts that are extremely delicate from the standpoint of fundamental rights, such as those on hate speech or on the protection of copyright[162]. The needed step forward, as will be recalled in more detail below, cannot but contemplate rather invasive forms of real-time inspection of the functioning and behavior of the algorithms deployed by intermediaries. At present, except for what will be said below, EU institutions seem very far from developing this technology-enabled vision of law, let alone proceeding towards its concrete implementation."[163]

The "final" version of the DMA contains several new features compared to the texts approved by the Council and Parliament, respectively.

[162] Vezzoso S., *The dawn of pro-competition data regulation for gatekeepers in the EU*, European Competition Journal, 2021, where the author shares some reflections on the data-related obligations for gatekeepers in the Proposal for a Digital Markets Act

[163] Renda A., *Making the digital economy "fit for Europe"*, Eur Law J. 2021;1–10, available online https://cadmus.eui.eu/bitstream/handle/1814/72338/RENDA_2021.pdf?sequence=1&isAllowed=y

It has been noted in doctrine that the DMA is one of those rare pieces of legislation that ends up being stricter than the Commission's initial proposal. This, in addition to being a peculiarity, is particularly interesting in the concrete case if one considers that already the initial version set rather ambitious enforcement goals. Added to this, then, is the strong lobbying by Big Tech against the European legislator to limit the negative impact on their business as much as possible. Indeed, the lobbying pressure on the European legislator has been based precisely on arguments related to the difficult relationship between innovation and regulation, highlighting a possible negative impact on consumers, including in terms of privacy.

On the other hand, as noted, the European institutions have now reached a broad consensus that something must be done about large digital platforms, particularly because competition law has not been effective in limiting their market power.

Subjectively, the final text of the DMA confirms the previous approach with respect to scope, the list of basic platform services, and the designation of digital gatekeepers under Articles 3.1 and 3.2 of the DMA, except for the addition of two new basic platform services, namely web browsers and virtual assistants. However, introducing a rebuttal procedure in Article 3.4, which has raised not a few concerns in the doctrine about its exculpatory effect.

The final text of the DMA, in fact, defines the concept of gatekeeper by reference to three general qualitative criteria, going on to assess whether a firm (a) has a significant impact on the domestic market; (b) serves as an important entry point for business users to reach end users; and (c) enjoys an entrenched and enduring position in its operations. However, an enterprise is presumed to meet these criteria if it meets certain quantitative thresholds-in which case it is up to the enterprise to rebut the presumption.

It has been noted in the doctrine that relying solely on quantitative criteria to designate gatekeepers is not particularly useful, as these criteria relate to the size of the enterprise in question and do not inform the analysis of whether that enterprise's core platform service is "an important gateway for business users to reach end users".[164] However, relying on quantitative criteria is not so bad if firms that meet those criteria can then demonstrate, based on the criteria in Article 3.6, that they do not meet the general qualitative criteria (i.e., that they do not perform any gatekeeper function) because, for example, end users and business users move across multiple platforms. This was essentially the approach presented in the Commission's DMA proposal. However, the final version of the DMA modified this approach. Recital (23), in fact, states that in the rebuttal process "the Commission should consider only those elements that relate directly to the quantitative criteria, i.e., the firm's impact on the internal market beyond revenue or market cap, such as its size in absolute terms and the number of member states in which it is present the extent to which the actual number of business users and end users exceeds the thresholds and the importance of the firm's core platform service, considering the overall scope of activities of the respective core platform service; and the number of years for which the thresholds have been reached."

In terms of the obligations imposed on gatekeepers, among other things, the DMA will obligate them to (a) allow users to download apps from the Internet and third-party app stores; (b) allow app developers to use the in-app payment solution of their choice and promote offers to app users; and (c) provide access to the app store on fair, reasonable and non-discriminatory (FRAND) terms. These obligations, which go in the direction of addressing

[164] GERARDIN D., *The leaked "final" version of the Digital Markets Act: A summary in ten points*, in The Platform Law Blog, 19 april 2022, available at https://theplatformlaw.blog/2022/04/19/the-leaked-final-version-of-the-digital-markets-act-a-summary-in-ten-points/

concerns expressed by app developers in recent years, will force Apple and Google to change their app store guidelines substantially.

There is a new (and far-reaching) interoperability obligation for gatekeepers providing number-independent interpersonal communication services i.e., messaging services. In these cases, the gatekeeper will, under certain conditions, have to interoperate with rival messaging services, so that, for example, a user of the gatekeeper's service will be able to send text messages to the user of a rival service-but this should not compromise the end-to-end encryption of communications. More generally, the DMA includes very stringent interoperability obligations.

The DMA leaves sufficient time for companies to comply, with a view to, among other things, also allowing time for the Commission to provide more precise guidance and appropriate clarifications. In particular, Recital 76 (b) provides that: "The Commission may develop guidelines to provide further guidance on different aspects of this Regulation or to assist undertakings providing core platform services in implementing their obligations under this Regulation. Such guidance may be based on the experience gained by the Commission through monitoring compliance with this Regulation."

Therefore, as is usually the case, the Commission will most likely wait until it has accumulated sufficient experience in the implementation and enforcement of the DMA before drafting guidelines.

Also of particular importance from this perspective is the possibility of a regulatory dialogue, which has been included in the final text of the DMA, but with a significant caveat, which could in turn reduce its effectiveness: the Commission will have the discretion to decide to initiate such a dialogue, subject to the principles of equal treatment, proportionality, and good administration.

Article 31(b)(7) of the DMA provides that a national competition authority ("NCA") may, on its own initiative, conduct an investigation into a case of possible non-compliance with Articles 5, 6, and 6a of this Regulation in its territory. However, the initiation of a DMA proceeding by the Commission exempts the NCA from conducting such an investigation or concluding it if it is already underway. In other words, while NCAs will be able to launch an investigation into the possible violation of the above provisions, only the Commission will have the power to adopt an infringement decision, as well as to impose relevant remedies.

The DMA provides a mechanism to ensure a consistent regulatory approach across different regulatory instruments. Under Article 31d, the Commission establishes a high-level group for the DMA that can provide advice and expertise to the Commission to ensure a consistent regulatory approach. This is a very important and welcome development, as issues addressed in the DMA can be inextricably linked to privacy considerations, to give one example.

Compared to the original DMA proposal, the final version provides a stronger role for third parties, such as businesses or end users. While there is no formal complaints procedure, Article 24(a)1 of the DMA provides that "any third party, including business users, competitors or end-users of the main platform services identified pursuant to Article 3(7) of this Regulation, as well as their representatives, may inform [...] the Commission of any practice or conduct of gatekeepers that falls within the scope of this Regulation."

Finally, while not comprehensively addressing the issue of private enforcement, the DMA recognizes that national courts will be called upon to enforce the regulation in the context of (private) litigation. Article 31c thus provides a mechanism for the Commission to cooperate with national courts to ensure consistent application of the DMA, mirroring Article 15 of Regulation (EC) No. 1/2003 on cooperation between the Commission and

national courts in competition law matters. In this context, national courts cannot make decisions that conflict with Commission decisions under the DMA.

6.2.1. Conclusion on DSA and DMA

If one looks at this issue from a political perspective, it seems that the time is ripe to try to follow the impassable path of *ex ante* regulation.[165] The US seems to be heading in this direction, where, on 6 October 2020, a US Congressional Commission published a report on how America should update its competition law.[166]

A first knot that countries wishing to follow the path of regulation will then have to unravel is that of identifying a definition of *gatekeeper that* can be unequivocally applicable, and which can stand alongside the traditional category of "dominant position". In this sense, the introduction of a quantitative parameter could certainly help to draw a clear line in the subjective scope of the reform, although different values could be taken into

[165] Reference is made to numerous studies produced by different countries in recent years. *Inter alia*, UN IGF Dynamic Coalition on Platform Responsibility, United Nations Internet Governance Forum, *Platform Regulations How Platforms are Regulated and How They Regulate Us Official Outcome*, Geneva 2017 available online: https://juliareda.eu/wp-content/uploads/2019/09/Reda2017_Platform-regulations-how-platforms-are-regulated-and-how-they-regulate-us3.pdf; Australian Competition and Consumer Commission, *Digital platforms inquiry,* 2019, available online https://www.accc.gov.au/focus-areas/inquiries-ongoing/digital-platforms-inquiry; French Competition Authority, *Contribution to the debate on competition policy and digital challenges*, 2020 available online https://www.autoritedelaconcurrence.fr/sites/default/files/2020-03/2020.03.02_contribution_adlc_enjeux_numeriques_vf_en_0.pdf; German Commission 'Competition Law 4.0', *A new competition framework for the digital economy*, 2019, available online https://www.bmwi.de/Redaktion/EN/Publikationen/Wirtschaft/a-new-competition-framework-for-the-digital-_economy.pdf?__blob=publicationFile&v=3; Stigler Committee for the Study of Digital Platforms, Market Structure and Antitrust Subcommittee 2019 available online https://research.chicagobooth.edu/stigler/events/single-events/antitrust-competition-conference/digital-platforms-committee .

[166] Online Platforms and Market Power: Part 6: Examining the Dominance of Amazon, Apple, Facebook, and Google, 29 July 2020, available online https://judiciary.house.gov/uploadedfiles/competition_in_digital_markets.pdf .

consideration such as the number of users, revenue, accumulated data (more difficult to measure).

On the other hand, as repeatedly raised by the tech giants in their comments on the draft European regulation, the risk to be averted is that of trapping gatekeepers in a 'legal straitjacket', which could ultimately limit the incentive for innovation. This, after all, is the ultimate dilemma of regulation.

What is apparent is that fast-moving technological markets require equally fast and elastic instruments, and the development of effective rules will take time. Perhaps no less time than antitrust proceedings. But as has been correctly observed on several occasions, it would be a historical anomaly if technology were not regulated, as other systemically important sectors were before.[167]

In this context, there is a clear risk of "paradoxical" enforcement in the context of digital markets. The attempt to find a one-fit-all notion of a digital platform to encompass all relevant actors risks over-enforcement. The Commission's reports (summarized in the image below) show the difficulty of contextually encompassing platforms that, while united by their disruptive effects in the marketplace, have little more in common, with the risk of creating an environment of regulatory uncertainty in which smaller firms are the ones who discount the price. This is in the face of defensive compliance that may ultimately curb, in the case of less risk-prone firms, the drive to innovate.

[167] Interesting on this point is the in-depth article on the American political situation in The Economist, *Ex-antics Google, antitrust and how best to regulate big tech,* 7 October 2020

Table 3: Designated gatekeepers when considering market capitalisation, turnover and number of CPS in the DMA

bruegel

	Google	Amazon	Microsoft	Apple	Facebook	SAP	ORACLE	NETFLIX	AIRBNB	TWITTER	ZOOM
European Commission proposal	y	y	y	y	y	y	y	n	y	n	y
Council of the EU position	y	y	y	y	y	y	y	n	y	n	y
Schwab proposal	y	y	y	y	y	n	n	n	n	n	n
IMCO position	y	y	y	y	y	y	y	n	n	n	n

	SPOTIFY	SALESFORCE	UBER	BOOKING HOLDINGS	EXPEDIA	PayPal	Ebay	Zalando	Yahoo (Verizon)	Slack	Vivendi
European Commission proposal	n	y	n	y	n	y	n	y	y	n	y
Council of the EU position	n	y	n	n	n	y	n	n	y	n	y
Schwab proposal	n	n	n	y	n	n	n	n	y	n	n
IMCO position	n	y	n	y	n	y	n	n	y	n	y

Source: Bruegel. Note: The thresholds considered for each of the proposals were as follows, for EEA turnover and market capitalisation, respectively. For the EC proposal, €6.5 billion and €65 billion; For the Council proposal, €6.5 billion in each of the last 3 years and €65 billion; For Schwab's first proposal, €10 billion and €100 billion; For IMCO's final agreement, €8 billion and €80 billion. Note that the turnover figure specifically for the EEA is still challenging to obtain with the available data, but we tried to approximate it as much as possible. The criterion 'the presence in at least 3 Member States of the EU' has been assumed as being always fulfilled since this is the case to the best of our knowledge. The number of CPS we considered for each firm can be seen in Table 4.

All in all, the dominance in its declination as gatekeeper is no longer just a special responsibility to other enterprises and users but is also a responsibility in terms of "self-determination": in these "city-states" it is the platform itself that must dictate rules and have to make sure that they are respected.

CHAPTER IV

DIGITAL REVOLUTION: HOW DISTRIBUTED LEDGER TECHNOLOGIES ARE CHANGING THE WORLD AND THE LEGAL LANDSCAPE

1. INTRODUCTION

In Chapters II and III, the thesis illustrated how big data, as the foundation of the business models of online platforms, has received increasing attention, through numerous reports produced on the subject, and experienced a gradual regulation. This process of understanding has culminated most recently with the adoption of the Digital Markets Act and Digital Service Act as important building blocks for the regulation of digital platforms.

In this chapter the thesis will analyze the case of distributed ledger technologies in the light of their different state of understanding and regulation.

In particular, the following paragraphs will show how these technologies, with their highly disruptive impact, are still experiencing a phase of strong expansion in which regulatory intervention may still be premature. In addition, attempts to analyze the phenomenon will be provided in order to understand how current regulatory tools, net of the latest interventions, can alone suffice to regulate and safeguard competition.

2. THE PRO-COMPETITIVE PROMISES

The Blockchain phenomenon, in the context of Distributed Ledger Technology (DLT), lends itself to being welcomed in various fields of application. Blockchain is destined to have a significant impact in diverse sectors, finding its use for instance not only in transactions involving money, goods and property rights, but also as a tool for voting, for the conclusion of

independently enforceable agreements,[168] and for the certification of production chains or documents.[169] The main advantages of *blockchain* systems have been found in the elimination of the risks associated with the violation of the archive referable to the distributed ledger, through a decentralized system in which several copies of the same transaction are stored (so-called process integrity). Blockchain presents the ability to trace a precise chronology, being able to retrace the different moments of the ledger in time and in the absence of a central entity certifying and regulating the system.[170] An essential characteristic is that the archive of which the blockchain comprises can only be updated in the presence of two circumstances. First, in the presence of the correct application of credentials, i.e. a private and public key together. Second, the credentials must be verified by the majority of network participants. As a result, it is only possible to update the archive when the majority of independent computers verify those credentials that allow a new block to be added, thus ruling out possible vulnerabilities and averting the possibility of external actions aimed at corrupting the archive. In some cases, blockchain technology has been embraced as a form of 'democratization' of the information acquisition process, although in practice, as will be seen in the below, there are several dynamics that could subvert this idealistic vision.

In this sense, it has been pointed out in discourse how *Blockchain* technology presents itself, at least in its original declination, as a paradigm destined (i) to resolve many of the critical issues that have emerged in the era of *online* platforms for which antitrust doctrine and decision-making

[168] One thinks of the possibility of programming *Smart Contracts* by writing a code on the Ethereum *Blockchain*.

[169] In this sense, one thinks of the possible use in the certification of the provenance of luxury goods. The producer of the good could connect it to a *Blockchain*, developed by himself, and trace the people who gradually own it, in order to secure the purchase of the used good, whose origin can thus always be guaranteed.

[170] OECD, Diractorate for financial and enterprise affairs competition committee, *Blockchain technology and policy* in *Issues paper by the Secretariat*, 2018 available *online www.ocse.it/documents.*

practice still struggle to find a correct framework; (ii) to open up to new competitors markets historically characterized by high barriers to entry and increase the competitive pressure exerted on operators holding consolidated market power.

3. Blockchain: antithesis of digital platforms?

Blockchain stands as a technology inspired by competitive logic, which could be suitable for subverting some of those mechanisms of the so-called feedback loop and 'competition for the market', which underlie not only virtuous circles, which could ultimately result in a benefit for consumers, but also the unstoppable rise to power of the "Internet giants".[171] In the context of online platforms*,* in fact, big data, properly collected and exploited, represent an essential input controlled by market-dominant companies and, according to one interpretation of the phenomenon, could be suitable to create barriers to entry and facilitate the exploitation of consumers. Through their use, companies can gain control of a different market, becoming true *gate-keepers*.

It is clear that a system such as the *Blockchain,* characterized by decentralization, disintermediation, transparency and immutability in transactions, is in many ways the antithesis of the model described so far.

[171] According to some reconstructions of the phenomenon by the doctrine, the virtuous circle, on which the power of large *online* platforms is based, starts from the greater information on the characteristics of supply and demand from which derives a more efficient service offered by the *matchmaker*. Hence, the more users attracted to the platform and the greater the overall volume of information they release to the platform, the greater the quality of the services offered by the *providers*. The massive collection of data, fuelled by the improvement in the quality of the services offered to users, would in fact enable platforms to attract a growing number of advertisers to whom they could offer advertising spaces increasingly in line with users' preferences and purchasing habits and, therefore, more functional to *behavioral targeting*: the revenues deriving from this side of the platform would enable *providers* to sustain the investments necessary to guarantee continuous updates and technological advancements of the platform and, in this way, preserve their customer portfolio and attract new ones. See on this point Colangelo G., *Big data digital platform and antitrust*, in *Concorrenza e Mercato*, vol. 23, 2016, 425 ss, and Pitruzzella G., *Big data competition and privacy a look from the antitrust perspective,* in *Big data and competition*, in «Concorrenza e Mercato», 23, 2016, 15 ss.

The most macroscopic difference lies in the different access to data. At the basis of distributed ledger technologies lies generalized access to all data concerning past transactions. In principle, this could pave the way for a scenario with reduced information asymmetries and imbalances in the trading power of traders. In 'first generation' *blockchain* systems, each user holds all past information, and no operator can acquire information at a centralized or exclusive level and use it as leverage for further strengthening of market power[172]. However, while the data are accessible to all, in practice only a few companies might have the tools to extract the information content from them. As a result, the system would be brought back to a paradigm of centralisation in the control of information.

The increased 'democratization' of data access, and the substantial non-modifiability of the repository have a considerable impact, also in terms of data portability. Operators interacting on the Blockchain system, be they users or application developers, are able at any time to decide to switch from one 'fork' to another[173] or to leave the Blockchain in favor of a different platform, without incurring high transmigration costs and without risking the loss of data acquired up to that moment. In addition to this, as has been widely noted within the discourse, in the face of a reduction in fixed costs, and a variation in the economic incentives that drive the different operators acting in the *Blockchain* ecosystem, it is likely that there may be reductions in economies of scale and *network effects*, as essential aspects in the establishment of a position of dominance in the digital dimension.[174]

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[172] Lianos I. , *Blockchain Competition - Gaining Competitive Advantage in the Digital Economy: Competition Law Implications*, in Hacker P., Lianos I., Dimitropoulos G. and Eich S., *Regulating Blockchain: Political and Legal Challenges*, Oxford, 2019, 12.

[173] This refers to the possible bifurcation of the blockchain as a result of the authentication of the new transaction by different *miners*, as well as cases of voluntary bifurcation by members of the *blockchain* system.

[174] Catalini C. , Gans J.S., *Some Simple Economics of the Blockchain*, in *Rotman School of Management Working Paper*, *MIT Sloan Research Paper*, vol. 5191-16, 2017, 12. For a widespread dissection of the different competitive dynamics that connote the *Blockchain* and *online* platform dimensions, see Lianos I. , *Blockchain Competition,* cit., 1-20, where in particular the author underlines how "*An important difference between the traditional centralized platform model and blockchain is that*

4. More competitive pressure and open markets, or old giants in disguise?

Blockchain would seem to be able to open up competition to new players in sectors characterized by the presence of a few companies, banks above all, with great market power, such as the financial sector. The promise of total disintermediation based on a new concept of trust[175] would seem to be able to reduce transaction costs and represent an important competitive pressure against intermediaries in the most diverse sectors. For instance, distributed ledger technology could allow new *fintechs* to enter the financial services market by providing a specific service, such as digital payments, traditionally offered by a few dominant firms, and position themselves as direct competitors. In this sense, we need only think of the effect of the *Payment Service Directive* (PSD2) in terms of *Open Banking,* which has provided for the sharing of data between different players by requiring banks to open their *Application Program Interfaces* (APIs) to *fintechs,* allowing *third-party providers* to access indispensable channels to gain access to the bank's customer data and build their own products and services. The spread of the *Blockchain* system could go in the same direction, through an *ab origine,* distributed and *open source* ledger, without the need for *ex post* regulatory intervention.

A good example of the new competitive pressure *incumbents* are under is the case of cross-border payments[176]. This is an area where the

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users of the latter are less anchored to the specific platform because of the risk of losing the data it contains. This may harm the users to the extent that the harvesting of data contributes to higher performance, as, for instance, search results become more personalized and irrelevant advertising is excluded. [...] Contrary to centralized platforms, where users are averse to switching, the replicability of data makes it easier for blockchain to switch to competing forks and abandon the older version of the blockchain. ".

[175] The trust is based on a 'cryptographic proof', whose risk of tampering is minimized, since once a transaction is recorded within *Blockchain*, it will become unchangeable and visible to all users see Nakamoto S., *Bitcoin: A Peer-to-Peer Electronic Cash System*, 2008.

[176] See in this respect the in-depth article by Faden M., *The Future of Cross-border Payments: Ripple versus SWIFT*, accessible *online* https://www.americanexpress.com/us/foreign-exchange/articles/ripple-vs-swift-gpi-cross-border-payments/.

financial communication service provider SWIFT has been in a dominant position for more than 40 years. However, the increasingly pressing need for banks to offer more efficient cross-border payments has led to the emergence of new competitors. This is the case with Ripple, the leading *fintech* start-up experimenting with the use of *blockchain* technology for cross-border interbank payment transfers. In response to this competitive pressure, SWIFT is working to accelerate payments on its network with the SWIFT *global payments innovation* initiative, which promises same-day transfers, transparent fees and payment tracking. Whilst being a clear example of how *blockchain* technology can open up markets to new competitors, the Ripple case highlights how, in practice, the promise of disintermediation lends itself to being easily circumvented, and how market access by *fintechs* is far from easy. Ripple, in fact, is a cryptocurrency entirely sponsored by large multinationals, including American Express, for whom such technological innovation represents a means of consolidating market power.

Any consideration of the competitive implications of the *Blockchain* paradigm must pass through an analysis of the concrete dynamics. This is so in order to assess whether the development of fully decentralized *Blockchain* products can be sustained by *start-ups* or whether it requires investments that are unlikely to be sustained, except in *partnership* with more powerful players.

5. The playing field: markets and stakeholders

The preceding commentary demonstrates that behind a pro-competitive assessment of the *Blockchain* tool, problems arise from the actual use of the technology. If what has been said is true, it is necessary to clarify that under the general notion of *Blockchain,* it is possible to bring back different technologies that are constantly changing and evolving. An in-depth analysis reveals a series of side effects, with possible anti-competitive repercussions.

Blockchain technology brings about the emergence of an autonomous ecosystem whereupon different economic actors operate. This is driven by competitive incentives peculiar to the system, and not always traceable to a price mechanism. One of the main difficulties in addressing the issue of its impact from a competitive perspective lies, therefore, in the application of ordinary market analysis tools. In the case of the *Blockchain*, as is generally the case in the digital economy, the relevant market does not seem to be identifiable on the basis of the analysis of monetary transactions, since the interests pursued by the actors involved and the means of acquiring power are different. As is commonplace in the digital economy, the absence of a price mechanism makes the application of the traditional SSNIP test and hypothetical monopolist test unsuitable[177]. The same criterion of quotas could prove inadequate since it is incapable of capturing market situations subject to sudden changes in competitive assets and the emergence of new players in addition to innovation scenarios[178] . In this sense, a more relevant parameter could be that of the shares of control of transactions and/or operations conveyed through *Blockchain* technology, which would have important repercussions in merger control matters.

That said, wanting to try to reconstruct the dynamics within the *Blockchain* in terms of the *value chain,* it is possible to imagine a series of

[177] Whish R. , Bailey D. , *Competition Law,* Oxford, 2012, 25 ff. With reference to the digital economy the alternative proposed in doctrine is the recourse to the parameter of the quantitative measurement of quality, with the use of a SSNDQ ("*small but significant non-transitory decrease in quality*"), albeit with all the doubts concerning the legal ineffability of the concept of "quality", cf. Colangelo G., *Big data digital platform and antitrust,* cit. See also Pitruzzella, *Big data competition and privacy a look from the antitrust perspective,* cit.

[178] As in the case of so-called *data-driven* companies where market power is attributed not so much by the mere possession of data, but by its *data mining* capacity, i.e. its ability to collect and manage large amounts of end-user data, transforming them into economic value. See Bogdan K., *Big Data and EU Merger Control - A Case Review*, in *Journal of European Competition Law & Practice*, vol. 8 (8), 2017, 479-491; Directorate for financial and enterprise affairs, *Big data: bringing competition policy to the digital era*, *Background note by the Secretariat*, 2016.

'markets'[179] concerned, as shown in the graph (*below*): (i) a 'market' of the upstream product developed through the *Blockchain* technology (cryptocurrency market); (ii) the sub-'market'of the transaction authentication so-called *mining* activity; (iii) the 'markets' of complementary services provided through *Blockchain* technology; (iv) the 'market' of downstream intermediation services that interpose themselves between the *Blockchain* product market and end users, or between the *Blockchain* product market and that of complementary services. At the moment, there is no shortage of cases of vertical integration which could be at the root of exclusionary practices. This happens when *Blockchain* developers link additional services to a cryptocurrency. Such as in the Ripple case, which simultaneously provides a cryptocurrency, XRP, and services via the platform, such as the instant transfer of large amounts of money, an exchange network and money transfer. (v) Alongside these are a series of adjacent markets indirectly influenced by the *Blockchain* phenomenon (highlighted in orange in the graph *below*).

Within the 'markets' identified in this way, different operators move, for each of which it is necessary to ask the question as to whether they fall within the notion of ‘relevant enterprise’ for antitrust purposes that has become established at the European level.[180] On closer inspection, in fact, *Blockchain* is a technological paradigm, and any consideration of possible anti-competitive scenarios within the ecosystem is intended to refer to the operators within the *network*. In this regard, in the absence of a definition in the Union Treaties, the interpretation by the Court of Justice and the decision-making practice of the European Commission include, in the notion

[179] The reference to the notion of 'market' is meant in a broad sense, to identify a potential benchmark in the reconstruction of a *value chain* within the Blockchain ecosystem. However, it is evident how in such dynamic and constantly evolving sectors it is particularly difficult, if not impossible, to define the markets within which to apply competitive discipline.

[180] CJEU, Sixth Chamber, 23 April 1991, *Case Höfner and Elser v Macrotron GmbH*, C-41; CJEU, Judgment of the Court of First Instance, Third Chamber, Extended Composition, 8 July 2008 *AC-Treuhand v Commission*, Case T-99/04.

in question, any subject exercising an economic activity consisting in offering goods or services on a given market[181] . In particular, the question is whether the activity relating to the *Blockchain* sector can be considered economic since the qualification must always be carried out separately for each activity exercised by each subject, with the possibility that different regimes may apply depending on different activities carried out by the same subject[182] .

The approach that has emerged at the European level is a functional one, emphasis is placed on the type of activity carried out rather than on the characteristics of the operator carrying it out. It is also irrespective of the for-profit or economic purpose, the legal *status* and the mode of financing of the entity[183]. In the case of operators active in the 'markets' identified within the *Blockchain* ecosystem it does not matter that in some cases services are offered free of charge. For an activity to qualify as ‘economic’, however, it must be exercised by a private entity and outside of a public interest and the exercise of the powers of a public authority[184] .

5.1. The 'market' upstream of the Blockchain product

At the beginning of the *value chain,* it is possible to imagine a *Blockchain* product/service market[185]. A product using *blockchain* technology can be considered a substitute for other products using the same technology if there is interchangeability between them[186]. This could be the case with

[181] Pace L. , *Dictionary of Competition,* Naples, 2013, 47.

[182] Pace L. F., *Systematic Dictionary of Competition*, cit. , 13 ff.

[183] Whish R. , Bailey D. , *Competition Law,* Oxford, 2012, 83.

[184] *Inter alia* CJEU, 18 March 1997, Case *Diego Calì & Figli Srl v Servizi ecologici porto di Genova SpA (SEPG),* C-343/95.

[185] Commission Notice on the definition of the relevant market for the purposes of Community competition law, *Official Journal- C 372*, 9.12.1997, 5-13 '*the relevant product market comprises all those products and/or services which are regarded as interchangeable or substitutable by the consumer, by reason of the products' characteristics, their prices and their intended use*'.

[186] Whish R. , Bailey D. , *Competition Law*, cit, 33 ff. On this point Halaburda H., Sarvary M.. Beyond *bitcoin: The economics of digital currencies,* Berlin, 2016, 3 ff., where some business models of large *online platforms* and the characteristics of digital currencies recently introduced by these platforms are analyzed in order to draw the boundaries between platform-based currencies and centrally issued money.

systems that provide alternative cryptocurrencies in terms of demand, as in the case of Bitcoin and Ethereum[187] .

It is interesting to note that *blockchain* technology represents a candidate to be a substitute for products belonging to different markets. An example includes Bitcoin potentially substituting financial instruments distributed by intermediaries at a centralized level, or digital payment instruments.[188] This substitutability is currently only potential in terms of demand, in light of the fact that, despite its incredible diffusion, there still remains a certain diffidence on the part of users towards the large-scale purchase of financial instruments through totally disintermediated channels.

The active players in this market are the developers of *blockchain* technology (so-called *writing apps*) who are attracted by the prospect of potential future profits generated by the appreciation of the value of the native *token.* They are on the one hand competing with each other for a position of dominance, from which to derive high levels of profitability and a sustainable long-term competitive advantage[189] , and on the other hand potentially competing with intermediaries of similar services operating at a

[187] The most relevant and competing cryptocurrencies are Bitcoin, Ethereum, Litecoin, Dash, and Ripple. At least 500 different cryptocurrencies are currently in circulation according to https://www.worldcoinindex.com/.

[188] In this regard, the nature of cryptocurrencies is debated. According to the thesis shared in this contribution, the nature would be that of a financial instrument, in light of the different functions performed with respect to currency. In particular, according to CONSOB's institutional website http://www.consob.it/web/investor-education/criptovalute: "*the high volatility of cryptocurrencies certainly does not allow for the proper performance of the 'unit of account' function: the prices of the main cryptocurrencies are subject to very large fluctuations, even within the same days. It is therefore highly inefficient, not to say impossible, to price goods and services in units of cryptocurrency. As far as the store-of-value function is concerned, one has to consider that, as they are designed, the more they are used to pay for goods and services, the more they will increase in value. This is because the number of units of cryptocurrency that can be produced is limited (the creation of new cryptocurrency is contained and reduces over time); it follows that the more transactions are settled in cryptocurrencies, the greater their value will be. Finally, they are not a commodity currency, i.e. they do not also have a use function, like gold, for example. Instead, they may increasingly fulfil an exchange function in the near future*'.

[189] Some authors in particular have referred to an architectural competitive advantage, see on this point Lianos I. , *Blockchain Competition,* cit*. ,* 33 ff*.*

centralized level. Developers therefore offer a service on the market and, in the light of the functional approach referred to, it is not decisive that they operate without the aim of making a profit, as in the case of the Ethereum Foundation, since the economic nature of the activity carried out can only be excluded in the case of solidarity or public interest activities.

5.2. The 'market' for *miners*

Within the *blockchain* product 'market', it is possible to identify a possible sub-market, that of so-called *miners* (*infra*). In some types of technology, so-called nodes, physically consisting of the *servers* of each participant, can perform the function of *miners.* These are operators that execute a cryptographic programme in order to verify the authenticity of a transaction within the decentralized ledger, through a complex calculation required to add a new block to the chain. It is an activity that requires considerable computational energy, which grows exponentially the more blocks are added, and for which specialized companies have come into existence, as well as consortia of independent *miners in order to* optimize the use of resources.

Anyone, in the case of a public, or *Permissionless Blockchain*, can become a *miner* and can compete to be the first to solve the complex mathematical problem of creating each new block of transactions that can be added to the *Blockchain*. The *miners* then compete with each other and are driven by an incentive system based on a *venture capital* model whereby initial contributors earn tokens in exchange for the resources (capital and time) required for the operations of the platform. Following the initial process of *blockchain* development, *miners are* initially compensated with native *tokens,* and are subsequently compensated with the payment of transaction fees. It follows that even in the case of *miners,* and as far as the specific activity of *mining is concerned*, consisting of the utilization of computational resources for the validation and storage of transactions towards the payment

of a token, there are no considerations that preclude the notion of an enterprise. In the same way, similar considerations can be extended to the case of so-called *mining pools*, groups of *miners* who act in an aggregate manner in order to cope with the high demand for energy and computational power that is required to successfully complete the activity of *mining*[190] .

5.3. The 'markets' for complementary services provided through blockchain technology

It is also possible to imagine complementary 'markets' with respect to the 'upstream' product. The main reference is to Ethereum's *Blockchain* through which it is possible to build and develop decentralized applications, *Decentralized Applications* (or *DApps),* and programme *Smart Contracts*[191] through a code that is executed by the nodes that are part of the *Blockchain*. In this sense, a 'market' could be identified with reference to specific services offered through *Blockchain* technology.

Ethereum, in fact, opens up a new business dimension for application developers by allowing new players to enter the market, and by strengthening established players through innovative products. In this sense, for example, Nintendo, Microsoft and Electronic Arts are developing games on Ethereum; the insurance company AXA is experimenting with the use of Ethereum for a flight insurance; important banking institutions, such as UBS, are launching a project on Ethereum aimed at facilitating the collection of

[190] *Mining* has become a real business activity that has mobilized huge investments. Consider the case of tycoon Alexey Kolesnik, who recently bought two power plants in Central Russia with the intention of using them solely for the production of energy for his *mining* operations.

[191] In particular, *Ethereum* is an open (or *Permissionless*) *Blockchain* platform aimed at the use and construction of applications intended to be used through the technology itself and in particular *smart contracts*. In this regard, LIPSHAW J., *The persistence of "dumb" contracts*, in *Suffolk University Law School Research Paper*, vol. 18-11, 2018, 11, available *online* https://ssrn.com/abstract=3202484 notes that the idea of *Smart Contracts* stems from the need to crystallise contractual rights in *hardware* and *software in* order to give them a high level of certainty given the fact that they are digitally stored, and ultimately make the breach of contract so economically prohibitive that it would be of no interest whatsoever. The author's indicative comparison is that of the '*vending machine*', as a direct ancestor, where the machine collects the currency, dispenses the service, gives the change, with a sufficient level of security to protect the transaction from attack.

data on their affiliates[192] . In the case of application developers, the applicability of the notion of company may vary from case to case depending on the specific activity carried out. In some cases, referability to a public activity may lead to exclusion from the notion of enterprises, as for example in the case of the use of Ethereum for certification purposes by public bodies, in the exercise of their prerogatives. This is the case of the University of Cagliari, which has started to ensure the validity and integrity of European degree certificates thanks to the Ethereum Blockchain.[193]

5.4. The 'market' for brokering services

A downstream 'market' of intermediary services can therefore be identified. These services weave themselves, on the one hand, between the Blockchain product market and the end users, and on the other hand, between the Blockchain product market and the market for complementary services.

In the first aspect, one can think of a 'market' of exchange services, which allow the exchange between different cryptocurrencies or between legal tender and cryptocurrencies, as in the case of *Digital Wallets* services that allow the exchange of native *tokens* between different *Blockchain* technologies, enabling the development of digital *marketplaces.* At the Bitcoin level, several companies provide this service, such as ArcBit, Bitcoin core, Bitcoin Knots, which provide applications that can be downloaded for free on a *device*. In some cases the brokerage service is offered through the sale of *hardware* devices*,* equipped with the necessary tools to access the technology (e.g. Digital Bitbox, LedgerNano S).

At the same time, interface services could be inherent in a 'market' of services enabling merchants to accept cryptocurrency payments through

[192] See https://etherevolution.eu/

[193]See http://www.ansa.it/sito/notizie/tecnologia/tlc/2018/07/18/cagliari-certificati-laurea-blockchain_d49816bd-7432-4bb9-8cd1-3bdddd3ca44b.html

third party payment intermediation (TPP) so-called *Payment Gateways For Merchants* (such as Bitpay, Coinbase *etc.*). In all these cases, irrespective of whether they are free of charge, they are enterprises providing a service on the market and thus fall within the notion of an enterprise. As seen in the Ripple case *supra,* some of these services are offered by the developers of the upstream product themselves.

In the second aspect, the intermediation service can be aimed at connecting *blockchain* technology with a complementary service to be offered to end users. Take the case of DApps and *Smart Contracts* developed on Ethereum. The Ethereum *Blockchain* has no relationship with the outside world, and several services have emerged to address the need to obtain precise information outside the technology and to connect it with real data. *Smart Contracts*, in fact, perform a logical function on the *'if-this-then-that'* model, and therefore need to receive information about a given contractual situation and its evolution in order to be able to fulfill the consequential and deterministic conditions embedded in the *Blockchain* through code language. Furthermore, the development of DApps requires, on the one hand, reliance on a decentralized *network* such as the *Blockchain* and, on the other hand, the collection of data through user interaction via Web APIs[194] . This interface service is carried out for instance by companies offering *Oracle* services, such as *Oraclize,* whose use is made perfectly clear by the advertising *claim* that '*Smart contracts live like in a walled garden, they cannot fetch external data on their own. Oraclize is here to help. We act as a data carrier, a reliable connection between Web APIs and your Dapp. There is no need to open additional trustlines as our good behavior is enforced by cryptographic proofs*'.[195]

A further example is provided by the Ethereum Virtual Machine (EVM) as a component that allows code to be executed on Ethereum, through

[194] Mik E., *Smart contracts: Terminology, technical limitations and real world complexity*, in *Law, Innovation and Technology*, vol. 9 (2), 2017, 269-300.

[195] See website http://www.oraclize.it/#services.

software that creates a virtual environment that emulates the behavior of a physical machine.

Service providers operate in these sectors, exercising a specific economic activity consisting of offering a complementary service and subject to competition discipline.

5.5. Adjacent markets

Finally, in the context of markets, it is necessary to refer to a number of markets that are collaterally affected by the phenomenon. These are, in particular, the markets for products in potential or current competition with the specific *Blockchain* product. To return to the Bitcoin example, the market for financial instruments that can be considered substitutable by consumers, or for digital payment instruments.

At the same time, it is interesting that the technology under scrutiny may also have an impact on product markets that perform the essential *input* function upstream, as in the case of the electricity needed to complete the computational operations underlying the technology or the market for Internet access needed to use the platforms. The impact, in this case, may be indirect, entailing an increase in demand, and thus a readjustment of the competitive equilibrium, but also direct if it leads to vertical integration, in order to allow companies active in the *blockchain* product market to access the input directly.[196]

[196] See footnote 124 *above*.

Chapter VI

Regulation of digital payments: the case of pagopa

1. Introduction

In the previous chapters the thesis illustrated the theoretical background underlying the relationship between regulation and innovation (Chapter I) and showed how in practice this relationship passes by a deep understanding of each and every disruptive innovation.

In particolar, the thesis demonstrated how a broader regulation of digital platforms has been possible only after several years of technical studies and reports - combining different knowledge - which allowed a deep insight into these business models. In the meanwhile, however, the enforcement of competition law by European authorities has played an important role in providing “rapid” solutions for tackling the phenomenon (Chapter II and III).

Furthermore, the thesis illustrated how distributed ledger technologies could represent an opportunity to a more efficient implementation of the path outlined for big data, leveraging "enforcement errors” found at the application level, and seeking to intervene earlier and more effectively (Chapter IV).

This Chapter will now focus on a specific sector: digital payments. After a brief analysis of the regulatory landscape in the digital payments sector we will illustrate the case of PagoPA as a virtuous example of how regulation, if well calibrated, can foster innovation and open new markets and new opportunities.

2. Digitalization of financial services

The payments system is a segment that is strongly linked to the technology sector and, historically, has always been on the frontier of innovation. In many cases, one observes the 'genetic' transformation of

certain operators who, from service providers active in other sectors, such as telecommunications or transport, have established themselves in payments services. This transformation can be justified not only by the need to facilitate the underlying payments necessary for the use of services, but also by the existence of network and purpose economies.

Digitalization of financial services represents one of the main disruptions of the last decade. On the one hand, the financial sector is exploiting innovation to update payments, planning, lending and funding, trading and investment, insurance, cybersecurity, operations, and communications. On the other hand this represents a spur for a broader digitalization of many connected sectors.

A good example can be seen in the role played by digital payment services in the digitalization of public administration. It is worth noting that digitalization of payment is considered a “enabling factor” for the digitalization of the public administration according to the European e-government action plan 2016-2020, as implemented in Italy by mean of the Code of Digital Administration[197] (so-called CAD).

However, the innovation of the financial sector also represents an ever-bigger challenge for the European legislator which has to cope with a fast-changing world. This is a world where different priorities – apparently - coexist together. In this context, one of the main challenges faced by regulators is how to strike a fair balance between overlapping priorities. While open banking, as we will see in the foregoing, is crucial to lower barriers to entry, open the market, and establish a level playing field, it is important to recall that access to data may ultimately go to the detriment of consumers. Whereas it may enable market abuses such as perfect price

[197] D.lgs. 7 marzo 2005, n. 82 Codice dell'amministrazione digitale available online https://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:decreto.legislativo:2005-03-07;82%21vig=

discrimination, targeted marketing reducing product comparison, and in general may lead to a limited control on the use of account data.

Considering the above, it is crucial to briefly analyze the main disruptions of the digitization of the financial sector.

From the "new entrants" perspective there are two significant disruptions. First, as analyzed in Chapter III, the recent advances in technology and innovation represented by distributed ledger technologies (DLT) paved the way for new payment infrastructures and instruments for cross-border payments. Secondly, the fintech's upheaval resulting from the rules introduced by the Payment Services Directive 2 (PSD2).[198]

From the first standpoint, as broadly described in Chapter IV, DLT could allow, for example, new fintech companies to enter the financial services market through providing a specific service, such as digital payments, traditionally offered by a few dominant companies, and become direct competitors.

However, from a competition law point of view, DLT may also create new anticompetitive opportunities such as the use of blockchain, and in particular self-executing smart contracts, to easily reach collusive outcomes. In this sense this topic intersects with the unsolved debate on algorithm collusion - or other horizontal agreements (such as R&D agreements); the use of blockchain to exchange relevant information, playing the role of a hub-and spoke; the use of blockchain as a leverage to raise barriers and exclude rivals from new markets (*e.g.*, essential facilities; exclusionary and exploitative practice).

[198] Directive (EU) 2015/2366 of the European Parliament and of the Council of 25 November 2015 on payment services in the internal market, amending Directives 2002/65/EC, 2009/110/EC and 2013/36/EU and Regulation (EU) No 1093/2010, and repealing Directive 2007/64/EC *OJ L 337, 23.12.2015, p. 35–127*

From the second standpoint, the PSD2 allows Third Party Providers (TTP) to access indispensable channels to get to the bank's customer data and build their own products and services. The Directive is aimed at lowering barriers to entry and assuring a better choice and product comparison.

This aim is pursued by recognizing that the strong consumer authentication imposed by the first version of the directive (PSD1) could represent an obstacle to emerging fintech, and thus, prescribing a duty of data sharing on incumbent banks.

The data sharing rules allows new entrants to gain access to account information stored by an incumbent financial player by means of a specifically developed application programs interface (API) in compliance with rules set out by GDPR.

The PSD2 shares the purpose of the data portability right introduced with the GDPR, *i.e.*, to trigger and foster inter-platform competition by decreasing the transaction costs incurred by consumers. A consequence of the control over personal data ensured by the GDPR is the stronger bargaining position enjoyed by individuals *vis-à-vis* online service providers. Similarly, the PSD2 encourages consumers to shop by providing easy access to their accounts and transaction data to benefit from new services or better deals. Overall, the GDPR and the PSD2 can be regarded as the building blocks of the recent European regulatory strategy aimed at opening up retail markets and sustaining consumer activity and engagement in the digital landscape.

Such a rule, as shall be illustrated in the following paragraphs, open up to new payment services, and particularly to new players aimed at providing account information services (AIS) or payment initiation services (PIS).

Notwithstanding the above, the rule has been the object of some critics in literature.

First, it has been noted that the open banking regime is hard to reach in practice. Incumbents will always enjoy a much broader data set since just a small part of their data is shared with TTP.[199]

Second, it has been pointed out that the PSD2 has actually helped the consolidation of BigTech power in finance. The paradox is startling when one considers that BigTech are those really taking advantage from the data sharing: the bigger the data stored by the BigTech the greater is utility extract from matching those with bank account data.[200]

Similar concerns have been expressed concerning the entry of BigTech platforms into retail banking, as a result of the access to account (XS2A) rule introduced by the revised EU Payment Service Directive (PSD2).[12] By harnessing substantial quantities of data generated by their networks and benefiting from access to payment account information enabled by the PSD2, large technology companies may disrupt retail banking markets.

The XS2A rule enshrined in the PSD2 was designed to harness this potential of FinTech. In compliance with this rule, account servicing payment service providers (especially commercial banks) allow TPPs to access real-time data on users' accounts as well as provide access to such accounts by executing payment orders initiated via payment initiation service providers interfaces. This is provided that the account is accessible online and the customer has given his/her explicit consent. Accordingly, by strengthening users' control over their transaction data in order to allow TPPs to process

[199] Borgogno O., Colangelo G., *The data sharing paradox: BigTechs in finance*, European Competition Journal, 16:2-3, 492-511, (2020)

[200] Di Porto F., Ghidini G. *I Access Your Data, You Access Mine. Requiring Data Reciprocity in Payment Services* (June 20, 2019). International Review of Intellectual Property and Competition Law - IIC, 51, 2020, p. 307-329 (forthco), Available at SSRN: https://ssrn.com/abstract=3407294 or http://dx.doi.org/10.2139/ssrn.3407294

such data or initiate payment orders, European policy makers intended to reinvigorate competitive dynamics.[201]

In light of the above, some scholars have suggested a reform of the PSD2 in order to impose a reciprocity clause in the data sharing, to limit the competitive advantage of BigTech to the detriment of small fintech players, in the “I give my data if you give me yours” formula[202].

However, it is noteworthy that payment services are only some of the services affected by the digital revolution of the financial sector. In this context, it is important to mention the new approach to financial advisory arising from the use of robotics advisory, machine learning and Big data analytics as great opportunities for engaging and assisting consumers with their own financial planning.

These tools may speed up the process of financial alphabetization of the population, helping a wiser managing of finances, planning of spending and savings, tracking finances, comparing financial products and deciding on which products to invest.

Among these an important role is played by robo-advisors, implemented through AI technology, which provide investment advice based on an individual's account activity.

Once again, the issue from a consumer and a competition law perspective concerns possible individual profiling and targeted marketing. One could envisage, for example, as to the significant impact of this profiling in the pricing policy of insurance, or in the possible exclusion of disadvantaged individuals from lending and other financial services.

[201] Bani E., De Stasio V., Sciarrone Alibrandi S., *L’attuazione della Seconda Direttiva sui servizi di pagamento e "Open Banking"* (2021)

[202] Di Porto, F., Ghidini, G. “I Access Your Data, You Access Mine”: Requiring Data Reciprocity in Payment Services. *IIC* 51, 307–329 (2020). https://doi.org/10.1007/s40319-020-00914-1

The regulators have an ever-tricky role in setting the regulatory framework. The dichotomy, as always when dealing with regulation, is apparent. Over-regulation may impose constraints that impede the ability to compete with new players. For instance, the effects of prudential regulation on competitive level playing field issues. Nevertheless, consumer protection from privacy, discrimination and freedom to choice, is at stake and the effect of an under regulation are now more than ever prejudicial to fundamental rights.

3. Regulating the big data phenomenon in fintechs: psd2

3.1. A new regulatory approach

As seen in the previous paragraph, the PSD2 aims at fostering competition and innovation in the retail payments sector while ensuring user security and regulating certain activities that were already offered to users without specific safeguards.

The approach performed by PSD2 is rather innovative whereas, in its intention to define a competitive environment that would allow the possible benefits of technological innovation to unfold, did not predefine technical solutions at the regulatory level, thus avoiding 'crystallizing' them in the Directive. Therefore PDS2, running seamlessly through the PSD1, provides a flexible framework aimed at fostering the spread of technological innovation for '*the development of new types of payment services, ensuring a level*

playing field for existing and new payment service providers'[203], and capable of responding to the needs posed by the acceleration of technological evolution in the years that followed.

As a result, PSD 2, while spelling out the principle of technological neutrality, leaves to soft law the duty to set certain prerequisites of a technical nature to ensure, along with competitiveness, the reliability and efficiency of electronic payment instruments and an adequate level of consumer protection. In this regard, the European Banking Authority (EBA) is entrusted with the task of issuing standards or guidelines on the more technical aspects, so that the provisions contained in the directive can be applied in practice.

In the intentions of the European legislator, the deferral to the EBA of the preparation of the technical regulations contributes to the definition of a more elastic and more easily modifiable regulatory framework, capable of better keeping pace with the rapid technological evolution that is being observed.

In this context, the intertwin between regulatory and technical profiles is apparent: the real novelty of PSD2, from the point of view of supervisory authorities, is represented by the fact that, compared to the past, the regulation of retail payments presupposes - and requires - a close supervision also of the more operational and technical profiles that

[203] Cfr. recital 33, PSD2, reads as follows: '*This Directive should aim at ensuring continuity in the market by enabling new and existing service providers to offer their services within a clear and harmonized regulatory framework, irrespective of the business model they apply. Until those provisions are applied, and without prejudice to the need to ensure the security of payment transactions and the protection of the customer against the demonstrable risk of fraud, the Member States, the Commission, the European Central Bank (ECB) and the European Supervisory Authority (European Banking Authority) established by Regulation (EU) No 1093/2010 of the European Parliament and of the Council (1) (EBA) should ensure fair competition in that market by avoiding unjustified discrimination against existing players. Any payment service provider, including payment service providers rooting the payment service user's account, should be able to offer payment order provision services*'.

characterize the functioning of the market. Even the European Commission, in its *Fintech Action Plan* emphasizes how the authorities must strive to fully understand the trends in the financial technology sector and strengthen their contacts with the market in order to increase their knowledge and expertise on digital innovations.[204]

3.2. The principle of access to payment account data by operators ('*third-party providers'* or 'TPPs')

In updating the regulatory framework for payment services and facilitating the entry of new players into the market and, more generally, the creation of conditions for the development of a more competitive ecosystem, PSD2 introduced the principle of access to payment account data by operators ('*third-party providers'* or 'TPPs') who, for this purpose, must be authorized by the competent national authorities. Once again, data is the main trigger for the enlargement of the market, and the creation of new playing fields to compete.

The underlying idea is that data are at the disposal of the customer who has 'generated' it, who may then allow it to be used by third parties for the purposes identified in the directive: initiating payments or receiving information in order to have an immediate overview of his or her financial situation. By doing so, the provisions of the PSD2 are in line with technological developments connected to big data, and illustrated in Chapter 2, whereas data take on a 'commercial' value, becoming a sort of “commodity”. In this regard, payment accounts become a form of essential facility, a functional infrastructure for the development of an open ecosystem for retail payments, paving the way for a broader notion of 'payment service', which no longer presupposes either a transfer of funds or the operation of a payment account.

[204] European Commission, *Financial Technology Action Plan: towards a more competitive and innovative European financial sector*, March 201

The new services regulated by PSD2, i.e., payment initiation services (PIS) and account information services *(*AIS), have characteristics that partly distinguish them from traditional payment services. This is so since they do not involve the management of financial flows or the holding of user funds. The decision to also include such activities among the services subject to the reservation of law entailed a broadening of the notion of 'payment service', which has always been associated with a transfer of funds and the operation of a payment account. This choice has also simplified the regulatory framework and has avoided referring the rules applicable to operators who, in practice, are active in the same ecosystem to a different set of rules.

The predominantly informational nature of these services has led the legislature to recognize their specificity by adapting the rules generally applicable to payment institutions to their providers. For example, there are no capital requirements or rules on segregation of client funds; there is no requirement to hold initial capital for AISPs. For both AISPs and PISPs, there is an obligation to take out an insurance policy to cover the risks arising from the activities provided, or to offer a similar guarantee (e.g., a letter of *patronage*); the latter aspect may make it easier for future PPPs emanating from banking and financial groups to comply with the requirement.

As already mentioned, what characterizes these services is that they provide access to online payment accounts managed by a different operator. This entails specific risk profiles related to the security of users' access credentials to their accounts and the respect of personal data confidentiality.

The Directive does not establish a general principle of non-interest-bearing access to all bank payment data, but only to those instrumental in enabling the development of two services that are essential and unavoidable in any innovative solution in the field of payments. PSD2 can therefore rightly be considered an 'innovation accelerator' since, by forcing banks to 'open up', it requires them to make investments in

technology, creating the basis for the development of new business models that enable the offer of innovative services.

This *ex lege* free access is circumscribed both in its perimeter (in that it is provided only for payment accounts) and in its purpose, which is limited to placing a payment order, for the PISP, and to offering information services to enable the user "*to have an immediate overview of his financial situation at a given time*"[205], for the AISP; these limitations appear functional to counterbalance the lowering of entry barriers to the provision of payment services, aimed at stimulating competition, while protecting the investments that the bank, with which the account is hinged, is required to make in order to preserve the values received on deposit, the technological infrastructures used and, more generally, the security of all information collected.

3.3. Open banking and Application Programming Interfaces *(APIs)*

In the new regulatory framework, banks must allow access to payment accounts by TPPs to ensure that the user's right to use such services is guaranteed. The primary legislation, also in compliance with the principle of technological neutrality, do not impose a specific solution to ensure such access, deferring the choice to the banks[206].

However, the EBA's secondary legislation outlines two possible ways in which TPPs can access payment accounts, subject to the user's consent:

[205] Recital 28 provides that "technological developments in recent years have also led to the emergence of a number of ancillary services, such as account information services. Such services provide the payment service user with aggregated *online* information on one or more payment accounts, held with another payment service provider(s), which can be accessed via online interfaces of the payment service provider of the account. The payment service user may thus immediately have an overview of his or her financial situation at any given time. These services should also be addressed in this directive in order to guarantee consumers adequate protection with regard to payment and account data as well as the legal certainty associated with the *status of* an account information service provider'.

[206] Gammaldi D., Iacomini C., Mutamenti del mercato dopo la PSD2, in Maimeri F., Mancini M., *Quaderni di Ricerca Giuridica della Consulenza Legale, Le nuove frontiere dei servizi bancari e di pagamento fra PSD2, criptovalute e rivoluzione digitale*, N. 87 – Settembre 2019, pg 125 ss.

via the user-interface made available to the customer by the bank in the home-banking environment, or by means of a dedicated interface developed for this purpose. In the latter case, one speaks of an API (*Application Programming Interface, i.e.*, the set of rules for activating and using a software module together with the operating environment for its activation and use.

Whichever method is chosen, it will have to comply with the aforementioned regulatory constraints placed on access to accounts by TPPs: possibility of access only to payment data contained in accounts previously identified by the user, obligation to identify the TPP at the time of access, impossibility for TPPs to store data and use them for purposes other than those expressly indicated by law.

This implies, by way of example, that in the event of access via a user interface, the latter must in any case be duly modified to ensure *compliance* with the aforementioned limits.

This approach declines the concept of '*open source*', which is characteristic of the most recent technological evolution, into the legal system. Generally speaking, from a technical point of view, APIs allow the exchange of data available within networks not belonging to the same domain. The use of such open interfaces makes it possible to obtain and share, at a lower cost than traditional *systems integration* activities, information necessary for the provision of new services, pushing banking operators to a real 'leap' in the commercial and distribution strategies adopted.

The new element, which leads to the creation of an environment conducive to competition, is the publicity of the technical specifications to be used to access the information, which the individual company makes available even in the absence of a contractual relationship with the subjects

that will potentially use it. On a technical level, an API allows a company to be 'chosen and included' in a production process and thus to benefit, inductively, from a third party's product.

The concept of API immediately leads back to the concept of *FinTech*, which in the Financial Stability Board's definition is intended to capture the phenomenon of financial innovation triggered by "technology, which can take the form of new business models, processes or products, producing a decisive effect on financial markets, institutions, or service offerings"[207].

The evolution that can be observed in the European market following the approval of PSD2 is consistent with the legislator's wishes: an open ecosystem is emerging in the banking community in which cooperative and competitive aspects find their balance in order to foster the emergence of services that are useful to the user, with a clear indication of the responsibilities of the various actors involved.

It should be borne in mind that European legislation, in line with the objective of strengthening the internal market for retail payment services, requires that any solution adopted to ensure access to payment accounts by TPPs be constructed in such a way as to meet the needs of all European payment providers. Certain choices for the verification of the Directive's or the EBA's provisions confirm this; by way of example only, one may recall the rules on wide usage or those on the advertising of technical interface solutions.

The Delegated Regulation (EU) No. 2018/389 adopted by the European Commission contains, among other things, regulatory technical standards to define common and secure open communication standards

[207] See the Financial Stability Board (FSB) definition of *FinTech*: '*Technology-enabled innovation in financial services that could result in new business models, applications, processes or products with an associated material effect on the provision of financial*', from *Financial Stability Implications from FinTech*, June 2017.

between payment service providers. The aim is thus to ensure a secure authentication and communication channel between banks and TPPs. As anticipated above, under this Regulation, lenders holding accounts must, by 14 September 2019, set up access interfaces to enable TPPs to conduct their business.

If the dedicated interface is adopted, it is envisaged that, in the event of its unavailability or inadequate performance, TPPs will be guaranteed the possibility of accessing payment accounts through the interface made available to customers in the *home-banking* environment (the so-called '*fall-back option*')[208] . The mechanism outlined by the EBA at the instigation of the European legislator was based on the fear that any malfunctioning of the dedicated API, in the absence of a back-up solution, could in fact constitute an obstacle to the development of TPPs' services to the detriment of the users.

4. Regulating big data for the digitalization of public administration: open government

Nowadays, States are more and more pursuing new approaches for a transition to the digital government transformation. A good example is the delivery of e-government as a platform, the development of digital services, the adoption of data-centric approaches, the strengthening of digital capacities to deliver people-centric services, and the innovative use of new technologies such as artificial intelligence and blockchain.

As it is apparent, there are two elements to this transition: User-centricity and cross-border interoperability.

[208] Article 33(4) of Delegated Regulation (EU) no. 2018/389, provides that 'Under a contingency mechanism, payment service providers referred to in Article 30(1), [TPPs] shall be allowed to use the interfaces made available to payment service users for authentication and communication with the payment service provider of the account root [the bank], until the dedicated interface is restored to the level of availability and performance provided for in Article 32 [i.e. the same level of availability and performance, including support, as the interfaces made available to the payment service user for direct access to his *online* payment account].

In 2017, the European Commission published the European Interoperability Framework (EIF) which is focused on a set o principlesf: (i) *User Centricity* – indicates to what extent (information about) a service is provided online and how this is perceived; (ii) *Transparency* – indicates to what extent governments are transparent regarding: their own responsibilities and performance, the process of service delivery, and personal data; (iii) *Cross-Border Mobility* – indicates to what extent EU citizens and businesses can use online services in another country; (iv) *Key Enablers* – indicates the extent to which four technical pre-conditions are available online. These are: Identification (eID), Electronic documents (eDocuments), Authoritative Sources, and Digital Post.

At the political level, the newest and central initiatives that will drive the digitalization of the public sector in Europe are the “Shaping Europe’s Digital Future strategy”, the “White Paper on Artificial Intelligence”, the “Strategy for a sustainable and digital Europe”, “the Action Plan for better implementation and enforcement of single market rules”, a new “Industrial Strategy for a globally competitive, green, and digital Europe”, and the “European Data Strategy”.

These initiatives form a key part of the European Commission’s top priorities for 2019-2024 set out by The President of the European Commission Ms. Ursula von der Leyen in July 2019, A Europe Fit for the Digital Age, and they build off initiatives from the Juncker Commission, including the Digital Single Market and the EU eGovernment Action Plan 2016-2020, and are now part of the National Resilience and Recovery Plan (“NRRP”).

While Member States pursue their own strategies and activities, the current Action Plan sets out seven principles that forthcoming initiatives should observe to deliver significant benefits from eGovernment services. The achievement of these seven principles by the Member States is monitored and the results presented in the annual eGovernment Benchmark

Report. The seven principles guiding the eGovernment Action Plan are: Digital by Default: Public administrations should deliver services digitally (including machine readable information) whenever possible (while keeping other channels open for those who are disconnected by choice or necessity). In addition, public services should be delivered through a single contact point or a one-stop-shop and via different channels. Once only principle: Public administrations should ensure that citizens and businesses supply the same information to a public administration only once. Public administration offices must take action, if permitted to internally re-use this data, in due respect of data protection rules, to ensure that no additional burden falls on citizens and businesses. Inclusiveness and accessibility: Public administrations should design digital public services that are inclusive by default and cater for different needs such as those of the elderly and people with disabilities. Openness & transparency: Public administrations should share information and data among each other and enable citizens and businesses to access, control and correct their own data; enable users to monitor administrative processes; engage with stakeholders (such as businesses, researchers, and non-profit organizations) in the design and delivery of services. Cross-border by default: Public administrations should make relevant digital public services available across borders to prevent further fragmentation and facilitate mobility within the Single Market. Interoperability by default: Public services should be designed to work seamlessly across the Single Market and across organizational silos. Trustworthiness & Security: All initiatives should go beyond mere compliance with the legal framework on personal data protection and privacy, and IT security. By integrating these elements in the design phase, public administrations will help to increase trust in and use of digital services. An important role is played by the Directive on open data and the re-use of public sector information, also known as the Open Data Directive, entered into force on 16 July 2019 on open data and the re-use of public sector information.[209] This Directive aims at unlocking the potential of data; opening

[209] See Directive (EU) 2019/1024 of the European Parliament and of the Council of 20 June 2019

up government data to help them create new services, jobs and growth; opening to engage with citizens in their decision-making process.

The Open Government approach helps to transform public administrations into a system of digital governance by optimizing process flows, opening public sector data and services, and moving away from a silo mentality to a coordinated and collaborative approach. The approach is based on collaboration, transparency, and participation principles, functioning within an open governance framework. It is also about opening-up government processes and decisions to foster citizen engagement and trust.

By removing public administrations from individual silos and opening up data, governments can work on a cross-border basis to reduce costs, prevent duplication, increase efficiency and facilitate cross-border mobility. In addition, the opening of this data will allow other actors in public administrations to reuse government data and services, thus enabling the design of targeted - personalized, pro-active and location-based services and facilitating digital interaction between administrations and users. This ensures the user-centricity of public services and fosters collaborative service creation.

An open government will support ICT-enabled public sector innovation; improving the efficiency, effectiveness, and quality of public services by introducing new processes, products, services and methods of delivery enabled by ICT. Indeed, while basic administrative services are the core of eGovernment, many new, location-based services can be created by governments, businesses, civil society, and other stakeholders using public administrations' open data, location data, and open services.

At Italian Level, the main goal is to foster the simplification of administrative action and the enhancement of public body information assets, as well as to achieve the country's digital transition. In this regard, the Digital

Administration Code (CAD) constitutes the first form of organic regulation of the application of information technology in public administration and the relationship between the Administration and the administration. In particular, in the explanatory report of Legislative Decree No. 217/17, the focal points of the discipline are highlighted.

The digital citizenship charter nature of the first part of the CAD was more strongly emphasized with provisions aimed at giving citizens and businesses the rights to digital identity and domicile, to use online and mobile-oriented public services, to participate in administrative proceedings electronically effectively and to make online payments; Integration and interoperability among public services provided by public administrations has been promoted so as to guarantee the right of citizens and businesses to use them in an easy manner; Greater legal certainty has been provided for the formation, management and preservation of computerized documents by providing that not only those signed digitally - or with another qualified electronic signature - but also those signed with different electronic signatures can, under certain conditions, produce the same legal effects and have the same evidentiary effectiveness without providing for the intervention of a judge on a case-by-case basis; The enforceability of digital citizenship rights has been strengthened and the raising of the level of quality of public and fiduciary services in digital has been promoted, both by establishing at AgID the Office of the Digital Ombudsman and by increasing the extent of sanctions that can be imposed if fiduciary service providers violate the rules; A process of enhancing the value of public information assets by bringing them back among the institutional purposes of each administration has been promoted.

In this regard, according to the CAD, under Art. 1 para. l-ter), open data are data that have the following characteristics: availability under the terms of a license or regulatory provision that allows its use by anyone, including for commercial purposes, in a disaggregated format; accessibility

through information and communication technologies, including public and private telematic networks, in open formats, suitable for automatic use by computer programs and provided with the relevant metadata; availability free of charge through information and communication technologies, including public and private telematic networks, or made available at the marginal costs incurred for their reproduction and dissemination.

The spread of the open philosophy also coincides, in large part, with the proliferation of legislation that has provided for a right to know to be guaranteed through access to information held by public institutions, along the lines of the U.S. Freedom of Information Act (Foia) model.

In order to reach the aforementioned goal and the implementation of the main platform developed by the Italian National Authority for the Digitalization of Public Administration (Agid) today a specific entity has been funded: Pagopa s.p.a..

The company pursues the specific goals of helping digital payment systems by easing services between Payment Services Provider and Public Administration; supporting digitalization; and spreading digital public services near to citizens.

5. PagoPA S.P.A. MISSION AND BACKGROUND

PagoPA is a company wholly owned by the Ministry of Economy and Finance ("MEF"), incorporated by notarial deed dated 24 July 2019[210] on the basis of Article 8, paragraph 2, of Decree-Law No. 135 of 14 December 2018 ("d.l. 135/2018")[211] and Prime Minister's Decree No. 104 of 19 June 2019 ("DPCM of 19 June 2019")[212] .

[210] Rep. No. 84032, registered with the Internal Revenue Service on 25 July 2019, No. 21779.

[211] Urgent provisions on support and simplification for enterprises and public administration, O.J. No 290 of 14 December 2018, converted by Law No 12 of 2019.

[212] Decree of the President of the Council of Ministers No. 104 of 19 June 2019. These activities are also indicated in Article 4 of the PagoPA Statutes.

PagoPA pursues the objective of implementing the strategic objectives of the Italian Digital Agenda, consistent with the European Digital Agenda[213], through the realization of the Platforms.

The Directive of the President of the Council of Ministers of 14 April 2021 ('Directive of 14 April 2021')[214] implemented these strategic objectives by means of the platforms managed by PagoPA.

At a statutory level, PagoPA's objectives are to contribute to the widespread diffusion of digital public services; the design, development and industrialization of the main platforms necessary for the modernization of the PA and digital citizenship; to undertake all activities to promote the knowledge, diffusion and use of the pagoPA technology platform by citizens and public administrations; and to further encourage the increase of electronic money transactions for payments to the public administration.

PagoPA manages some of the most critical platforms for the digitalization of the Italian public administration. Some of these are briefly presented in the forthcoming paragraphs.

5.1. PagoPA Platform

The PagoPA Platform is an infrastructure that enables the centralisation of payments, through enabled payment service providers ("PSPs"), for the benefit of the entities referred to in Art. 2(2) of the CAD ("Public Bodies"), in line with the objectives set at EU level by Directive (EU) 2015/2366 on payment services in the internal market ("PSD2 Directive")[215],

[213] See in this regard Article 8(1) of Decree-Law 135/2018; the Decree of the Council of Ministers of 30 April 2019 on the directive identifying the objectives referred to in Article 8(2) of the CAD; the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions 'A Digital Agenda for Europe', COM/2010/0245 final; Directive (EU) 2016/2102 of the European Parliament and of the Council of 26 October 2016 on the accessibility of public sector bodies' websites and mobile applications.

[214] Registered at the Court of Auditors on 12 May 2021 under No. 1094.

[215] Directive (EU) 2015/2366 of the European Parliament and of the Council of 25 November 2015 on payment services in the internal market, amending Directives 2002/65/EC, 2009/110/EC and

as transposed by the national legislation[216], and Regulation (EU) 2021/241, establishing the Recovery and Resilience Facility ("RRF Regulation").[217]

By virtue of Article 8(2) of Decree-Law 135/2018 and Article 3(1) of the Prime Minister's Decree of 19 June 2019, the activity of managing the PagoPA Platform was assigned to PagoPA, which received all the assets, resources by deed of recognition and transfer of resources dated 22 October 2019 ("Recognition and Transfer Deed").

The combined provisions of Article 2(2) and (2-quater) of the CAD and Article 65(2) of Legislative Decree No. 217 of 13 December 2017 ("Legislative Decree 217/2017")[218] provides for an obligation on both Public Bodies and PSPs to use the PagoPA Platform exclusively in relation to payments intended for Public Bodies. Indeed, the law requires that all payments, due for any reason, to the public administration, including micro-payments, must transit exclusively through the “pagoPA platform”.

All in all, pagoPA platform represents the meeting point of the needs of administrations, users, and payment service providers. The platform allows, in fact, the standardized management of all payment transactions in favor of the administration and enables all service providers and creditor bodies (even the smallest and least 'equipped') to operate 'on an equal footing' in a competitive and technologically advanced market. There is no longer a need for specific negotiation and technological integration between

2013/36/EU and Regulation (EU) No 1093/2010, and repealing Directive 2007/64/EC, O.J.E.U., L 337, 23 December 2015, p. 35-127.

[216] Law No 170 of 12 August 2016, Delegation to the Government for the transposition of European Directives and the implementation of other acts of the European Union - European Delegation Law 2015, G.U. Serie Generale No 204 of 01 September 2016, art. 12.

[217] Regulation (EU) 2021/241 of the European Parliament and of the Council of 12 February 2021 establishing the Recovery and Resilience Facility, OJEU, L 57, 18.2.2021, pp. 17-75, recitals 10 and 12.

[218] Laying down supplementary and corrective provisions to Legislative Decree No 179 of 26 August 2016, concerning amendments and additions to the Digital Administration Code, referred to in Legislative Decree No 82 of 7 March 2005, pursuant to Article 1 of Law No 124 of 7 August 2015, on the reorganization of public administrations, O.J. No 9 of 12-01-2018.

each creditor institution and each provider, with regard to individual payment systems. Both can simply integrate with the platform, transforming into "one-to-one" a relationship that, without the platform, would be "many-to-many". This enhances the 'contractual strength' of smaller credit institutions, emancipating them from the treasurer and the technology partner, while at the same time increasing the projection of the most innovative and competitive companies, which, by accrediting themselves directly in pagoPa, are able to operate in favor of any creditor institution and to be chosen, for the individual payment, by the individual user in a regime of effective competition. In addition, payments brokered through the platform are made available as early as the following day directly to the authority's treasury, ensuring real-time automated reconciliation of payments, with a level of analyticity pushed down to the individual payment (through the 'IUV', Unique Payment Identifier) and also avoiding possible diversion of funds by the collector.

5.2. APP IO

PagoPA manages App IO, “the point of access of the services of the public administration”. Article 64-bis of the CAD provides the obligation for Public Bodies to make their services available via App IO, the design, development and management of which was entrusted to the PagoPA by virtue of Article 8(3) of Decree-Law 135/2018[219] .

Citizens' access to the services offered through AppIO is ensured through the relevant mobile application, the end terminal of AppIO (*front end*), which can be downloaded free of charge through the *app store*. For their part, organizations ensure the technological integration (*back end*) with AppIO through application interfaces ('API').

[219] See also PagoPA Statutes, Art. 4(1)(l).

5.3. Centro Stella

The so-called “Centro Stella” constitutes a set of services based on the 'Digital Transaction Register' (RTD).

Through the Centro Stella, the pagoPA platform receives information from merchants operating on the Italian territory ('Merchants') and from natural persons and legal representatives of legal entities ('Buyers') with respect to transactions carried out with electronic payment methods registered on AppIO, allowing on the one hand, electronic invoicing providers ('Providers') to automatically generate an invoice at the request of Buyers ('Automatic Invoicing'). On the other hand, public administrations provide citizens with an *ex-post* reimbursement ('Cashback'), a discount, upstream or downstream ('ID Pay').

5.4. PDND Interoperability

The “Piattaforma nazionale dati” so-called PDND Interoperability, provided for in Article 50-ter of the CAD[220], consists of a platform for the purchase of APIs capable of guaranteeing the interconnection between the Public Bodies' databases. This makes them accessible through special interfaces ('E-services') to other Entities or to private entities entitled to access them.

Also with a view to ensuring the objective of re-use of information held by public bodies, enshrined in Directive (EU) 2019/1024 of the European Parliament and of the Council of 20 June 2019 ("PSI Directive")[221] , Article 50(2) of the CAD provides for the obligation of public administrations to grant

[220] As amended in particular by Article 34 of Decree-Law No. 76 of 16 July 2020 and Article 39 of the PNRR Decree.

[221] Directive (EU) 2019/1024 of the European Parliament and of the Council of 20 June 2019 on the openness of data and the re-use of public sector information, O.U.E., L 172, 26.6.2019, p. 56-83; Implemented through Legislative Decree No. 200 of 8 November 2021, implementing Directive (EU) 2019/1024 of the European Parliament and of the Council of 20 June 2019 on the openness of data and the re-use of public sector information, O.J. General Series No. 285, 30-11-2021 - Ordinary Suppl. No. 42.

free mutual access to each other's data[222] if this "*is necessary for the performance of the institutional tasks of the requesting administration*".

In this context, Article 50-ter, paragraph 2, CAD, provides for the obligation of Public Bodies to be accredited to the PDND Interoperability and to publish the APIs necessary for the provision of E-Services therein. However, this is without prejudice to the possibility for Public Bodies to continue to use the interoperability systems already provided for by current legislation (Article 50-ter, paragraph 7, CAD).

PagoPA has been entrusted with the design, development, management and implementation of the PDND Interoperability pursuant to Article 8(3) of Legislative Decree 135/2018[223] .

5.5. Platform for Digital Notifications

The Platform for Digital Notifications consists of a digitalized repository envisaged by Article 1, paragraph 402, of the Law of 27 December 2019 ("Law 160/2019")[224] aimed at enabling the delivery - with legal value - of acts, measures, notices and communications of the public administration [225] .

The same provision, in conjunction with Article 26(2) of Decree-Law No. 76 of 16 July 2020 ("PN Decree")[226], entrusts the PagoPA with the

[222] Excluding data relating to activities that are highly sensitive for public security, such as those relating to defense, police, electoral activities (Art. 2(6) CAD).

[223] This was reaffirmed by PagoPA's Articles of Association, Article 4(1)(l) and (m). Moreover, PDND Interoperability was included among the enabling platforms envisaged in the Three-Year Plan for IT in Public Administrations, while its development was declared one of the strategic objectives for the Company in 2021 (Art. 3(k)) through the Directive of 14 April 2021.

[224] As amended by Article 26 of Decree-Law No. 76 of 16 July 2020, as converted by Law No. 120 of 11 September 2020 and amended by Decree-Law No. 77 of 31 May 2021, as converted by Law No. 108 of 29 July 2021, which regulates the platform referred to in Article 1, paragraph 402, of Law No. 160 of 27 December 2019 and its mode of operation.

[225] Certain types of deeds indicated in Article 26(17) of the PN Decree, such as judicial deeds and deeds that would fall under execution procedures in the strict sense, i.e. real estate, third-party and movable attachments, are excluded from the list of deeds.

[226] As converted by Law No. 120 of 11 September 2020 and amended by Decree-Law No. 77 of 31 May 2021, converted by Law No. 108 of 29 July 2021, by which Article 1, paragraph 402 of Law 160/2019 was also amended.

development of the Platform for Digital Notifications, in cooperation with the universal service provider[227] , as well as its management[228].

Article 26(2)(c) of the PN Decree provides that the senders of the Acts ('Senders') are: (i) the Public Administrations (ii) the collection agents (iii) the entities referred to in Article 52(5)(b)(1), (2), (3) and (4) of Legislative Decree No. 446 of 15 December 1997[229] .

Pursuant to Article 26(2)(d) of the PN Decree, the addressees of the Acts ('Addressees') are any public or private person residing or having their registered office in Italy, or abroad should they have a tax code[230] .

The modalities for the operation of the Notification Platform are set out in the Presidential Decree No. 58 of 8 February 2022 ('Implementing Decree')[231].

The Implementing Decree provides that, once the documents have been deposited on the Platform for Digital Notifications, PagoPA shall send a notice to the Addressees, through the address provided by them[232] . For this purpose, PagoPA could make use of AppIO, as indicated in Article 26(7) of the PN Decree.

6. PAGOPA PLATFORM

As discussed, pagoPA platform represented a first step toward the digitalization of public administrations services. From a broader perspective,

[227] Referred to in Article 3 of Legislative Decree No. 261 of 22 July 1999.

[228] The role of the Company for activities related to the Notification Platform is also reaffirmed by the Directive of 14 April 2021 (Art. 3(l)).

[229] Limited to acts issued in the exercise of activities entrusted to them pursuant to Article 52 of Legislative Decree No 446 of 15 December 1997.

[230] Attributed pursuant to Presidential Decree No 605 of 29 September 1973.

[231] Regulation on a platform for the service of public administration documents, Official Gazette General Series No. 130 of 06-06-2022.

[232] Which may correspond to a certified mail address or digital address (for which the addressee will receive an acknowledgement of receipt) or a non-certified address (for which the addressee will receive a courtesy notice).

it also represented a crucial development in the digitization of payments, as a means of more transparent transactions.

In particular, its objective is to incentivise the digital payments market, acting as a facilitator of services between PSPs and public administrations; to foster the digital transformation of the Country, collaborating with institutions and partners in the private sector, and to spread digital public services, more and more citizen-friendly.

The document 'Guidelines for making electronic payments to Public Administrations and Public Service Providers' - published in the Official Gazette General Series no. 152 of 03-07-2018 - defines the rules and methods to be adhered to by the subjects adhering to the Payments Node.

PagoPA platform is essentially a marketplace in which the Payment Service Providers (PSPs) adhering to the platform are at the center of the ecosystem, through which citizens and businesses can make payments to the public administration.

The creation of this infrastructure became necessary as, prior to its creation, each public authority had to tender its collection system to a PSP. This entailed a plurality of relationships between public administrations and PSPs, leading to complexity and heterogeneity in the services offered to citizens.

In addition, this system also entailed problems for the State General Accounting Office, which, receiving the amounts from the local authorities at final balance and net of current expenses, had deferred visibility, and not a complete and, above all, not easily reconcilable visibility of the revenue, losing its ability to control the revenue.

Therefore, the creation of a centralized collection management system, on the one hand, has made it possible to achieve as a first objective the homogenization of services and, on the other hand, has benefited the

State General Accounting Office, which through the PagoPA platform is able to know in real-time all the data concerning the payment of taxes.

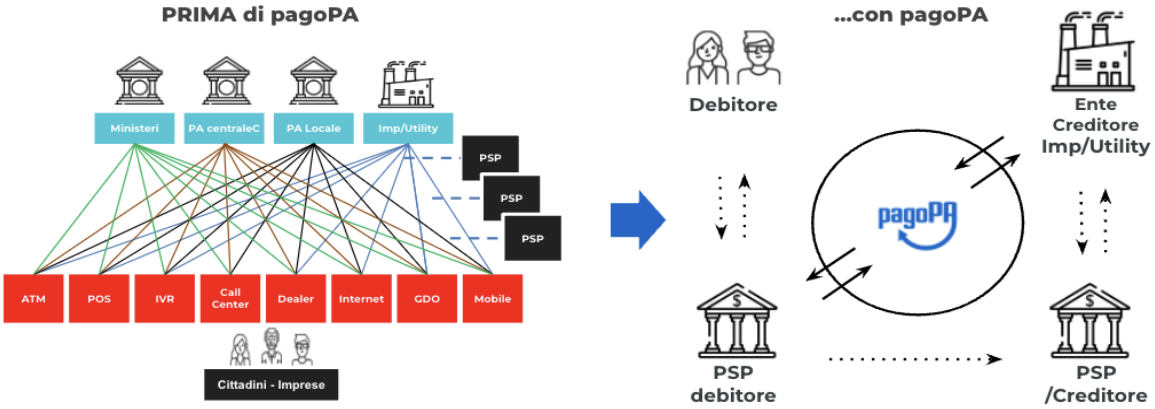
At an early stage, even prior to the establishment of PagoPA, PSPs and P.A. used these services free of charge, the citizen alone having to pay a fee when choosing this payment method.

Subsequently, within the framework of the “digital team”, the creation of a special-purpose company has been proposed to manage and develop this payment system-platform. This is so in order to set up an entity with the necessary technical expertise to develop the service extensively and manage it appropriately. In this second phase, it was decided to adopt a self-sustainable model as it is based on the fees paid by PSPs for each transaction carried out.

In the first four months of PagoPA S.p.A.'s establishment, a great effort was made to sign binding agreements with some 400 PSPs to enable the company to sustain itself independently.

As of 31 December 2021, 20,473 entities were adhering to pagoPA platform: equal to 89.6% of the total number of entities on the PA Index (IPA). However, it must be borne in mind that the subjective scope of pagoPA is broader than the total number of entities recorded in IPA.

The new paradigm envisages that PAs and PSPs are interconnected to operate based on a single framework agreement that defines communication standards without the need to enter into multiple agreements.



The pagoPA platform, compliant with current regulations, allows creditor bodies to improve the provision of services to users, with a single agreement and in compliance with the principles of competition. Thus, achieving efficiency and cost savings through the management of payments in a centralized and standardized manner with significant savings in management costs; the automatic reconciliation of the payment against the debt position; real-time control and monitoring of all collections; the reduction of collection costs; the reduction of indirect costs resulting from incorrect payment management (cash payment, travel, debt collection, penalties, etc.); real-time notification of payment to the payee by all PSPs; collection of sums directly to the treasury account at D+1, i.e. the possibility of receiving the sums the day after the payment is made.

7. How PagoPA enables competition in the Payment Services markets

7.1. The Income tax system

Income tax consists of all income, revenues and credits of any kind that the entity is entitled to collect by virtue of laws, decrees, regulations, or other titles. All revenue must be entered in the budget. Since these are public

revenues, their acquisition is subject to specific procedural steps that are precisely regulated and consist of assessment, collection and payment.

The ascertainment phase highlights the legal/accounting moment in which the right to collect arises; the entity ascertains the reason for the creditor and the person who owes it and enters the claim amount in the balance sheet.

The collection phase represents the moment in which the authority is certain of the monetary means with the collection of the sums either directly from the treasurer (a person who, under his specific function, represents the "control room" for all the financial movements of the authority's incoming and outgoing in a single management system) or indirectly from a collection agent known as a "special collector".

The special collector performs the collection service based on a specific contract that, in addition to defining the various profiles of the service, also defines the technical ways and times of channeling the sums to the entity performing treasury functions for the subsequent phase of payment to the treasury account aimed at concretely constituting the availability for the execution of expenditure.

The traditional pattern of collections is therefore usually based on (i) an inflow of sums directly to the treasurer with immediate payment and provision of monetary resources, or (ii) an indirect inflow through a special collector who subsequently, in accordance with contractual agreements, channels the sums into the treasury account.

This traditional set-up was significantly affected by the reform process implemented by Article 5 of the CAD (as amended as of 2012), which led to the establishment, development and dissemination of the pagoPA system to be adopted on a mandatory basis by all entities with a public character.

7.2. Regulatory context

7.2.1. Art. 5 CAD - Subjective and objective scope

The pagoPA system has had a profound impact on Public Administration collections, publicly controlled companies and public service managers. On the other hand, it has also had an impact, on payments to public sector entities. In fact, the pagoPA system is of significant importance for citizens, businesses, public administrations, and the banking world. Significantly, all public and private operators have changed their operations as a result of a substantial reform of the matter.

The objective pursued by the new system is to allow all persons in debt with the PA and other public interest entities (hereinafter referred to as Creditor Entities) to make payments due for any reason, also through the use of information and communication technologies. In this regard, a specific obligation is imposed on Creditor Entities, which are obliged to accept such payments, establishing an innovative functionality that makes it possible to collect, pay, reconcile, and account for every financial movement in their favor.

Article 5 of the CAD constitutes the primary regulatory source of the pagoPA system. In its original 2005 version, this rule enshrined the principle that public administration collectors should allow businesses and citizens to pay with alternative forms to cash.

The first significant change to this rule of principle took place in the context of Legislative Decree No. 235 of 30 December 2010 (setting forth the amendments and additions to the CAD) which, in Article 4, (i) extended the principle to all PAs, both central and local; (ii) detailed precise rules for the methods of making payments to public administration collectors; (iii) delegated to a special ministerial decree the issuance of detailed rules on the entire matter; (iv) provided that the regions and local authorities amend their

own regulations in order to adapt them to this principle.

Subsequently, Article 6-ter of Law No. 35 of 4 April 2012 (converting Decree-Law No. 5 of 9 February 2012) introduced a new significant element that definitively changed the nature of the rule, making it, from a rule of principle, a directly operative provision for all PAs, including local ones. Maintaining the system outlined by Law No. 235/2010, it was in fact established that, within ninety days of the entry into force of the law, PAs would have to: (i) publish on their institutional websites and on payment requests the identification codes of the bank account on which to make payments; (ii) specify the data and codes to be mandatorily indicated, by the payers, in the reason for payment.

The issue's complexity, together with a formulation of the rule that objectively could have given rise to some difficulties of interpretation, led the Legislator to introduce a new and different formulation of the discipline under examination. In particular, Article 15 of Decree-Law No. 179 of 18 October 2012, converted into Law No. 221 of 17 December 2012 ("Further Urgent Measures for the Country's Growth") completely reworded Article 5 of the CAD, initiating the innovative process of reforming the Collections of Public Bodies, which was concretely outlined by the Guidelines issued by the Digital Italy Agency (so-called AGID) in implementation of Article 5 of the CAD.

Subsequently, the Monti Government with Decree-Law No. 179/2012 (the so-called Growth Decree II) made critical regulatory changes, namely: amended and better detailed the regulatory scope of Article 5 of the CAD for electronic payments to administrations; entrusted the Digital Italy Agency, after consulting the Bank of Italy, with the task of defining the Guidelines for the specification of technical and operational modalities for the execution of electronic payments; it introduced in Article 15, paragraph 5 bis, of Decree-Law No. 179/2012, the mandatory use of a technological platform made available by AgID 'fo*r the achievement of the objectives of rationalization and containment of public expenditure on information*

technology and in order to ensure homogeneity of supply and high levels of security'

Therefore, pagoPA has also found strong and growing support from successive governments, including the Renzi government, which, with Legislative Decree No. 179 of 26 August 2016, reformulated Article 5 of the CAD on electronic payments, gave new and further effectiveness to the regulatory scope of the same, namely: the centrality of the pagoPA payment platform was confirmed; obligation to join has also been extended to publicly controlled companies; the payment services that the platform is required to handle have been expanded to include micro-payments, including those based on the use of telephone credit; it has been pointed out that, in full compliance with the European principle of non-discrimination of different payment services, payments made at the physical counters of administrations must also accept debit, credit and prepaid cards through integration with the pagoPA platform

The text of the provision subsequently underwent further partial amendments and additions, first as part of the so-called Madia Reform (Legislative Decree no. 179 of 26 August 2016, entailing amendments and additions to the CAD) and, subsequently, with Legislative Decree no. 217 of 13 December 2017, containing supplementary and corrective provisions to Legislative Decree no. 179/2016.

The amendments and additions have unequivocally clarified the central role of the pagoPA platform (almost without exception and with regard to the most diverse payment instruments) and further broadened its subjective scope, making its use mandatory also for public service providers; they have also expressly incorporated certain principles and rules defined in the meantime within the framework of the implementation discipline outlined by AgID in the Guidelines on the subject.

The new text currently in force is as follows:

1. *The entities referred to in Article 2, paragraph 2, are obliged to accept, through the platform referred to in paragraph 2, payments due for any reason through electronic payment systems, including, for micro-payments, those based on the use of telephone credit. Through the electronic platform referred to in paragraph 2, the possibility of also accepting other forms of electronic payment shall remain unaffected, without discrimination in relation to the payment scheme enabled for each type of electronic payment instrument as defined pursuant to Article 2, points 33), 34) and 35) of Regulation EU 2015/751 of the European Parliament and of the Council of 29 April 2015 on interchange fees on card-based payment transactions.*

2. In order to implement paragraph 1, AgID shall make available, through the Public Connectivity System, a technological platform for the interconnection and interoperability between public administrations and authorized payment service providers, in order to ensure, through the instruments referred to in Article 64, the authentication of the parties involved in the transaction throughout the management of the payment process.

2-bis. Pursuant to Article 71, and after consulting the Bank of Italy, the modalities for the implementation of paragraph 1 shall be determined, including the obligations to publish data and information instrumental to the use of the payment instruments referred to in that paragraph.

2-ter. The entities referred to in Article 2, paragraph 2, shall allow electronic payments through the platform referred to in paragraph 2 also for the spontaneous payment of taxes referred to in Article 2-bis of Decree-Law No. 193 of 22 October 2016, converted, with amendments, by Law No. 225 of 1 December 2016.

2-quater. Authorized payment service providers shall execute payments to public administrations through the use of the platform referred to in paragraph 2. The system of unitary payments referred to in Article 17 et

seq. of Legislative Decree No 241 of 9 July 1997, Chapter III, shall remain in force until the adoption of a decree by the President of the Council of Ministers or the Minister delegated thereto, on the proposal of the Minister of Economy and Finance, in agreement with the Minister of Labour and Social Policies, after consulting the Revenue Agency and AgID, which establishes, also in a progressive manner, the technical modalities for making tax and contribution payments through the platform referred to in paragraph 2.

2-quinquies. Through the platform referred to in paragraph 2, information on payments is also made available to the Ministry of the Economy and Finance - State General Accounting Department.

3. The Digital Italy Agency, having consulted the Bank of Italy, shall lay down guidelines for the specification of the payment identification codes referred to in paragraph 1 and the means by which the payment service provider makes the payment information available to the institution.

4. The activities provided for in this Article shall be carried out with the human, financial and instrumental resources available under existing legislation.

Already with the 2012 version and more incisively with the subsequent ones, a rule with an increasingly broader subjective profile was thus enacted; it is referred to, as already mentioned, indiscriminately to all PAs in the broad sense, to the publicly controlled companies specified in Article 2 of the CAD, and to public service operators, for payments by their customers for services rendered to them.

In terms of objective profiles, the rule lays down stated obligations for the Creditor Entities with reference to all payment instruments (bank transfer, postal transfer, post office giro, debit cards, credit cards, prepaid cards, other available electronic payment instruments, also including the use of physical or virtual ATMs and POS and the use of direct debits).

7.2.2. Guidelines

A central role in the implementation of the rule is attributed to AgID; in fact, paragraph 4 of Article 5 establishes that the Agency is charged, after consulting the Bank of Italy, with defining the Guidelines for the specification of payment identification codes and the way the PSP makes available the information relating to the payment itself.

The Guidelines and the related technical specifications in Annexes A and B were issued by AgID at the beginning of 2014. Guidelines and annexes, together with Article 5 and the regulations within the CAD that directly or indirectly affect the matter, constitute the reference regulatory framework concerning payments to Creditor Bodies.

The Guidelines, also for the purpose of a parallel and mutual alignment with the amendments and additions gradually made to Article 5 of the CAD, were revised and partially amended during 2018. On the occasion of this revision, AgID also decided to enrich the annexes with an outline of an agreement for the performance of the treasury service, which contains the elements for the possible inclusion in the contract of additional services relating to pagoPA.

As to the contents of the Guidelines, the document is wide-ranging and articulate a complementary role in the reform of the collection matter, providing useful elements for an interpretative reading of the basic rule and foreshadowing scenarios concerning the entire 'life cycle' of the payment, from its generation, to settlement, reconciliation, and receipt.

In particular, the new arrangement that is set out in the Guidelines is based on two elements that have a significant impact on the pre-existing situation.

First, collection potentially takes place at any PSP, even if not bound by specific contractual relationships with the beneficiary entity. Second, there

is the generalized use of the technological platform called “Nodo-SPC,” made available by AgID and intended for the interconnection between Creditor Entities and PSPs.

The pagoPA system, thanks to the univocal coding of payments (IUV code) and the provision of standard rules and specifications for the execution of the payment transaction, allows for full interoperability of each PSP authorized to operate on the system with respect to each Creditor Entity. This is all with the effect of creating effective competition in the collection activity on the part of participating public entities and of leaving any choice (PSP, payment instrument, payment channel and payment commission) to the free determination of the private user. This thereby releases the Creditor Entity from the activity of contracting and from any remuneration for the collection of its revenue.

It follows that the new set-up is based on the central role of the SPC Node, the use of which is in any case mandatory for Creditor Entities to use six payment services made available to payers by the pagoPA System. Therefore, the agreement by a Creditor Entity for one or more specific payment services relating to collections takes place on an entirely exceptional basis. In this regard, AgID has made it clear (already in the context of the consultation phase launched in September 2013, which preceded the issuance of the Guidelines, and then more timely in the most recent and current version) that recourse to this exceptional procedure must be based on specific needs of the entity.

In this regard, it is worth quoting what AgID stated in the consultation stages: "the Node allows the PSP - called upon by the end user to execute the electronic payment transaction in favor of the Creditor Entity - to be able to interact with the entity regardless of a bilateral relationship and/or an agreement with it".

Consistent with what has already been indicated, AgID has also

specified, in paragraph 5 of the Guidelines, that the Creditor Entities obliged to adhere to pagoPA may only use the following payment methods alongside the system: a)"Delega unica F24" (so-called F24 model) until its integration with the pagoPA system; b) Sepa Direct Debit (SDD) until its integration with the pagoPA system; c) any other payment services that have not yet been integrated with the pagoPA System and that cannot be replaced with those provided through pagoPA because a specific provision of law requires them to be made available to the user for the execution of the payment; d) cash, with the entity that performs the treasury or cash service for that entity.

Therefore, without prejudice to the contractualisation of treasury and cash services, an agreement by a Creditor Entity for one or more specific payment services relating to collections may only take place in respect of the matters set out in (b) and (c) above.

In addition, entrusting the activity of assessment, settlement, and collection of revenue to a special tax collector entails the obligation for such tax collector to adhere to the pagoPA System, and as a result of such delegation, the delegating entity will have fulfilled the obligation to use the pagoPA system for the payment of the revenue it owns and that has been entrusted. On the other hand, the delegating entity must adhere to the pagoPA System for any revenue not entrusted to the special collector and to make available to the user the service for the purchase and payment of digital stamps, when it receives applications/documents that must be subject to stamp duty.

With reference to the role and function of any other platforms, the clarifications provided by AgID still appear to be incisive. It has clarified that '*any online payment platform already implemented by a Creditor Entity and/or provided by a PSP or other entity may remain in place provided it is capable of interfacing with the Node-SPC'*.

An important annotation concerns the profile inherent in the definition

of the general criterion for the application of costs for payment transactions, a criterion closely linked to the principles of the PSD (transposed by Legislative Decree No. 11 of 27 January 2010) and the current PSD2 (transposed by Legislative Decree No. 218 of 15 December 2017).

Since the PSPs enabled on the Node-SPC act in the capacity of payer, they may request their commissions relating to payment transactions exclusively from the end user. This is regardless of whether the latter is a regular or occasional customer. It follows that the Creditor Creditor Entity may only be called upon to pay commissions relating to payment transactions in its favor after having entered into an agreement with that PSP, if the Creditor Entity decides it wishes to accept all or part of the commissions due to the payers.

As to operational content, the Guidelines outline a payment process that is based on the crucial phase of the provision by the Creditor Entity of a set of minimum information necessary and indispensable to enable the debtor or payer (so-called *end user* according to the terminology adopted by AgID) to make the payment. The entity must store this information characterizing the individual payment in a specific file in order to allow the subsequent reconciliation phase of the payment itself (see paragraph 7 of the Guidelines).

In particular, these are the following six elements which, taken together, constitute a Payment Notice*:* name of the creditor entity; identification of the obligor (tax code or VAT number); the amount of the payment due; unique payment identifier (UIV) and reason for payment; identification of the payment account into which the sums due are to be paid (IBAN or postal account); expiry if foreseen.

A central role in the reform design is played by the IUV, which is an essential component of the reason for payment and enables the reconciliation activities by the creditor entities and the reversal of the amount

by the PSPs. The IUV is assigned by these entities to each collection transaction and cannot be associated over time with any other collection.

The format of the UIV must comply with the implementation specifications set out in Annex A to the Guidelines and must be generated taking into account the methods and procedures provided. However, the composition of the code may be modeled by each individual Creditor Entity according to their own requirements, taking account of the fact that the coding must be structured in compliance with international standards, with specific regard to the 35-character maximum limit imposed by the SEPA standards used for the credit instruction.

7.2.3. The Payments Node

In paragraph 8.3, the Guidelines dwell on the nature, functionalities and criteria for joining the Node-SPC, highlighting its central role in the PA collection scenario.

First, it is clarified that this is a technological platform - structured within the Public Connectivity and Cooperation System (SPCoop) - ensuring the interconnection and interoperability between the Creditor Entities and the PSPs; this infrastructure is called upon to allow the Creditor Entities to interactively manage payments through adopting any organizational solution inherent to collection, safeguarding the debtors' right to make use of all the payment instruments available on this platform. This applies both to payments activated directly on the websites of the entities, and to those initialized at the structures of the PSPs; the Node-SPC must also support both the pull mode, i.e. when payment initiation is substantially generated by the entity (Creditor-initiated payments) or the *push* mode, i.e. when *payment initiation* is generated by the debtor user (Spontaneous payments).

The Node-SPC acts as a collector for the exchange of computerized objects called *Telematic Payment Request (RPT)* and *Telematic Receipt (RT)*; the latter, if successful, constitutes proof of the end-user's debit and

must be retained, by the Creditor Bodies, in the manner outlined in the provisions on the retention of computerized documents.

The repeated central role of the Node-SPC means that all stakeholders (Creditor Entities and PSPs intending to operate in the specific area of PA collections) are obliged to join the System, either directly or through technological intermediaries.

Regarding PSPs, it should be noted that the indication contained in paragraph 8.3.2. Their subscription to the Node-SPC is done "on a voluntary basis" needs to be contextualized. It should be recalledi that the purpose of this statement is to specify that while there is a legal obligation for Creditor Entities to adhere to pagoPA, there is no equal legal obligation for PSPs. It remains true, however, that in the absence of subscription, the PSP will not be able to collect on behalf of the entity, adopting its own connection methods; in fact, only joining the Node-SPC allows PSPs to issue the payer with a receipt, telematic or in paper form, with discharging power.

Failure to adhere to the Node, also concerning the sanctioned mandatory nature of the Node for Creditor Entities, is therefore equivalent to the impossibility of implementing the services in question. As confirmed by AgID, "in concrete terms, non-membership of the Node is not without consequences, as it is equivalent to a refusal to operate in the specific sector (...). Membership is permitted to all PSPs - national and international - that submit the relative request, which will be enabled provided that they fully comply with the provisions set forth in the Guidelines and in the relative annexes".

In addition, it seems appropriate to point out that Article 65(2) of Legislative Decree No. 217 of 13 December 2017 states "*The obligation for qualified payment service providers to use exclusively the platform referred to in Article 5(2) of Legislative Decree No. 82 of 2005 for payments to public administrations shall take effect on 31 December 2019*". Therefore, the

Guidelines specify that as of this date, the providers qualified to offer payment services under PSD2 will not be able in any way to execute payment services that do not pass through the Node-SPC where they have as beneficiary a public party (Creditor Entity) obliged to adhere to the same system. This is with the sole exception of the payment services indicated in paragraph 5 of the same Guidelines.

With regard to the management of the Node-SPC, it should be noted that the same delegated to AgID, which were also in charge of the conception of the implementation and development of the System, have more recently been attributed to the Presidency of the Council of Ministers, which avails itself, if appointed, of the Extraordinary Commissioner. In particular, Article 8(1) and (2) of Decree-Law No. 135 of 14 December 2018, converted, with amendments, by Law No. 12 of 11 February 2019 (hereinafter, "D.L. Semplificazione"), *"[a]i fini dell'attuazione degli obiettivi di cui all'Agenda digitale italiana anche in coerenza con gli obiettivi dell'Agenda digitale europea, hanno trasferito la gestione della piattaforma ad una società per azioni interamente partecipata dallo Stato, quale la società PagoPA s.p.a",* incorporated on 24 July 2019 and registered in the Companies' Register on 31 July 2019 by virtue of the directive adopted by the President of the Council of Ministers on 30 April 2019 and the decree of the President of the Council of Ministers of 19 June 2019.

The pagoPA system seeks to respond to every payment need on the part of the user.

A first function (so-called “Model 1”) of the system responds to the need of the citizen who either having received a payment notice from the Creditor Body or spontaneously, i.e. without having received a specific notice, wishes to make a payment either of a tax or other sum however due to the Creditor Body or connected to the request for a service to be provided by the Body itself.

In this case, the citizen will be able to access the Entity's website and, once identified, will be able to select a specific service that he/she wishes to request from the Creditor Entity (e.g. the issuance of a document or the booking of a health visit) or he will be able to view the debts that he wishes to settle (e.g. a car tax, a fine or other debt).

Once the payment object has been chosen, the Creditor will provide the user with the IUV code enabling the user to make the relevant payment.

Finally, the user will be called upon to perform the payment transaction for the service or, in any case, for what is due and, in this regard, he/she will find indicated on the website of the Creditor the different payment methods offered by the market and the maximum fees for each method, as advertised by each PSP participating in the System.

Therefore, depending on the payer's preference, the transaction can be performed online by means of a bank transfer or postal order, or by using a credit card or direct debit.

Owing to the public infrastructure of the Node-SPC, the payment provider chosen by the user and the Creditor Institution will be able to communicate in real time and, therefore, mutually exchange the information necessary to activate and execute the payment transaction. Once the payment provider has been chosen, the user will find the payment request pre-filled, and once it has been executed, i.e. authorized, he/she will immediately receive from the Creditor - through the payment provider selected by him - a receipt for the payment, which will have the value of the payment transaction that has just been executed.

Thus, the administration, being able to perform an immediate reconciliation of the payment through the IUV code and having the possibility of communicating with the service provider who performed the payment transaction, even if chosen by the user, is much more efficient and can immediately issue a receipt to the payer. Consequently, providing the service

requested from him/her just as quickly.

This payment model can also be used to execute transactions repeated over time, subject to the payer's memorisation of the PSP selected and the payment method used; this is useful when the citizen, professional or business has an ongoing relationship with a specific Creditor Institution and/or wishes to make several payments online over time in favor of beneficiaries adhering to the pagoPA System.

A different payment model (so-called “Model 3”) - which can be activated at the payment service provider's premises - provides that the citizen, having received a payment notice from the Creditor, on the basis of the IUV code in the notice, may choose the payment channel (e.g. physical counter of the PSP, ATM of the PSP, website/home banking of the PSP, points of the proximity of the PSP, such as tobacconists, bars, supermarkets, etc.), the payment service provider among those already participating, and the payment instrument (e.g., credit transfer with a debit to account, only if he turns to his bank, postal giro slip if he turns to Poste Italiane s.p.a, credit transfer with cash or credit/debit card even if he turns to a PSP of which he is not a regular customer).

In this model, the user, having already received a payment notice, either delivered directly by the Creditor Entity or found on the website of the Creditor Entity itself, and having at his/her disposal the IUV code relating to that payment, will be able to settle his/her debt and benefit from all the functions of the pagoPA System by going to a service provider participating in the System.

Also in this model, the system in automatic mode provides the citizen with a receipt of payment, which has the value of a release and enables the service to be provided by the authority.

AgID specified that entities subject to the scope of application of the CAD are obliged to make electronic payments available to users through the

infrastructure of the Node of Payments-SPC. This obligation is set out and technically detailed in the Guidelines and their technical annexes, where the different payment models are described.

Therefore, the entities obliged to join the Node-SPC are also required to implement all the payment models envisaged unless the Creditor Entity verifies that the process for the provision of all the services it provides is fully dematerialised. In this specific case, the entity may not implement the payment model activated at the PSP (so-called “Model 3”).

Finally, it should be noted that both models go beyond the physical location where the payment transaction is carried out and are therefore also open to use through mobile payment, where the mobile phone is configured as an additional device on which to carry out payment transactions in the standard mode.

7.2.4. Exclusive use of the pagoPA system

As previously noted, the obligation to adhere to, activate and make the pagoPA system available to payers concerns PAs, the public-controlled companies indicated in Article 2(2) of the CAD, and public service operators.

This extension of the original subjective scope of application of the CAD was carried out, in accordance with the indications of the delegating legislator, in order to ensure that citizens, regardless of the public or private nature of the entity providing the public service, have similar rights and similar instruments at their disposal for their implementation.

Consistent with this general approach, Article 5(1) of the CAD stipulates that 'The entities referred to in Article 2(2) are obliged to accept, through the platform referred to in Article 2(2), payments due for any reason through electronic payment systems, including, for micropayments, those based on the use of telephone credit'.

In light of the provisions of Article 5 of the CAD, public service

providers - regardless of their public or private legal personality - are obliged to guarantee the users of the public services they provide the right to be able to pay their fees through the pagoPA platform.

Having clarified what has been said so far with regard to the mandatory nature of the obligation, this obligation, however, is more cogent with regard to public administrations, since the various provisions of paragraph 2-quater of Article 5 of the CAD and Article 65, paragraph 2, of Legislative Decree 217/2017 already referred to are provisions aimed at regulating the relationships between payment service providers and public administrations and which for such relationships establish the exclusive use of the pagoPA System for the component of collections.

On the other hand, as specified in an opinion issued by the Extraordinary Commissioner for the implementation of the Digital Agenda, as the competent body for the pagoPA System following the issuance of the Simplification Decree, the obligation to use pagoPA by entities other than public administrations does not imply an exclusive use of the same platform for such entities, since such entities may continue to accept payments from their users also through platforms and instruments other than those made available through the pagoPA System.

7.2.5. Impact on treasury

With regard to the impact on the activities of entities performing treasury and/or cash functions, it should first be noted that AgID has clarified that the Guidelines, constituting secondary legislation, are based on the primary provisions on payments; consequently, the new rules do not affect the criteria for the performance of treasury services in the sense that they do not entail any tasks for treasurers in terms of payment reconciliation, tasks that are left directly to the Creditor Entities. The rules also do not affect the obligation for the treasurers of local authorities to accept the collection of any sum regardless of the information contained in the payment (thus

disregarding the existence or non-existence of the information that, according to the Guidelines, guarantees its reconciliation) and in compliance with Article 180, fourth paragraph, of the TUEL.

It is clear that the obligation to join the Node-SPC also concerns the entities performing treasury functions in the event that they also take on the specific role of collector on behalf of the entity. In this case, the agreements envisaged in the model agreement set out in Appendix 2 of Annex B to the Guidelines may be integrated within the treasury agreement.

In this regard, it is worth recalling the prohibition set forth in Article 65(2) of Legislative Decree No. 217 of 13 December 2017, according to which PSPs, including therefore treasurers and cashiers, must exclusively use the pagoPA platform for payments to public administrations as of 31 December 2019.

Initially, the adaptation of credit institutions to the new collection systems was to start as early as 1 June 2013.

AgID, in the first version of the Guidelines, provided an interpretative reading of this requirement at that time, indicating a new deadline and an appropriate phasing-in for the full implementation of the new rules; the deadline was therefore set at 31 December 2015.

In order to implement this arrangement, AgID further had the opportunity to specify that the procedure for joining the Node-SPC 'constitutes in itself compliance with Article 5 of the CAD, provided that the public administration at the time of joining defines an activation plan that identifies in detail the activities to be carried out and the timeframe for completion by 31 December 2015. The plan may also provide for a gradual activation with reference to the individual services offered'.

This approach allowed a step by step adjustment by limiting the negative effects associated with sudden changes in established operational

and contractual arrangements.

It was further stipulated that the provisions of the Guidelines would apply as from the natural expiry of the existing agreements and negotiated arrangements between credit institutions and PSPs.

The concrete experience in the three-year period 2015/2018 highlights the difficulties in adapting to the deadlines set by the legislator; the significance of the Reform has not yet allowed for the generalized adherence of the entire system and has led to a significant delay on the part of many PAs.

Thus, a new deadline was set that included a form of sanction and the involvement of PSPs (which was in principle considered improper because it involved the control and indirect application of sanctions by third parties).

In particular, the aforementioned Legislative Decree No. 217 of 13 December 2017 provided (in Article 65, paragraph 2) that "The obligation for qualified payment service providers to use exclusively the platform referred to in Article 5, paragraph 2, of Legislative Decree No. 82 of 2005 for payments to public administrations shall take effect as of 1 January 2019".

The rule 'shifts' the obligation to use the platform to the PSPs with the consequence that they should refuse payments improperly ordered by PAs. This entails, on the one hand, the burden of setting up an operation, complex and in some respects impracticable, to identify whether the payment comes from an entity subject to PA payment, and, on the other hand, responsibilities and implications resulting from the refusal of a payment intended to increase the availability of a public entity.

Conclusions

From the beginning of the 21st century, we have witnessed the development and spread of big data as a powerful means for the creation of new digital services and new business models. The phenomenon of big data has, in the context of financial services, led to the emergence of new alternative and disruptive systems of payments which leverage more open markets and new distributed ledger technologies.

The financial payments system is a market segment that is strongly linked to the technology sector and, historically, has always been on the frontier of innovation. In many cases, it is possible to observe the evolution of businesses who have transitioned from being service providers active in other sectors (such as telecommunications or transport) to being established as payment service providers. That evolution is justified not only by the need to facilitate the underlying payments necessary for the use of their services, but also by the existence of networks and economies of scale (and scope).

The financial sector is exploiting innovation to update payments, planning, lending and funding, trading and investment, insurance, cybersecurity, operations, and communications. That innovation represents a spur for a broader digitalization of the many sectors connected to the financial sector.

A good example of that is the role played by digital payment services in the digitalization of public administration. The digitalization of payment services is considered an “enabling factor” for the digitalization of the public administration according to the European e-government action plan 2016-2020, as implemented in Italy by means of the Code of Digital Administration. The National Recovery and Resilience Plan (NRRP) has provided a line of investment (M1C1 - digitalization, innovation e security in the public administration) for the digitalization of the public administration that

is specifically focused on digital payments and seeks to leverage those payments in order to encourage broader innovation.

As is clearly stated in the NRRP's narrative presented to the European Commission, digital payments may fill the digital divide by providing an easier and more immediate way to access the services of the Public Administration. That increase in access is not only to services related to the payment of taxes but also those connected to specific benefits, such as the payment of bonuses or loans.

In the context of public IT systems these innovations lay the foundations for important economies of scale. They enable the disintermediation of the information systems operated by individual state organizations (especially the smaller, less structured organizations) which only have to onboard on "pagoPA" in order to receive its benefits. As pagoPA evolves over time, it will always be in a position to ensure both the best technology and market conditions, as well as constant integration with the entire ecosystem of digital services.

This revolution in payment services has been made possible thanks to a set of regulations which imposed the data-sharing, data portability and interoperability obligations (Payment Service Directive 1 and Payment Service Directive 2, Open Data regulations).

Those data sharing rules have allowed new entrants to gain access to account information stored by the handful of incumbent financial players by means of a specifically developed application programs interface (API) that complies with the rules set out by the GDPR. In this regard, both the GDPR and PSD2 can be regarded as the building blocks of a regulatory strategy aimed at both opening up retail markets and sustaining consumer activity and engagement in the digital landscape.

That same strategy has been further reinforced by the Digital Markets Act, which uses data portability as one of the main tools both to limit the market power of gatekeepers and to assure a competitive playing field.

However, it is important to note how the benefits of "enabling" regulations - as highlighted within Chapter V - risk being nullified in practice.

This is what happens in all cases where new players - like PagoPA - once they enter a market, are faced with increasingly complex compliance models in light of regulatory provisions that are not always clear.

An example is provided by the GDPR provisions regarding data transfer abroad whereas the risk of compliance is particularly critical due to the recent decision of the Court of Justice of the European Union in the Schrems II judgment where the Court invalidated the EU Commission's "privacy shield" decision.[233] This latest decision left an important gap in the applicable framework in that, on the one hand, it invalidated the most commonly used tool for legitimizing data transfers to the U.S. (i.e., "Privacy Shield") and, on the other hand, it also called into question the second most widely used tool, namely the so-called "standard contractual clauses" issued by the EU Commission.

Regulatory uncertainty on the point has generated significant compliance costs. Companies have reacted by restricting services so as not to incur privacy violations, with obvious limitations of services provided and innovation, or by looking for different and time consuming technical adjustments.

All in all, it is apparent that beyond the enabling sectoral rules, it is the general rules that can generate conflicting effects. Burdensome regulations that are accompanied by unclear and often difficult-to-understand rules leave

[233] Decision 2016/1250 on the adequacy of the protection offered by the EU-US privacy shield regime.

compliance officers with the burden of understanding how fast to go in order to stay under the limits but not slow down.

It is therefore no coincidence that a specific article in the DMA is devoted to compliance officers by providing "a requirement for gatekeepers to appoint compliance officers who report directly to the gatekeeper's management body"[234].

Given the challenges highlighted, in the balance between regulation and innovation, the role of the compliance officer, as a steering function for risk strategy, as well as an interpreter of the regulations and the overall framework emerging from the decision-making policy, appears to be strengthened and more important than ever.

[234] Art. 28 "Compliance function". According to the premises (6) to the act "This has created divergent regulatory solutions which results in the fragmentation of the internal market, thus raising the risk of increased compliance costs due to different sets of national regulatory requirements." Available at: https://www.consilium.europa.eu/media/56086/st08722-xx22.pdf

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