Chapter 1: The Macro level: Digital competition – Technology and Business Environment

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> Do not get set into one form, adapt it and build your own, and let it grow, be like water. Empty your mind, be formless, shapeless — like water.

Bruce Lee, A Warrior's Journey

1.1. Introduction

1.1.1. The Main Challenge of Our Digital Future

Shortly before his passing, astrophysicist Stephen Hawking, when answering questions from science fans on his page in the r/science community on Reddit.com, gave the following comment on our society's development prospects related to the on-going technological changes: "If machines produce everything we need, the outcome will depend on how things are distributed. Everyone can enjoy a life of luxurious leisure if the machine-produced wealth is shared, or most people can end up miserably poor if the machine-owners successfully lobby against wealth redistribution. So far, the trend seems to be toward the second option, with technology driving ever-increasing inequality".¹

This fear expressed by Dr. Hawking is not unfamiliar to the BRICS leaders. Russian President Vladimir Putin shared similar concerns while addressing an international audience at the St. Petersburg Economic Forum held on 6-8 June, 2019: "Monopoly always means concentration of incomes in the hands of the few at the expense of all the rest, and in this sense, attempts to monopolise the new technological wave, limiting access to its results, are taking the problem of global inequality both among countries and regions and within countries themselves to an absolutely new and different level. And we are well aware that this is the main source of instability. It is not only about the level of incomes, income inequality, it is about the fundamental difference in people's opportunities. In fact, in the making there is an attempt to form two worlds, and the gap between them keeps growing. Where some people have access to the most advanced systems of education, health, modern technologies, others have neither prospects, nor chances to

¹ Hawking S. AMA Answers // The New Reddit Journal of Science. Science AMA Series. Submitted on 08 Oct 2015. URL: https://www.reddit.com/r/science/comments/3nyn5i/science_ama_series_stephen_hawking_ama_answers/cvsdmkv/

escape poverty, and still others are hardly balancing on the verge of survival"².

Chinese President Xi Jinping in his recent keynote speech at the World Economic Forum was also highlighting this problem emphasizing that "[t]he richest one percent of the world's population own more wealth than the remaining 99 percent" and "[i]nequality in income distribution and uneven development space are worrying"³. And he concludes that growing global inequality "is the biggest challenge facing the world today"⁴.

The first-ever Digital Economy Report released on 4 September 2019 by the United Nations also highlights this problem, as noted by the UN Secretary-General António Guterres, in a foreword to the report: "Digital advances have generated enormous wealth in record time, but that wealth has been concentrated around a small number of individuals, companies and countries. Under current policies and regulations, this trajectory is likely to continue, further contributing to rising inequality"⁵.

Recent empirical research has revealed that over the last 25 years, the top 1% have gained more income than the bottom 50% put together and "[f]ar from trickling down, income and wealth are being sucked upwards at an alarming rate"⁶. As an outcome, since 2015, the richest 1% has owned more wealth than the rest of the planet⁷.

Risks of ignoring this problem may be extremely high. For example, Joseph E. Stiglitz points out in his well-known book "The Price of Inequality" that growing inequality leads to significant losses for societies and governments, as well as provoking development imbalances that result in long-term instability.

This is not just a problem of some individuals or even countries that had a run of bad luck and find themselves at the bottom of social or global hierarchy, but relates to a wider problem of performance, resilience and in the long run survival of the entire human society: "Widely unequal societies do not function efficiently, and their economies are neither stable nor sustainable in the long term⁸", Stiglitz concludes.

Unfortunately, as this concern over a surge in inequality at the current stage of industrial revolution has actually become almost a truism in the current discussions about the digital economy⁹, very few actual measures to tackle this problem are implemented. The UNCTAD, which highlighted this problem in the recent UN Digital Economy Report, has

- 2 <u>http://kremlin.ru/events/president/news/60707?fbclid=lwAR38iZbXoaP2u4H0E2Ht2LCuosyyrXmw_jAGwmJnMLk7R1lK_NA1KTa9VUc</u>
- 3 Keynote Speech by H.E. Xi Jinping, President of the People's Republic of China at the Opening Session of the World Economic Forum Annual Meeting 2017, Davos, 17 January 2017, <u>https://america.cgtn.com/2017/01/17/full-text-of-xi-jinping-keynote-at-the-world-economic-forum</u>
- 4 Ibid
- 5 The Digital Economy Report 2019, UNCTAD, <u>https://unctad.org/en/PublicationsLibrary/der2019_en.pdf</u>
- 6 Oxfam, An Economy for the 99%, Oxfam Briefing Paper, 2017, <u>https://www-cdn.oxfam.org/s3fs-public/file_attachments/</u> bp-economy-for-99-percent-160117-en.pdf
- 7 Ibid.
- Stiglitz J. The Price of Inequality: How Today's Divided Society Endangers Our Future. W. W. Norton Company, 2012. P.
 83
- 9 See, for instance: Piketty T. Capital in the Twenty-First Century. Harvard University Press, 2014; H.Ekbia, B.Nardi, Heteromation, and Other Stories of Computing and Capitalism (MIT Press, 2017)

already been vocal about this for a number of years, as, for instance, in its 2017 annual report, it mentioned that "hyperglobalization has led to a considerable concentration of economic power and wealth in the hands of a remarkably small number of people"¹⁰.

Far from being solved, this problem is only getting worse against the backdrop of current technological shifts and the global economy's transition to a new quality – the digital economy. Digitalization has played a major role in making the global economy more globalized and interconnected. But it has also probably contributed to another major redistribution of wealth on the global scale. There are different opinions on the factors that contributed to this redistribution of wealth happening in the context of the digitalization of the global economy. But it would be myopic not to pay attention to one particular phenomenon that is also closely related to the competition law and policy debate in the digital economy.

The growing world power of digital platforms, which like spiders drag an increasing number of economic activities and economic values into their digital webs, worsens rather than reduces the inequality problem. As the UN Digital Economy Report shows, the platform-based economy is growing fast with an estimated combined market value of the leading digital platform companies becoming 67 per cent higher just in a period of two years between 2015 and 2017, when it increased from 4 to 7 trillion USD¹¹. Add to this that already in 2018 and 2019 Apple, Amazon and Microsoft – three out of seven "super platforms" (Microsoft, Apple, Amazon, Google, Facebook, Tencent and Alibaba), each exceeded a \$1 trillion market valuation. At the same time, some empirical studies conducted recently show that the rapid process of digitalization during the past decade does not seem to have translated into strong productivity growth; on the contrary, that growth has slowed¹². According to the UNCTAD, global employment in the information and communication technology sector increased from 34 million in 2010 to 39 million in 2015, and the share of this sector in total employment rose over the same period, from 1.8 per cent to 2 per cent.

This quite limited achievement of the digital economy in bringing a rise both in productivity and employment on the global scale compared with the soaring market valuation of the major digital platforms could be a sign of a serious flaw in the legal and economic regulation of the digital economy in need of being addressed. The hyperglobalization and digitalization have become mutually supportive forces driving the growth of inequality in the global economy. Vladimir Lenin shortly after the Russian Revolution marking the destruction of the old world of empires and the beginning of painful transition towards a new economic order famously stated that "Communism is Soviet power plus the electrification of the whole country".¹³ The modern leaders of digital capitalism

¹⁰ UNCTAD Trade and Development Report 2017, <u>https://unctad.org/en/PublicationsLibrary/tdr2017_en.pdf</u>

¹¹ Ibid. P. 83

¹² Crafts N. The productivity slowdown: Is it the 'new normal'? Oxford Review of Economic Policy, 2018, 34(3): 443–460; Gordon R. The Rise and Fall of American Growth: The U.S. Standard of Living Since the Civil War (Princeton University Press 2016)

¹³ Vladimir Lenin, Report on the Work of the Council of People's Commissars. December 22, 1920. Source: V. I. Lenin, Collected Works (Moscow: Progress Publishers, 1964), Vol. XXXI, pp. 513-518.

could say that the digital economy is market power plus the digitalization of the whole world.

This story of interlinked digitalization and globalization are important elements of a new mythology of the extractive or 'predatory' capitalism as Mariana Mazzucato¹⁴ has neatly put it. In her book on 'making and taking' in the global economy, she emphasizes the importance of storytelling and naming for defining actual economic policy. She notices that "[t]he confused and misleading approach to the concept of value that is currently dominating economics" is generating some paradoxical government policies – for instance, incentivizing unproductive activities like advertising that constitutes the main source of profits for the Internet platforms but not the activities that is of most importance for societies and cohesive economic development.¹⁵One of the key consequences of this confused and misleading approach to understanding value creation and allocation, according to Mazzucato, is a government's failure to address an apparent connection between the digital monopolies and falling incomes of the global population. She highlights this connection through privatization of data in the sole interest of the corporate giants' profit maximization, that in its turn produces "a new form of inequality – the skewed access to the profits generated from big data".¹⁶

The concepts are important, and we have to keep in mind that with the advance of the digital economy and a number of new phenomena accompanying its development there would be more and more attempts to reframe the discourse in economics and law in the interest of the main beneficiaries of the new economic order. The UN Digital Economy Report emphasizes that "lobbying in domestic and international policy-making circles" is an important mechanism for global digital platforms to consolidate their competitive positions.¹⁷ Some narratives that are fed to the regulators all around the world can actually be intentionally confusing and hide the real meaning of things. Like a famous motto "Competition is just one click away"¹⁸ produced and promoted by Google in defense of abusive conduct accusations. Indeed, "a Google search for "one click away" produces over 9.5 million results, almost as many as "In God we Trust," slightly more than "girls just wanna have fun," and more than 50 times more than "God Save America", – calculated Eric Clemons, Professor of Operations Information and Decisions at Wharton Business School.¹⁹

"If names be not correct, language is not in accordance with the truth of things. If language be not in accordance with the truth of things, affairs cannot be carried on to success. When affairs cannot be carried on to success, proprieties and music will not flourish. When proprieties and music do not flourish, punishments will not be properly

¹⁴ Mazzucato M. The Value of Everything. Making and Taking in the Global Economy (Penguin Books, 2019)

¹⁵ Ibid. P. 221

¹⁶ Ibid.

¹⁷ The Digital Economy Report 2019, UNCTAD, P. 84

¹⁸ Google's Approach to Competition, Google's Public Policy Blog, May 8, 2009, <u>https://publicpolicy.googleblog.</u> <u>com/2009/05/googles-approach-to-competition.html</u>

¹⁹ Clemons E. One Click Away? Maybe and Maybe Not, Huffington Post, 08.16.2011, <u>https://www.huffpost.com/entry/</u> google-one-click-away_b_928009

awarded. When punishments are not properly awarded, the people do not know how to move hand or foot»,²⁰ – Confucius warns us in his Analects.

As not much has yet been done to help to change the current trajectory of the digital economy development leading to an ever-increasing market power of the digital platforms and soaring inequality, it is probably time to ask ourselves the question Confucius asked his students – if we indeed speak "in accordance with the truth of things".

1.1.2. A Mechanistic Trap of Modern Competition Law

What is the actual meaning of the digital economy as a social phenomenon? Is this a new quality of the economic system? A real technological breakthrough? Or rather a new way to sell the old neoliberal vision of the global economy to the general public and policy makers to loosen regulation and allow monopolies to avoid proper checks and balances on their market power, just another marketing trick?

Evgeny Morozov sees the pervasive enthusiasm about the digital economy among the global business and expert leaders as another attempt to "make the idea of capitalism more morally acceptable".²¹ He records how "capitalist thinkers still look to Silicon Valley and its culture with a glimmer of hope" as the digital economy "occupies a prominent role on the horizon of the Western capitalist imaginary" and offers "a promising field for regenerative mythologies".²²

This 'capitalist imaginary' could be not a harmless thing. For instance, Mariana Mazzucato mentions that "in the absence of strong, transnational, countervailing regulatory forces, firms that first establish market control in the digital economy reap extraordinary rewards".²³ Why would these "strong, transnational, countervailing regulatory forces" be still missing after so many years of debate about the growing inequality and disbalances in the world economy?

The UN Digital Economy Report reminds us that "technology is not deterministic" – it is totally up to governments and other stakeholders to "shape the digital economy" by defining the rules of the game.²⁴ So, it becomes imperative for governments all around the world to define these rules according to the nature of things belonging to the digital era. Ideally, if these rules could form a holistic vision for tomorrow's society beneficial for all.

Ronald Dworkin has suggested that the legal system constitutes what is designed "to share the sense of purpose of the [legal] enterprise", which is realized in society by all its members as inherently equal.²⁵ Without this framework of solidarity and common

²⁰ James Legge, The Analects of Confucius, Chapter 14, <u>https://ebooks.adelaide.edu.au/c/confucius/c748a/complete.html</u>

²¹ Morozov E., Digital Socialism? The Calculation Debate in the Age of Big Data, New Left Review, 116/117, March-June, 2019, https://newleftreview.org/issues/II116/articles/evgeny-morozov-digital-socialism

²² Ibid.

²³ Mazzucato M. The Value of Everything. Making and Taking in the Global Economy (Penguin Books, 2019), P. 220

²⁴ The Digital Economy Report 2019, UNCTAD, P. 123

²⁵ Dworkin R. Justice for Hedgehogs. Harvard University Press, 2011. P. 353-354.

sense of purpose, law as the mechanism for governing social development loses all its meaning.

Michael Agarkov, a prominent Russian and Soviet legal scholar, who lived through the major socio-economic transition of the early 20th century, noted that at the start of the 20th century "an integral world outlook had already ceased to exist, and science had to turn to the key issues of civil law, verify old truths, get rid of the obsolete and formulate anew its own basic premises" ²⁶ This search for "integral world outlook" is also clear to the present-day policy makers irrespective of the country where they work when they deal with the new phenomena of the digital economy.

At the same time, many regulatory attempts that we can see in the sphere of the digital economy are quite often fit into the mechanistic tradition in understanding law, a relatively simple model based on classification and linear logic. Legislators across the world are overwhelmed with heated debates over big data, digital platforms, social networks and AI – but are developing fragmented regulatory regimes for each of these phenomena without defining an integral vision of a digital future that is desirable. As a matter of fact, such a legislative work based on the mechanistic legal tradition often leads to a single practical outcome – it helps to retain the status-quo without a real search for answers to the "accursed questions" ranging from distribution of benefits and risks to the sustainable development of the digital economy.

Mechanistic law, through its conversion into a closed system based on certain classifications and linear logic, became a historical fact of the industrial era. Ugo Mattei and Fritjof Capra thoroughly examined this development of the law in the context of industrialization of the past century. According to them, the current outcome of the evolution of law has become its adjustment to the laws of industrial economics: "The mechanistic trap promotes a vision of the legal system as an aggregate of pre-existing legal rules that abstractly bind everybody, both the weak and the strong. This ideology makes plain, law-abiding people think of law almost as if it were a set of instructions to assemble a potentially dangerous appliance".²⁷ The problem mechanistic application of law, to which the authors of the study refer as "a mechanistic trap" is that it constitutes, in their opinion, one of the gravest problems inherited by modern jurisprudence and legal practice from the industrial era.

Enthusiasm for machines and mechanisms at the time of the 20th century's industrialization brought about a relevant mindset, which in many ways stripped law of the living spirit and by so doing made law unfitted to effectively meet the key challenge of today – a new stage of industrial revolution. The lower adaptability of law due to its mechanization and transformation into a closed system makes it poorly geared to the present-day challenges of the digital era. The key element of the new economic and social reality – an unprecedentedly high speed and multidirectional nature of the on-going change – was

Агарков М.М. Ценность частного права // Агарков М.М. Избранные труды по гражданскому праву в 2-х томах.
 Т. 1. М. 2002. С. 49. (М.М. Agarkov. Value of Private Law// М.М. Agarkov. Selected works on civil law in 2 volumes. V.1.
 M.2002. P.49)

²⁷ Carpa F., Mattei U. Op. Cit. P. 125.

well captured by the sociologist Zygmunt Bauman in his book "Fluid Modernity".

Bauman has described the state of humanity at its current development stage through the properties of liquid:

"Liquids, unlike solids, cannot easily hold their shape. Fluids, so to speak, neither fix space nor bind time. While solids have clear spatial dimensions but neutralize the impact, and thus downgrade the significance, of time (effectively resist its flow or render it irrelevant), fluids do not keep to any shape for long and are constantly ready (and prone) to change it; and so for them it is the flow of time that counts, more than the space they happen to occupy: that space, after all, they fill but 'for a moment'. In a sense, solids cancel time; for liquids, on the contrary, it is mostly time that matters. When describing solids, one may ignore time altogether; in describing fluids, to leave time out of account would be a grievous mistake. Descriptions of fluids are all snapshots, and they need a date at the bottom of the picture. Fluids travel easily. They 'flow', 'spill', 'run out', 'splash', 'pour over', 'leak', 'flood', 'spray', 'drip', 'seep', 'ooze'; unlike solids, they are not easily stopped - they pass around some obstacles, dissolve some others and bore or soak their way through others still. From the meeting with solids they emerge unscathed, while the solids they have met, if they stay solid, are changed - get moist or drenched. The extraordinary mobility of fluids is what associates them with the idea of 'lightness' There are liquids which, cubic inch for cubic inch, are heavier than many solids, but we are inclined nonetheless to visualize them all as lighter, less 'weighty' than everything solid. We associate 'lightness' or 'weightlessness' with mobility and inconstancy: we know from practice that the lighter we travel the easier and faster we move. These are reasons to consider 'fluidity' or 'liquidity' as fitting metaphors when we wish to grasp the nature of the present, in many ways novel, phase in the history of modernity."28

What happens when the fluid digital economy encounters the mechanistic laws embedded in a solid form? It just bypasses such objects without any significant impact of the latter thereon. Or should the obstacle be large, such a solid object may block the movement of liquid, but as with any dam it is able to do it only to a certain extent.

It seems extremely important to recognize the fundamental nature of such conflict between our current laws and the liquid economic environment. It is not accidental that over a century ago when criticizing the scholastic realism of legal concepts, German philosopher Oswald Spengler stressed: "The future calls for restructuring of the entire legal thinking on the analogy with advanced physics and advanced maths".²⁹

Today, humanity is faced with quite existential challenges: the current inequality level multiplied by the on-going changes related to the new industrial revolution bringing up similar questions. Far from being prepared for such challenges, we approach them armed with such means that hinder rather than help to overcome them.

²⁸ Bauman Z. Fluid Modernity, SPB., 2008, p.8

²⁹ Шпенглер О. Закат Европы. Т. 2. М., 1998. С.85-86. (О. Shpengler. The Decline of the West. V.2, M., pages 85-86)

In a recent report of the World Economy Forum "Out Shared Digital Future", the following point was singled out from among its key observations: "Our existing institutions are struggling to respond effectively to the pace of change and its distributed nature".³⁰ The centuries-old legal system has today come up against a challenge to its ability to remain a functional mechanism for regulating and resolving fundamental social issues and controversies.

The modern world, permeated with computer-aided and other new technologies, can no longer be described in the legal parlance based on classical rationalism. In the view of the world taken by today's law, such categories as "equation" and "necessity" are gradually put on the back burners, whereas the notions of "likelihood", "probability" and "chance" prove to be increasingly relevant. In fact, law is on the threshold of a systemic shift and transformation: "Today we are told that nature and society have never had and will never have any unalterable laws. Only time will tell how law makers and those who apply law will take this 'welcome news' from today's science, and what conclusions they will draw".³¹ Forward-looking law-making initiatives in the digital economy are those that make the legal system more flexible and adaptive.

1.1.3. Competition Law for the Fluid Modernity

Going back to the inequality problem and its connection with the new desirable legal framework, one has to start from the fact that the substance of laws is never confined to the natural laws of economic development. Law cannot be devoid of the value dimension, it is not an exact science.

In the digital economy, society may be very different, and as evidenced in practice, its spontaneous development tends to result in growing inequality. Therefore, reconfiguration of legal regulation, its adjustment to the dynamic processes of digitalization does not rule out but, on the contrary, makes a certain *teleological and value choice* inevitable. This means that the policy of law should rely on certain ideals and be developed in unity with economic and social policies.

Just as a hundred years ago, when humanity was faced with the challenges of fast track industrialization, the current stage of industrial revolution also raises its own grave existential questions. Extreme inequality risks launching a spiral of even more radical social stratification, which is capable, in turn, of eliminating the remaining social solidarity in global society.

The problem of 'rigid' law, which, according to U. Mattei and F. Carpa, has fallen into a 'mechanistic trap' and turned into a rather isolated system of rules, is very acute to all developing countries. A serious approach to reforming the legal system due to the challenges of the digital economy should, in our opinion, first of all suggest a revival of the legal 'fiber', a connection of the goals and objectives of economic development with legal

³⁰Our Shared Digital Future: Building an Inclusive, Trustworthy and Sustainable Digital Society, WEF Report, 2018, https://www.weforum.org/reports/our-shared-digital-future-building-an-inclusive-trustworthy-and-sustainable-digital-society

³¹ Мальцев Г.В. Социальные основания права. М., 2011. С.70. (G.V.Maltsev. Social Grounds for Law. M., 2011, p.70)

regulatory mechanisms. The most critical sphere of economic life at which the revival of the laws should be aimed is the sphere of diffusion of knowledge and information.

According to Thomas Piketty, "over the long period of time, the main force in favor of greater equality has been the diffusion of knowledge and skills".³² At the same time, Piketty notes that the all-round spread of knowledge and technologies, which promotes greater equality, very often comes under pressure from forces that oppose such spread: "The crucial fact is that no matter how potent a force the diffusion of knowledge and skills may be, especially in promoting convergence between countries, it can nevertheless be thwarted and overwhelmed by powerful forces pushing in the opposite direction, toward greater inequality".³³

Greater access to knowledge and advanced technologies, especially in developing countries is a powerful tool for overcoming inequality. Therefore, this is the most important goal in adapting legal norms to the needs of the digital economy.

In a recent report prepared by a team of economists led by Dean Baker and Joseph Stiglitz, they analyze the impact of the existing laws of intellectual property on the dynamics of world economic development. The authors conclude: "If the knowledge economy and the economy of ideas is to be a key part of the global economy and if static societies are to be transformed into 'learning societies' that are key for growth and development, there is a desperate need to rethink the current regime and to allow for a much less restrictive flow of information and knowledge".³⁴

The practical implementation of this objective gives a special place to competition laws. The principal drafter of the first antitrust law in the world, the US senator John Sherman who caught the wave of the industrial revolution at the turn of the 20th century with his legislative initiative, was urging the US Congress to pass his bill with the following words: "Sir, now the people of the United States, as well as other countries are feeling the power and the grasp of these combinations, and are demanding of every Legislature and of Congress a remedy for this evil, only grown into huge proportions in recent times. They had monopolies and mortmains of old, but never before such giants as in our day. You must heed their appeal or be ready for the socialist, the communist and the nihilist".³⁵

From that time flexibility became the key distinctive feature of antitrust regulation in all countries that passed relevant laws, but especially in those where the mechanism of competition law was initially developed to ensure effective performance of the capitalist system. Flexibility and focus on keeping the market competitive and preventing excessive concentration of market power determine the specifics of the mechanism for application of competition laws.

³² Piketty T. Op. cit. I P. 22

³³ Ibid.

³⁴ Baker D., Jayadev A., Stiglitz J. Innovation, Intellectual Property, and Development: A Better Set of Approaches for the 21st Century. CEPR Report. 2017. P. 7. URL: <u>http://cepr.net/publications/reports/innovation-intellectual-property-and-</u> <u>development-a-better-set-of-approaches-for-the-21st-century</u>

³⁵ Congressional Records. 1896. Vol. 21.

Giuliano Amato, a former prime-minister of Italy and one of the leaders of the European Constitution project, describes this nature as follows:

"Antitrust law was, as we know, invented neither by the technicians of commercial law (though they became its first specialists) nor by economists themselves (though they supplied its most solid cultural background). It was instead desired by politicians and (in Europe) by scholars attentive to the pillars of the democratic systems, who saw it as an answer (if not "the" answer) to a crucial problem for democracy: the emergence from the company or firm, as an expression of the fundamental freedom of individuals, of the opposite phenomenon of private power; a power devoid of legitimation and dangerously capable of infringing not just the economic freedom of other private individuals, but also the balance of public decisions exposed to its domineering strength".³⁶

The OECD report "Inequality: A Hidden Cost of Market Power" shows the fallacy of the view that competition policy should distance itself from the problem of wealth concentration and distribution.³⁷

From the very first days of antitrust law emerging on the wave of the US industrial revolution in the late 19th century, it was aimed in its core at balancing the capitalist system in order to remove social and economic tensions that were inevitably emerging against the background of dynamic growth and sweeping transformations. According to Joseph Stiglitz: "The changes in our economy and our understandings of the interplay between economics and politics necessitates a broader reach for competition policy than envisaged by the original advocates of antitrust law, and that this is especially so in developing countries and emerging markets".³⁸ In a similar vein, the UN Digital Economy Report is urging for adapting existing competition law frameworks "to ensure markets remain competitive and contestable in the digital era".³⁹

Unlike positive regulation aimed at the establishment of fixed rules, competition law is a flexible instrument of responding to problems and "bottlenecks" in economic development. In the context of the new technological paradigm, antitrust regulation should be designed above all to remove barriers to entering new markets and ensure broader access to key technologies and knowledge. It is the revival of law, its greater flexibility, that should be aspired by law-makers in developing countries willing to make their economies competitive in the 21st century.

In confronting growing global instability and inequality, solutions that strengthen the role of humans as actors in the digital economy may be among the most important. Humans should be provided with greater opportunities for self-fulfillment in the context of the growing "power of machines" and the power of those who mostly benefit from

³⁶ Amato G. Antitrust and the Bounds of Power. Oxford, 1997. P. 2.

³⁷ Inequality: A Hidden Cost of Market Power. Ennis, S. et al. OECD, 2017. URL : http://www.oecd.org/daf/competition/ inequality-a-hidden-cost-of-market-power.htm

³⁸ Stiglitz J. Towards A Broader View of Competition Policy // Roosevelt Institute Working Paper. June 2017. URL: <u>http://</u> rooseveltinstitute.org/towards-broader-view-competition-policy/

³⁹ The Digital Economy Report 2019, UNCTAD, P. 137

the digital economy – Internet monopolies. From this point of view, Eleanor Fox quite logically insists that, "[a] vision of human rights that includes human economic welfare, in addition to the neoclassical economic view of aggregate economic welfare, is therefore necessary".⁴⁰ Stronger legal positions of human beings, new opportunities provided thereto should become the basis for defining new legislative initiatives across the world.

A human-centric approach to the IP rights protection; promotion of open access and data commons regimes; more emphasize on ethical and sustainable development of technologies and digital services – all this can be included into the competition assessment matrix for the sake of more efficient responding to the major challenges of the digital era.

And finally, it is desirable to keep trying to establish an effective global regime for the protection of fair and equitable competition in the digital economy. Today such a global legal framework does not exist. The BRICS countries could make an important and practical contribution to a closer reach to this goal in the interests of sustainable social and economic development for all in the digital era.

1.1.4. Global Nature of Competition Regulation

The end of the Cold War, along with the established Washington consensus that the wealth of nations will result from trade and investment liberalization, privatization and deregulation,⁴¹ changed the perceived nature of the global marketplace and opened doors for new opportunities, including for ones "in the area of competition law."⁴²

Along with geopolitical changes, another important shift well symbolized by the Internet had a transformative impact on the global marketplace by virtue of new communicative and information technologies. This transformation changed the perception of the global marketplace, allowing some commentators to say that, "the Web-enabled playing field" rendered the world flat.⁴³

The idea of a free and open global market became extremely powerful in the 1990s and spread around the world. The rise of this new perception provided the momentum for institutional and legal changes. As Jon Hanson put it, "In brief, what changed was the meta script,"⁴⁴ which forms the ideas, concepts and conclusions comprising the first and "highest" level of the law".⁴⁵

"What we may be witnessing is not just the end of the Cold War, <...>, but the end of history as such: that is, the end point of mankind's ideological evolution and the universal-

⁴⁰ Fox E., Globalization and Human Rights: Looking Out for the Welfare of the Worst Off, 35 N.Y.U. J. Int'l L. & Pol. 202 (2002)

⁴¹ Rainer Geiger, 'The Development of the World Economy and Competition Law' in Roger Zach and Andreas Heinmann (eds) The Development of Competition Law: Global Perspectives (Edward Elgar 2010) 235, 238

⁴² Eleanor Fox, 'Toward World Antitrust and Market Access' (1997) 91 Am. J. Int'l L. 1

⁴³ Thomas Friedman, The World Is Flat 176 (New York, 2005)

Jon Hanson and Ronald Chen, 'The Illusion of Law: The Legitimating Schemas of Modern Policy and Corporate Law' (2004) 103 Mich. L. Rev. 4, 10 (hereafter Hanson and Chen, 'The Illusion of Law')

⁴⁵ Ibid, 6

ization of Western liberal democracy as the final form of human government."⁴⁶ – was famously proclaimed by Francis Fukuyama. This neo-liberal agenda, like Milton Friedman's assertion that, "the operation of the free market... foster[s] harmony and peace among the people of the world,"⁴⁷ and focus on consumer welfare, triggered a broader question – why is it that competition law calculus does not include consumer welfare of other nations?

It is quite consistent with the faith in a free and open market, which, according to Richard Posner, "works best to achieve the common goals of most people in the world"⁴⁸ to consider the consumer demands as just consumer but not political actors. Chris Noonan insists that, "[t]he process [towards global competition law] should start by building a consensus among states that the long-term interests of all states would be advanced if international competition law had the overall objective of maximizing global consumer welfare."⁴⁹

But it did not happen. Although the global consumer welfare prescription is based on the ideological paradigm promoted as a part of the liberalization project, but the practical interests of the major states did not allow it to become a normative prescription in the legal framework of the global economy. Neither in the framework of the International Trade Organization in the 1940s, nor in the context of the United Nations in 70s and 80s, nor under the World Trade Organization's umbrella, the global competition law regime did not play out.

But a direct outcome of those numerous initiatives to establish a global cohesive legal regime for economic competition in the world has led to a particular role for competition law to play. Dissemination of competition regimes around the world and adoption of competition values by most of the world jurisdictions and international organizations have led to a series of effects making competition law an important factor in regulating the global economy distinct from other legal regimes (primarily of ex-ante regulations) also not unified under the international laws but not having such international recognition and allow for various forms of market intervention to protect competition. Also, the principle of competition protection is central to a whole range of key international agreements. For example, the Agreement on Trade Related Aspects of Intellectual Property Rights within the WTO directly provides for national states to limit the rights of intellectual property in order to protect competition.

Competition law receptive to international cooperation strongly improves the effectiveness of its application. For instance, if BRICS countries or those of other blocs of emerg

⁴⁶ Francis Fukuyama, 'The End of History?' The National Interest (Summer 1989) 3 (hereafter Fukuyama, 'The End of History?')

⁴⁷ Free to Choose: Vol. 1: The Power of the Market: The Pencil Story (1980), <u>http://www.freetochoose.tv/</u>

⁴⁸ Richard Posner, Law and Economics is Moral in Adam Smith and the Philosophy of Law and Economics 170 (ed. Robin Paul Malloy & Jerry Evensky, Kluwer Academic Publishers, 1994)

⁴⁹ Chris Noonan, The Emerging Principles of International Competition Law 561 (Oxford University Press, 2008)

ing economies take coordinated decisions on global monopolists, such decisions will be impossible to ignore.

These special features add more regulatory impact on global economic processes to countries that otherwise carry little weight in the world economy and are unable for this reason to set effective global market rules. Considering almost global acceptance by the major jurisdictions of the value of competitive process, competition law makes it possible for even small economies to influence the global processes of economic life in the new technological paradigm if they impose some nuanced restrictions on the global digital players in line with competition law analysis.

The range of tools for competition protection is quite broad and can be adapted to solve key objectives of fixing "bottlenecks" of the global digital economy, namely, ensuring access to the key elements of global infrastructure of the digital economy – above all to data and knowledge. It is apt to wonder would it be much a stretch to say that competition law is a relatively unique mechanism of the regulatory impact of small and medium-sized economies on global economic processes unfolding in the digital economy.

Evolving BRICS cooperation in the sphere of competition law and policy can provide a new hope for the global economy. This cooperation is aimed to embrace the peculiarities of globalization in its current phase. What is common for the BRICS jurisdictions is that they are all in search of a solution allowing to shortcut the developmental track. This experimentalist energy and creativity being the main characteristics of the group are extremely important for the current phase of global economic development. It is not only an institutional structure of the global order that is in transition but also the very nature of the global marketplace. The key focus of the new global competition policy should be the facilitation of openness among global networks and value chains through the reduction of the manipulative and exclusionary potential of digital platforms. The BRICS cooperation has an important role in making the global marketplace both fairer and more equal as it has an ability to promote a form of competition encouraging a broader dissemination of knowledge and advanced technologies that would cover the largest percentage of the world population, while eliminating barriers imposed on the global flows of innovation by both the global technological monopolies and cartel-like technological joint ventures burgeoning within their "walled gardens" at the expense of the excluded consumers and entrepreneurs around the world.

In the following chapters of this report, we explore in more details how the digital economy challenges can be converted into policy solutions and actual steps in improving competition law practice and legislation in the BRICS countries. The UN Digital Economy Report concludes that "there is a growing need for competition policy to be set and enforced within regional or global frameworks"⁵⁰. We hope that the timely initiative of the BRICS countries to further advance cooperation in the competition law and policy domain can address this need.

⁵⁰ The Digital Economy Report 2019, UNCTAD, P. 138

1.1.5. The emergence of digital financial capitalism

One of the crucial hypotheses of this report is that financialization lays at the center of the shift toward digital or informational capitalism: the term denotes the focus of modern capitalism on the predominance of the shareholder-value perspective, according to which firms and corporations are largely accountable for maximizing the short-term benefits of their shareholders through IPOs, collective ownership, stock buybacks, and other financial instruments. To accomplish this, starting in the 1980s, firms reversed from the allocation regime of 'retain and reinvest', where companies invested their revenues in job-creating innovations in organization and technology, to a regime of 'downsize and redistribute' that is focused on the allocation of revenues to shareholders. Lazonick traces these developments in terms of a shift from an 'old-economy business model' (OEBM) to 'new-economy business model' (NEBM)⁵¹. This shift, according to Lazonick, took place at different levels and on various dimensions, including models and practices of technological innovation, corporate governance, and capital investment, particularly in the high-tech world of Silicon Valley.

In brief outline, the adoption of open-systems standards by major players of the computer industry led to the weakening or abandonment of internal R&D within major corporations in favor of patenting, cross-licensing, outsourcing, and the takeover of start-ups. Technically, this was accompanied by the design and development of modular components that were manufactured by offshore companies and vertically integrated in niche markets. Financially, the shift was made possible through the rise of organized venture capital, cushioned by large investment from large retirement and pension funds (see Table 1.1.). These had important implications on the nature of work and led to important changes in the patterns of employment in these large corporations from the late 1970s, a process that accentuated with the development of personal computing and the Internet in the 1980s and 1990s.

	OEBM	NEBM				
Strategy, product	Growth by building on internal capabili- ties; business expansion into new product markets based on related technologies; geographic expansion to access national product markets.	New firm entry into specialized mar- kets; sale of branded components to system integrators; accumulation of new capabilities by acquiring young technology firms.				
Strategy, process	Corporate R&D labs; develop ment and patenting of proprietary technologies; vertical integration of the value chain, at home and abroad.	Cross-licensing of technology based on open systems; vertical specialization of the value chain; outsourcing and off- shoring.				
Finance	Venture finance from personal savings, family, and business associates; NYSE listing; payment of steady dividends; growth finance from retentions lever- aged with bond issues.	Organized venture capital; initial pub- lic offering on NASDAQ; low or no divi- dends; growth finance from retentions plus stock as acquisition currency; stock repur chases to support stock price.				

51 W. Lazonick, The New Economy Business Model and the Crisis of U.S. Capitalism, (2009) 4(2) Capitalism and Society, Article 4.

	OEBM	NEBM
Organization	Secure employment: career with one company; salaried and hourly employ- ees; unions; defined-benefit pensions; employer-funded medical insurance in employment and retirement.	Insecure employment: interfirm mobili- ty of labour; broad-based stock options; non-union; defined-contribution pen- sions; employee bears greater burden of medical insurance.

The emergence of the Fintech industry provides an illustration of the complex interplay between the processes of datafication and financialization and the emergence of specific forms of digital competition that may look different from the competitive process in the 'Old Economy'.

1.1.6. Case study: Fintech and banks in the Digital era

'Fintech' became a buzzword several years ago with the emergence of a large number of start-ups offering innovative financial services and promising to re-shape the future of finance.

Fintech is an abbreviation for Financial Technologies and refers to organizations where 'financial services are delivered through a better experience using digital technologies to reduce costs, increase revenue and remove friction'.⁵² The business models based entirely on digital products set them apart from traditional banks whose services might be similar but originally lacked a digital component.⁵³

There are certain difficulties in defining the exact scope of Fintech. However, there are easily identifiable product clusters, such as payments, lending/crowdfunding, deposits, financial planning, trading and investments, insurance, digital currency, wealth and asset management, enabling technologies and infrastructures.⁵⁴ This reflects the gradual diffusion of Fintech into areas that have been a domain of traditional banking institutions (such as lending), as well as the emergence of completely new areas such as the trading of digital assets.

Over recent years, investment in Fintech has been increasing exponentially and reached \$111.8 billion in 2018⁵⁵ (compared with \$19.9 billion in 2014),⁵⁶ more than doubling during 2018 alone. Though the information on the overall market volumes of Fintech activities is scant, the indicators related to specific markets show its significant growth. Thus, the volume of marketplace lending has increased from

⁵² Jim Marous, 'The Future of Banking: Fintech or Techfin?' Forbes (27 August 2018) https://www.forbes.com/sites/jimmarous/2018/08/27/future-of-banking-fintech-or-techfin-technology/#23c7024a5f2d accessed 19 January 2019.

Rory Van Loo, 'Making Innovation More Competitive: The Case of Fintech' (2018) 65:1 UCLA Law Review 232, 239.

⁵⁴ ibid 11; IOSCO (2017) 'Research Report on Financial Technologies (FinTech)' 4, <u>https://www.iosco.org/library/pubdocs/pdf/IOSCOPD554.pdf</u> accessed 31 March 2019.

⁵⁵ KPMG, 'The Pulse of Fintech 2018: Biannual Global Analysis of Investment in Fintech' (13 February 2019) <u>https://assets.</u> kpmg/content/dam/kpmg/xx/pdf/2019/02/the-pulse-of-fintech-2018.pdf accessed 31 March 2019.

^{56 &#}x27;2018 is Already a Record Year for Global FinTech Investment' (11 July 2018) https://fintech.global/2018-is-already-a-record-year-for-global-fintech-investment/ accessed 31 March 2019.

less than \$100 billion in 2015 to \$300 billion in 2018.⁵⁷ The Cambridge Center for Alternative Finance estimated the total volume of online alternative finance in the EU to be EUR 7 671 million as of 2016, which is 41 % higher than in 2015.⁵⁸

The Fintech adoption level has been also growing steadily. Thus, the average percentage of digitally active consumers using Fintech services reached 33% in 2017, compared to 16% in 2015.⁵⁹ The Fintech adoption level is considerably higher across emerging markets (46%).⁶⁰ This can be explained by the high level of tech literacy, internet and mobile penetration on the one hand, and the vast proportion of financially underserved population on the other hand.⁶¹ The examples of China and India with the highest rates of Fintech adoption⁶² demonstrate the main strength and weakness of Fintech. Where there is a vast proportion of unbanked population, Fintech companies are able to gain momentum and scale up quickly (leading to the potential rise of large companies like Ant Financial).⁶³ Meanwhile, in the well-served markets, like Europe, Fintech companies are focusing on improving user experience by complementing the existing offerings of traditional financial institutions⁶⁴ and often struggle to build scale on their own.⁶⁵

At the outset, there were two possible ways for the development of Fintech. The first one was to challenge incumbent financial institutions and to eat away their market shares (*disruptive path*). The initial ambition of Fintech was nothing less than 'a democratic revolution for all who use financial services'.⁶⁶ For example, alternative online banking first emerged with an aspiration to replace traditional

- 58 EU Directorate General for Internal Policies, A. Fraile Carmona and al., 'Competition issues in the Area of Financial Technology (FinTech)' (July 2018), 22, http://www.europarl.europa.eu/RegData/etudes/STUD/2018/619027/IPOL_ STU(2018)619027_EN.pdf accessed 25 March 2019.
- 59 'EY FinTech Adoption Index 2017' <u>https://www.ey.com/Publication/vwLUAssets/ey-fintech-adoption-index-2017/\$FILE/</u> <u>ey-fintech-adoption-index-2017.pdf</u> accessed 07 April 2019. EY survey compared across 20 markets including Australia, Belgium and Luxembourg, Brazil, Canada, China, France, Germany, Hong Kong, India, Ireland, Japan, Mexico, the Netherlands, Singapore, South Africa, South Korea, Spain, Switzerland, the UK, and the US.
- 60 ibid, 7.
- 61 ibid; A. Fraile Carmona and al. (n 58) 27.
- 62 'EY FinTech Adoption Index 2017' (n 59) 12.
- 63 In China alone, Alipay (the mobile payment division of Ant Financial) dominates the country's \$5.5 trillion mobile payment sector (54% of the total market share) Lerong Lu, 'How a Little Ant Challenges Giant Banks? The Rise of Ant Financial (Alipay)'s Fintech Empire and Relevant Regulatory Concerns' [2018] I.C.C.R.L. Issue 1 18.
- 64 A. Fraile Carmona and al. (n 58) 46.
- 65 CapGemini and LinkedIn in collaboration with Efma, 'World Fintech Report 2018' 10 <u>https://www.capgemini.com/</u> news/capgeminis-world-fintech-report-2018-highlights-symbiotic-collaboration-as-key-to-future-financial-servicessuccess/?FinancialBrand accessed 31 March 2019.
- 66 Mark Carney, Governor of the Bank of England, 'Enabling the FinTech transformation: Revolution, Restoration, or Reformation?' (Speech at the Lord Mayor's Banquet for Bankers and Merchants of the City of London at the Mansion House, London, 16 June 2016) <u>https://www.bankofengland.co.uk/-/media/boe/files/speech/2016/enabling-the-fintechtransformation-revolution-restoration-or-reformation</u> accessed 24 March 2019.

⁵⁷ Juan J. Cortina and Sergio L. Schmukler, 'The Fintech Revolution: A Threat to Global Banking?' (World Bank documents) http://documents.worldbank.org/curated/en/516561523035869085/pdf/125038-REVISED-A-Threat-to-Global-Banking-6-April-2018.pdf accessed 30 March 2019.

banks.⁶⁷ But except for some underserved sectors, most Fintech companies have shifted to building partnerships with incumbent banks as they struggled with scale and customer adoption (*collaborative path*).⁶⁸ Likewise, traditional financial institutions have noticed the opportunities arising from the emergence of new technologies and, first threatened by potential competition from Fintech start-ups, quickly switched to use them as a 'supermarket' for capabilities with the view to integrating them into the traditional banks' ecosystem.⁶⁹ Partnerships between traditional financial institutional financial institutions and Fintech is becoming more and more common and take various forms.⁷⁰

In order to understand the competition implication of various business strategies adopted by traditional banks and Fintech, this study considers both *intra-platform* and *inter-platform competition*. Many experts have emphasised the ongoing transitions of the financial industry from product to platform competition, with the rise of financial platforms set to only accelerate in the future.⁷¹ The World Economic Forum identifies platform rising among eight disruptive forces that have the potential to shift the competitive landscape of the financial ecosystem with the rower being transferred from financial services providers to the owner of the customer

68 World Economic Forum Report, Beyond Fintech: A Pragmatic Assessment Of Disruptive Potential In Financial Services (August 2017) 12; Rory Van Loo (n 53) 234; Alistair Milne, 'Competition Policy and the Financial Technology Revolution in Banking' (2016) DigiWorld Economic Journal 5, http://www.idate.org/en/Digiworld-store/No-103-Digital-Innovation-Finance-Transformation_1093.html accessed 10 February 2019.

69 World Economic Forum Report, Beyond Fintech (n 68) 13; Brett Johnson, 'Fintech: Friend or Foe?' NJBiz (3 April 2017) https://njbiz.com/welcome-ad/?retUrl=/friend-or-foe-some-banks-see-growing-fintech-industry-as-an-asset-while-others-see-it-as-unwanted-competition/ accessed 10 April 2019; Ioannis Lianos, 'Blochchain Competition: Gaining Competitive Advantage in the Digital Economy – Competition Law Implications' Philipp Hacker and Ioannis Lianos (eds) Regulating Blockchain: Techno-Social and Legal Challenges (Oxford University Press 2019) 371.

- For example, Alessandro Hatami has identified four models of the collaboration between traditional banks and Fintech: channel model when the bank helps the Fintech to sells its products to the bank's customers (e.g. the partnership between JPMorgan and OnDeck); supplier model when the bank engages with the Fintech as if it were a supplier (e.g. the collaboration between Bud and HSBC's First Direct); satellite model where the bank acquires the Fintech start-up, but leaves it relatively independent (acquisition of Nickel by BNP Paribas), and classical merger model where the acquired Fintech is integrated and rebranded within the bank (the acquisition of Final by Goldman Sach's consumer bank Marcus), see Alessandro Hatami, 'Bank & FinTech Collaboration Models' (14 August 2018) https://medium.com/@a_hatami/ bank-fintech-collaborations-how-big-banks-plan-to-stand-up-to-the-big-tech-challenge-24eea57db095 accessed 20 May 2019.
- 71 World Economic Forum Report, Beyond Fintech (n 68); KPMG, 'The rise of digital platforms in financial services', https://assets.kpmg/content/dam/kpmg/xx/pdf/2018/02/kpmg-rise-of-digital-platforms.pdf accessed 20 January 2019; Earnst&Young Report, Imran Gulamhuseinwala, How banks could join the platform economy (July, 2017) at https://www.ey.com/gl/en/industries/financial-services/fso-insights-how-banks-could-join-the-platform-economy accessed 20 January 2019; The Future of the Financial Services: the Banks as a Platform, (17 April 2017) https://www.realdolmen.com/en/blog/future-of-financial-services-bank-as-a-platform accessed 20 January 2019; Mine Kansu & Geoffrey Parker, Transitioning from Services to Platforms: The Financial Services Industry (9 August 2018) MIT Initiative on the Digital Economy, 3, https://www.db.com/newsroom_news/Whitepaper_MIT_financial_services_platform.pdf.

⁶⁷ Rory Van Loo (n 53) 241; Bryan Yurcan, 'How Moven Went From 'Breaking Banks' to Breaking Bread With Them' AM. BANKER (02 September 2016) https://www.americanbanker.com/news/how-moven-went-from-breaking-banks-tobreaking-bread-with-them accessed 30 March 2019.

interface.⁷² The platform's goal would be to develop a financial services ecosystem with different components developed by different firms, then combined and sold via the common customer interface. This reflects the digital trend of commoditization of the banking services replacing the universal banking model,⁷³ where the various sectors of financial activities are unbundled and specialized suppliers deliver financial products as commodities.⁷⁴

In these circumstances, the *intra-platform competition* (i.e. competition between participants of the platform to capture a greater share of the value generated by the platform) becomes of particular importance.⁷⁵The 'eco-system manager' or 'platform architect' sets the rules, controls the underlying platform technology, and determines who can participate in the platform.⁷⁶ This allows him to capture the lion's share of the whole profit. From the outset, the traditional banks are in a better position to gain the architectural advantage within the platform business model compared to Fintech. Among the primary reasons are high entry barriers in the industry,⁷⁷ network effects,⁷⁸ strong brands and trust-based relationships of incumbents and customers reluctance to switch to Fintech providers.⁷⁹ A significant entry barrier is the traditional banks' hold on the financial infrastructure, most notably the access to customer accounts.⁸⁰ These industry-specific factors might have driven Fintech to take the collaborative path, instead of unleashing the full disruptive potential of new technologies.

This lack of competition between incumbents and new entrants has presented a continuous concern for regulators, who considered Fintech as an important source of innovation and competition in the industry.⁸¹ Consumers also can benefit from increased competition between banks and Fintech companies as it can lead to disintermediation of existing value chains, lowering prices of financial services,⁸² improving customers experience and promoting financial inclusion in underserved markets.⁸³ To bring about the full potential of financial innovation, Fintech companies need to scale up effectively to compete with incumbents. This explains why

- 76 Mine Kansu & Geoffrey Parker, Transitioning from Services to Platforms: The Financial Services Industry (9 August 2018) MIT Initiative on the Digital Economy, 6, https://www.db.com/newsroom_news/Whitepaper_MIT_financial_services_platform.pdf.
- 77 Rory Van Loo (n 53) 242.
- 78 Alistair Milne (n 68) 6-7.
- 79 World Economic Forum Report, Beyond Fintech (n 68) 13; Rory Van Loo (n 53) 244-245.
- 80 Rory Van Loo (n 53) 242.
- 81 Ioannis Lianos (n 69) 372.
- A. Fraile Carmona and al. (n 8) 17; Rory Van Loo (n 53) 252.
- A. Fraile Carmona and al. (n 58) 46.

⁷² World Economic Forum Report, Beyond Fintech (n 68) 14.

⁷³ Ioannis Lianos (n 69) 371.

⁷⁴ ibid, World Economic Forum Report, Beyond Fintech (n 68) 19; Christoffer Hernæs, 'What Facebook's European Payment License Could Mean for Banks' TechCrunch (12 January 2017) https://techcrunch.com/2017/01/12/what-facebooks-european-payment-license-could-mean-for-banks/ accessed 23 May 2019.

⁷⁵ See, Chapter 4 of this Report.

policy makers and competition authorities around the globe consider a level playing field for Fintech companies and traditional financial institutions as a *sine qua non* of getting the best value for customers from Fintech.⁸⁴

In search for this level playing field, the regulators first turned their eye to the main source of the banks' architectural advantage – the customer accounts. Blocking or limiting access to customer accounts (even given the customer's explicit consent) significantly impedes the Fintech firm's ability to provide innovative services. For instance, mobile payments or aggregation of banking products⁸⁵ require linkage to a bank transactions account. The bank holding all the account information and technical access to the account can leverage this to keep potential competitors away from these lucrative markets. Denying the Fintech's access to customer accounts as crucial gateways of traditional banking activities increases the probability of exclusionary conduct on the part of banks and gives them the upper hand in the fight for architectural advantage.⁸⁶ As the COO of Fidor Bank put it: '[B]ank accounts are the last mile. Finance has had a hold on that, and will continue to leverage it'.⁸⁷

The recent EU and UK regulatory initiatives are intended to provide certain categories of Fintech companies with access to banking infrastructure. Thus, the second EU Payments Service Directive (PSD2), approved by the European parliament in 2015, obliges EU banks to provide open-APIs⁸⁸ for payment services.⁸⁹ The directive requires banks to provide third party providers (TPP) access to: (i) *account information* which allows a payment service user to have an overview of their financial situation at any time; and to (ii) *payment initiation services* which allow consumers to pay via simple credit transfer for their online purchases via TTP software.⁹⁰ The similar Open Banking initiative in the UK followed the Competition and Markets Authority investigation into retail banking⁹¹ which found that the incumbent banks

⁸⁴ Joaquín Maudos and Xavier Vives, Competition policy in banking in the European Union (January 2019, upcoming in the Review of Industrial Organisation) 25 <<u>https://blog.iese.edu/xvives/files/2019/01/Maudos-Vives-January-2019-1.pdf</u> accessed 27 February 2019.

⁸⁵ Aggregation enables users to aggregate and compare all account information from different providers on a single platform.

A. Fraile Carmona and al. (n 58) 14.

⁸⁷ Daniel Cawrey, 'Fidor Exec: Banks Can't Avoid Competition from Cryptocurrencies' (5 June 2014) https://www.coindesk. com/fidor-banks-cant-avoid-competition-cryptocurrencies accessed 02 April 2019.

⁸⁸ API (Application Programming Interface) is a method of standardised data exchange that allows easy and seamless communications between various components and devices. Its objective is to allow other developers to build on top of someone's software.

⁸⁹ Directive 2015/2366/EU 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, https://eur-lex.europa.eu/legal-content/EN/LSU/?uri=CELEX:32015L2366 accessed 01 April 2019.

⁹⁰ ibid.

⁹¹ Competition and Markets Authority, 'CMA, Retail Banking Market Investigation" (2016) Final Report, https://assets.publishing.service.gov.uk/media/57ac9667e5274a0f6c00007a/retail-banking-market-investigation-full-final-report.pdf ac-

'd[id] not have to compete hard enough to win and retain customers' compared to new entrants.⁹² It required the nine biggest UK banks⁹³ to allow licensed start-ups direct access to their data including detailed account information.⁹⁴ By the end of 2018 there were already more than 80 third party providers registered with the Financial Conduct Authority to provide either payment initiation or account information services and up to 17.5 million API calls per month.⁹⁵ However, the implementation of the PSD2 in EU has taken more time. By September 2019 it should finally land as the banks are expected to have implemented dedicated APIs for third-party providers in compliance with the European Banking Authority's Regulatory Technical Standards ('RTS').⁹⁶ Some surveys indicate though that the European banks generally have failed to prepare for this deadline with the RTS compliance rate slightly over 50% on average.⁹⁷

PSD2 and Open Banking are largely beneficial for intra-platform competition, as they enable Fintech providers 'to engage directly with and add value to customers'⁹⁸ without relying on the banks' consent to grant them access to customers' current accounts. This removes an important bottleneck in the financial services value chain. Access regulations have potential to further disintermediate the financial sector through unbundling the financial services value chain and thus promoting competition in these unbundled segments.⁹⁹ On the other hand, these initiatives may nudge banks to move quicker to the platform model where the services providers bring together various customer groups into one ecosystem managed by the bank. This mostly depends on the strategy chosen by banks – whether they consider the open APIs requirement as an impediment to their existing business model or as a potential 'extension to the bank-as-a-platform' concept¹⁰⁰ and an opportunity to capture an even bigger share of the customers market.¹⁰¹

cessed 20 May 2019.

⁹² See Competition and Market Authority Press Release 'CMA Paves the Way for Open Banking Revolution' (9 August 2016) https://www.gov.uk/government/news/cma-paves-the-way-for-open-banking-revolution accessed 02 April 2019.

⁹³ HSBC, Barclays, RBS, Santander, Bank of Ireland, Allied Irish Bank, Danske Bank, Lloyds and Nationwide.

⁹⁴ ibid.

⁹⁵ Scott Carey, 'Open Banking One Year On: Where Are We?' ComputerWorldUK (14 January 2019) https://www.computerworlduk.com/data/open-banking-one-year-on-where-are-we-3690264/# accessed 01 April 2019.

⁹⁶ Technical Standards on the EBA Register under PSD2 (29 November 2018) <u>https://eba.europa.eu/regulation-and-policy/</u> payment-services-and-electronic-money/technical-standards-on-the-eba-register-under-psd2 accessed 23 May 2019.

⁹⁷ As of March 2019 – see 'Open Banking: Why the Revolution Is Behind Schedule' FinTech Futures (2 May 2019) https:// www.bankingtech.com/2019/05/open-banking-why-the-revolution-is-behind-schedule/ accessed 23 May 2019.

^{98 &#}x27;The Second Payment Services Directive: a Game-Changing Regulation' (16 January 2018) https://www.openaccessgovernment.org/second-payment-services-directive-game-changing-regulation/41185/ accessed 01 April 2019.

⁹⁹ Ioannis Lianos (n 69) 375.

¹⁰⁰ Amber Leigh Turner, 'The future of finance: Banking as a platform' (14 September 2016) <u>https://thenextweb.com/</u> worldofbanking/2016/09/14/the-future-of-finance-banking-as-a-platform/ accessed 20 April 2019.

¹⁰¹ Ernst and Young, The revised Payment Services Directive (PSD2) What you need to know (2018) https://www.ey.com/ Publication/vwLUAssets/Regulatory_agenda_updates_PSDII_Luxembourg/\$FILE/Regulatory%20agenda%20updates_ PSDII_Lux.pdf accessed 02 April 2019; Scott Carey (n 95).

Having said that, the access regulations might have inadvertent implications for *inter-platform competition*, i.e. the competition for becoming the industry dominant platform or the "industry architect".¹⁰² Thus, Miguel de la Mano and Jorge Padilla point out in their paper that PSD2 is asymmetrical, as it enables the flow of crucial data only from banks to TTPs, but not the other way round. This can potentially give unfair advantage to Big Tech companies which can benefit in a direct or indirect way from the access to this raw data without having to invest in the relevant IT infrastructure.¹⁰³ Therefore, these regulations may shift the advantage in the industry architectural fight from the Big Banks to the Big Techs.

To grasp the full implication of the last argument, one needs to delve carefully into analysis of the inter-platform competition and the role played by Big Tech companies in financial markets. Big Tech are defined as global technology-based firms with widespread adoption across geographies.¹⁰⁴ These include Google, Apple, Facebook, and Amazon (GAFA) in the Western hemisphere and Baidu, Alibaba and Tencent (BAT) in Asia. Many Big Tech companies have already ventured into financial services, starting with payments and lending related to their principal platform offerings.¹⁰⁵

Among GAFA, Amazon is well-known for its attempts to unbundle the financial value chain and continuous investments in multiple areas of financing (see Figure 1.4.).¹⁰⁶ Amazon's broader strategy involves 'building a low friction payments service to attract customers online'¹⁰⁷ to ultimately increase participation (both from buyers and sellers) on its platform. Since the launch of its first payment service "Pay with Amazon" in 2007, Amazon has ventured into mobile payments and digital wallets (Amazon Pay and its predecessors), cash deposits (Amazon Cash, launched in 2017), B2B lending (Amazon Lending, launched in 2011), B2C lending (Amazon Prime credit cards, the first card launched in 2015), insurance (Amazon Protect, launched in 2016).¹⁰⁸ Amazon plans to further expand into checking accounts,¹⁰⁹ mortgage lending,¹¹⁰ home and health insurance.¹¹¹ Interestingly, each of its first payment set.

¹⁰² See Ioannis Lianos (n 69) 361-362.

¹⁰³ Miguel de la Mano and Jorge Padilla, 'Big Tech Banking' (2018) 11 <u>https://papers.ssrn.com/sol3/papers.cfm?abstract</u> <u>id=3294723</u> accessed 27 March 2019.

¹⁰⁴ CapGemini, 'World Fintech Report 2018' (n 65) 61.

¹⁰⁵ CapGemini, 'World Fintech Report 2018' (n 65) 61-63.

^{106 &#}x27;Everything You Need To Know About What Amazon Is Doing In Financial Services', CBInsights https://www.cbinsights. com/research/report/amazon-across-financial-services-fintech/ accessed 20 May 2019.

¹⁰⁷ ibid.

¹⁰⁸ ibid.

¹⁰⁹ Emily Glazer, Liz Hoffman and Laura Stevens, 'Next Up for Amazon: Checking Accounts' The Wall Street Journal (New York City, 5 March 2018) https://www.wsj.com/articles/are-you-ready-for-an-amazon-branded-checking-account-1520251200 accessed 20 May 2019.

¹¹⁰ Brad Finkelstein, 'Will Amazon Create Prime Competition for Mortgage Lenders?' National Mortgage News (New York City, 6 March 2019) https://www.nationalmortgagenews.com/list/will-amazon-create-prime-competition-for-mortgagelenders accessed 20 May 2019.

^{111 &#}x27;Everything You Need to Know About What Amazon Is Doing In Financial Services' (n 106).

nancial propositions leverages the network effects and Amazon's vast consumer base in other markets. For instance, home insurance might be offered in conjunction with its home devices, such as Alexa; Amazon Prime cards first leveraged the strong presence of Amazon in e-commerce (Amazon Prime programme) and then expanded beyond e-marketplace as well as to non-Prime customers (Amazon Visa Credit Card).¹¹² In general, the long history of Amazon's expansion into finance demonstrates that it is serious about gaining a hold of the financial market and transforming it into a completely new digital experience (Figure 1.1.).

Figure 1.1. Amazon and the unbundling of the bank



¹¹² ibid.

^{113 &#}x27;As Regulators Circle, China's Fintech Giants Put the Emphasis on Tech' The Economist (London, 13 September 2018) https://www.economist.com/finance-and-economics/2018/09/13/as-regulators-circle-chinas-fintech-giants-put-theemphasis-on-tech accessed 2 May 2019.

¹¹⁴ Tanaya Macheel, 'WeChat shows messaging is the future of financial services 'platforms' (9 January 2018) https:// tearsheet.co/future-of-investing/wechat-shows-messaging-is-the-future-of-financial-services-platforms/ accessed 20 May 2019.

ecosystem, Tencent launched wealth management tools (Li Cai Tong and Ling Qian Tong, in 2014), a B2C lending platform (WeiLiDai, 2015) and a B2B lending platform (Wei Ye Dai, 2017), an insurance agency platform (WeSure, 2017), and two online pension funds (2018).¹¹⁵ In 2015 Tencent even set up the chartered bank, WeBank, which is considered the first private Internet bank in China.¹¹⁶ Thus, Tencent has gained complete presence throughout all the retail banking sector, driving all its WeChat user base towards its own financial ecosystem.

There are more examples like this related to other Big Techs, including Google, Apple, Alibaba, and Facebook. Virtually all of them tried to launch financial products and achieved definite success, especially among millennial customers.

This is a clear sign that few dominant platforms or 'industry architects' are likely to emerge in the financial industry. Industry architects shape how the industry evolves in order to 'capture a disproportionate amount of the surplus value created by the innovation'.¹¹⁷ These are the firms with superior performance that can control 'bottlenecks' and 'leverage their position of strength over all other companies'.¹¹⁸ The battle over who becomes the financial industry architect will define who ultimately shapes the further development of the financial sector.

The Big Tech companies have a good chance to win this battle because they already possess several strategic advantages over both traditional financial institutions and Fintech. First, Big Tech companies have amassed rich customer data in other markets where they have already gained a strong presence (e.g. social media, online marketplace, etc.). These data are much more vast and, importantly, update almost instantly, than any data owned by a single bank let alone a Fintech start-up. On top of that, Big Techs benefit from emerging technologies, such as Big Data, AI, predictive analysis,¹¹⁹ that constitute further architectural advantage as it allows the setting of standards for the whole ecosystem.¹²⁰ Big Techs can leverage their strong position, revenues and consumer network in adjacent markets to gain a foothold in the financial sector. Importantly, unlike nascent Fintech companies, Big Techs have already strong brand recognition and 'are generating a level of trust previously reserved only for traditional banks.'121 Finally, they are still subject to much looser (if any) regulations compared to traditional banks. By adopting a business model of 'intermediaries', they avoid burdensome regulations but can hold the grip of the most important customer interactions. In fact, Amazon attracts millions of dollars of customers' money through Amazon Cash without the need to

^{115 &#}x27;Tencent's Payment & FinTech Business, an Important Revenue Growth Driver' Medici (1 April 2019) https://gomedici. com/tencent-payment-fintech-business-important-revenue-growth-driver/ accessed 20 May 2019.

¹¹⁶ Gaurav Sharma, 'FinTech in China: A 53-Point Summary' (n 63).

¹¹⁷ See Ioannis Lianos (n 69) 362.

¹¹⁸ ibid 364.

¹¹⁹ CapGemini, 'World Fintech Report 2018' (n 65) 11.

¹²⁰ Ioannis Lianos (n 69) 363.

¹²¹ Jim Marous (n 52).

comply with the capital requirements as regulated banks do.¹²² Alibaba's Yu'e Bao fund is the world's largest money market fund, with \$165.6 billion under its management, still loosely regulated.¹²³ These are examples of asymmetrical regulation that can place banks in artificial disadvantage relative to Big Tech platforms.¹²⁴

In this situation, access regulations such as PSD2 and Open Banking may miss the mark, as they do not take into account an important component of the competitive triad, namely – the Big Tech companies. According to PSD2, traditional banks are obliged to provide access to their customer data to all authorised competitors (including Big Tech platforms) free of charge. In fact, in the view of PSD2 fully entering into force in September 2019, many Big Tech companies have hurried up to obtain the so-called 'e-money' license in the European Union, including Amazon (May 2011, Luxemburg)¹²⁵ and Facebook (back in October 2016, Ireland)¹²⁶ among the first, followed by Google (December 2018, Lithuania and January 2019, Ireland)¹²⁷ and Alipay (January 2019, Luxembourg).¹²⁸ This license will allow them to tap into the customer data collected by the banks and provide 'one-click' payment and account information aggregation services directly to consumers.

On the other hand, Big Tech companies are not obliged to open up their customer data to competitors – to the contrary, under GDPR they 'will de facto retain economic sovereignty over the data of their customers'.¹²⁹ This has the potential to exacerbate the data disparity between banks and Big Tech platforms and lead to traditional banks being 'enveloped' by the tech giants, thus losing the fight for architectural advantage.¹³⁰ The banks and smaller Fintech competitors might end up as mere suppliers of unbundled financial products with the market power transferred to owners of the customer experience (i.e. digital platforms).¹³¹ In fact, Big

- 122 See Steve Cocheo, 'Amazon Bank' Is Already Here, Without a Charter or Regulatory Approval' The Financial Brand (20 August 2018) https://thefinancialbrand.com/74543/amazon-bank-checking-account-regulators-charter/ accessed 08 April 2019.
- 123 Stella Yifan, 'Jack Ma's Fintech Start-up Shakes up China's Banks' (Market Watch, 29 July 2018) https://www.marketwatch. com/story/jack-mas-fintech-startup-shakes-up-chinas-banks-2018-07-29 accessed 08 April 2019.
- 124 Miguel de la Mano and Jorge Padilla (n 103) 11.
- 125 Amazon Pay, License Information, https://pay.amazon.com/ie/help/201751610 accessed 23 May 2019; 'Internet Giants Eye up the Banking Business' BBVA (29 January 2019) https://www.bbva.com/en/internet-giants-eye-up-the-bankingbusiness/ accessed 23 May 2019.
- 126 Christoffer Hernæs, 'What Facebook's European Payment License Could Mean for Banks' TechCrunch (12 January 2017) https://techcrunch.com/2017/01/12/what-facebooks-european-payment-license-could-mean-for-banks/ accessed 23 May 2019.
- 127 Charlie Taylor, 'Google Gets Go-ahead from Central Bank for Payments' The Irish Times (5 January 2019) https://www. irishtimes.com/business/technology/google-gets-go-ahead-from-central-bank-for-payments-1.3747901 accessed 23 May 2019.
- 128 Daniel Döderlein, 'What Does Alipay's New EU-License Mean For Banks?' Forbes (29 January 2019) https://www.forbes. com/sites/danieldoderlein/2019/01/29/what-does-alipays-new-eu-license-mean-for-banks/#29a5bf9d639c accessed 23 May 2019.
- 129 Miguel de la Mano and Jorge Padilla (n 103) 10.
- 130 ibid 13.
- 131 World Economic Forum Report, Beyond Fintech (n 68) 19.

Tech platforms deny their ambitions to become the likes of banks. What they want is merely to offer financial services to their customer base to increase participation in their digital ecosystems¹³² – 'building a bank for [themselves]',¹³³ or more precisely to their vast clientele. This reveals Big Tech's ambition to occupy the most profitable position in the financial eco-system to extract most of the value generated by other levels without bearing the costs of regulatory compliance and relevant operation, security, and data protection risks. In the face of these challenges, Fintech and traditional banks have even stronger incentives to cooperate rather than compete against each other in order to morph into the modern digital platforms and stay atop the competition with Big Tech.¹³⁴

What are the implications for competition and regulatory policies? One of the options proposed to ensure a true level playing field is to introduce the reciprocity of data sharing obligations between banks and digital platforms.¹³⁵ This means that '[p]latforms above a certain size would have to grant access to others, including traditional banks, to a subset of their data' (with the data subject to consent, of course).¹³⁶ This is in line with the general move to prescribe a wider access to the data collected by the digital platforms when such data is instrumental to compete and foster further innovation in the relevant or adjacent markets, especially when data collection happens incidentally and without special investment.¹³⁷ Though unclear how it would be implemented in practice, this suggestion rests on the important premise – the data sharing obligations should apply to all firms reaching the certain threshold regardless of the sector where they are active or their regulatory status. This 'agnosticism towards the business model'¹³⁸ means that competition authorities and regulators should not look solely at the business model, but at the competitive impact it has on a relevant market, avoiding regulating only some of the players and skewing the competitive environment in these markets.¹³⁹

However, to effectively compete in financial markets, Fintech start-ups might require not just a one-time access to the data collected by the Big Tech platforms, but continuous data interoperability meaning real-time access to the data, normal-

136 ibid.

¹³² See my blog on Data Driven Investor, 'Apple Bank – the Future of Finance?' https://medium.com/datadriveninvestor/ apple-bank-the-future-of-finance-2722d5bb1bcb accessed 29 April 2019.

^{133 &#}x27;Everything You Need to Know About What Amazon Is Doing in Financial Services' (n 106).

¹³⁴ CapGemini, 'World Fintech Report 2018' (n 65) 63.

¹³⁵ Miguel de la Mano and Jorge Padilla (n 103) 21, 28.

¹³⁷ See Jacques Crémer, Yves-Alexandre de Montjoye, Heike Schweitzer, 'Competition Policy for the Digital Era: Final Report' (EU Commission, DG for Competition, 2019) 8-10, 76, 105; Justus Haucap, Wolfgang Kerber, Robert Welker, 'Modernising the law on abuse of market power' (Report for the Federal Ministry for Economic Affairs and Energy (Germany)), 6, https:// www.bmwi.de/Redaktion/DE/Downloads/Studien/modernisierung-der-missbrauchsaufsicht-fuer-marktmaechtigeunternehmen-zusammenfassung-englisch.html accessed 10 December 2018; Viktor Mayer-Schonberger and Thomas Ramge, 'A Big Choice for Big Tech. Share Data or Suffer the Consequences', Foreign Affairs, 97(5) 48, 52.

¹³⁸ Alfonso Lamadrid, 'Regulating platforms? A competition law perspective' (24 November 2015) <u>https://chillingcompeti-tion.com/2015/11/24/regulating-platforms-a-competition-law-perspective/</u> accessed 10 April 2019.

¹³⁹ ibid.

ly through privileged APIs.¹⁴⁰ This basically means extending the perimeter of PSD2 requirements to digital platforms. The scope of such extension is still unclear (for example, whether it should be applied only to platforms already active in the financial markets or any platforms owning the data that is essential for Fintech to provide the complimentary products to the platform's users). It is also unclear whether such interoperability should be provided only to Fintech companies or both Fintech companies and traditional banks. Miguel de la Mano and Jorge Padilla argue that the data sharing obligation through open API's should be applied to digital platforms vis-à-vis not only Fintech, but also vis- à-vis traditional banks, as digital platforms pose the largest threat to competition in financial markets.¹⁴¹ In addition, considering the constant confluence between Fintech and traditional banks, it might be difficult to separate the two. Also in line with the 'business model agnosticism' it might be undesirable to discriminate between competitors using different busi ness models. On the other hand, some authors express concerns that if leading banks manage to benefit from the big data and network effects provided by the new digital business models (and potentially by open access to the digital platforms' data storages), these banks might gain even bigger market shares and pose threat to financial stability further exacerbating the "too-big-to-fail" problem.¹⁴² In this scenario, any type of access regulation (asymmetric and symmetric) might be a double-edged sword requiring careful assessment of its impact on the competitive conditions in the market.

Alternatively, rather than relying on the sector-specific regulations (like PSD2), the access to data amassed by dominant digital platforms can be mandated by competition authorities based on Article 102 TFEU and its likes in the national legislations. When dominant, data-rich companies refuse to grant other firms access to their data, provided that the access to such data is indispensable to compete effectively in the relevant or neighbouring markets and there is a real danger of further entrenchment of the market power, competition authorities should treat this as abuse of the dominant position under Article 102 TFEU. However, this involves careful balancing between the need to protect the investment incentives of dominant firms and ensuring that the markets remain contestable and the competition for the market is protected.¹⁴³ The benefit of such an approach is that it is context-sensitive and allows to give or deny access to the customer data of the dominant firms based on the competitive dynamics of the market at hand, avoiding potential inadvertent externalities produced by the access regulations. Having said that, the assessment of market power in the financial markets is very difficult due to the diversity of business models and potential sources of market power.¹⁴⁴ Identifying data-related exclusionary practices in financial markets also requires

¹⁴⁰ Jacques Crémer, Yves-Alexandre de Montjoye, Heike Schweitzer (n 137) 84.

¹⁴¹ Miguel de la Mano and Jorge Padilla (n 103) 28.

¹⁴² Rory Van Loo (n 53) 250.

¹⁴³ Jacques Crémer, Yves-Alexandre de Montjoye, Heike Schweitzer (n 137) 98, 106.

¹⁴⁴ A. Fraile Carmona and al. (n 58) 48.

further elaboration of traditional theories of harm. These might include, for example, cross-usage of the data sets by big tech companies,¹⁴⁵ where a digital platform can use its privileged access to data obtained in one activity to leverage its position in the provision of other services, such as Fintech services.

Another problem might arise where the anonymous access to individual-level data or aggregated data is required to effectively compete in financial markets. Unlike PSD2 data sharing requirements, this involves access to the pseudonymized/anonymized and aggregated data of many users,¹⁴⁶ for example, to make accurate predictions of the user behaviour in order to deliver better services. One example might be a Fintech start-up that analyzes patterns in user behaviour to predict their chances to default on loan repayments and then rent out this solution to larger financial institutions.¹⁴⁷ The recent FSB report has pointed that 'banks and other lenders are increasingly turning to additional, unstructured and semistructured data sources, including social media activity, mobile phone use and text message activity, to capture a more nuanced view of creditworthiness, and improve the rating accuracy of loans.'¹⁴⁸ Such AI and machine learning applications in Fintech crucially depend on the availability of Big Data that allow to find statistically meaningful patterns and deviations and predict the riskiness of loans, investment portfolios, as well as to make pricing decisions and detect financial crimes, money laundering and fraud.¹⁴⁹ There is already a plethora of vendors that provide machine learning for financial market participants, based on publicly available sources, such as news, market analytics, etc. However, it is clear that firms which have access to larger data sets get strategic advantage in making better predictions and delivering better services.

According to the recent EU Commission's Report 'Competition Policy for the Digital Era', in such a scenario the access to data can be granted when it could be demonstrated that no substitutes exist in the market (the data is not available from data analytics providers or cannot be collected by a Fintech firm on its own) and the relevant data is indispensable to compete in the complimentary markets where a data controller is dominant.¹⁵⁰ When it comes to personal data, the situation is complicated by the GDPR requirements. In such cases, 'access to data for specified purposes and specified acts of processing may be mandated by a competition authority based on an interest balancing (Article 6 lit. f GDPR) or based on Article 6 lit.

¹⁴⁵ A. Fraile Carmona and al. (n 58)

¹⁴⁶ Jacques Crémer, Yves-Alexandre de Montjoye, Heike Schweitzer (n 137) 75, 85-86.

¹⁴⁷ See, for example, Penny Crosman, 'How Fintechs are Using AI to Transform Payday Lending' (American Banker, 07 March 2017) <u>https://www.americanbanker.com/news/how-fintechs-are-using-ai-to-transform-payday-lending</u> accessed 15 April 2019.

¹⁴⁸ Financial Stability Board, 'Artificial intelligence and machine learning in financial services: Market developments and financial stability implications' (01 November 2017) 12, <u>http://www.fsb.org/wp-content/uploads/P011117.pdf</u> accessed 15 April 2019.

¹⁴⁹ ibid.

¹⁵⁰ Jacques Crémer, Yves-Alexandre de Montjoye, Heike Schweitzer (n 137) 101-104.

e GDPR which, *inter alia*, allows processing that is necessary for the performance of a task carried out in the public interest'.¹⁵¹ It should be noted that access to data necessary for the purpose of training algorithms for uses completely unrelated to the markets where the data owner is active cannot be granted based on competition law.¹⁵² The specific regulatory regime might be needed to this end.

Legal cases on granting access to the data and payment infrastructure in financial markets are yet to emerge. It is also too early to draw conclusions on the outcomes of the access regulations, such as PSD2 or Open Banking. It is clear, however, that continuous scrutiny of the competition dynamics evolving between Big Tech, banks and Fintech firms is needed to ensure that data sharing obligations are used to invigorate both inter-platform and intra-platform competition and not for tacit collusion or increasing the market power of some players. As data is the source of competitive advantage, the combination of big data possessed by banks and digital platforms can potentially foster creation of dominant platforms in financial markets. Therefore, the rise of big platforms and the challenges arising from network effects which create significant barriers to entry remain the main competition concern in financial markets.¹⁵³ As the battle for gaining architectural advantage over the financial industry is ongoing, competition authorities should strive to promote competition on merit between various platforms and business models as well as fair and non-exclusionary practices within the vertical value chains. To this end, market monitoring and careful assessment, rather than introducing new sector-specific regulations might be a desired short-term solution.

As described above, the financial industry currently undergoes significant transformation, with the advent of agile Fintech competitors (referring to companies delivering financial services exclusively through digital technologies), transition to the platform business model and the threat posed by Big Tech being the most important trends. Competition authorities around the globe generally assess Fintech as a positive trend and expect Fintech to apply continuous competitive pressure on incumbent financial institutions for the benefits of consumers. However, in more developed economies, Fintech companies opt for cooperation with established financial institutions rather than challenging them, while in emerging economies with the high degree of financial exclusion (e.g. China and India) the disruptive potential of Fintech is much more evident.

Access regulations, such as the second EU Payment Services Directive and Open Banking in the UK, have potential to reduce entry barriers for Fintech companies and allow them to compete on a par with large financial institutions. However, the emergence of Big Tech companies (Google, Apple, Facebook, Amazon, Alibaba, etc.) offering a whole array of financial services to their customers changes the competitive dynamics in financial markets. In the future, the battle for becoming

¹⁵¹ ibid, 104.

¹⁵² ibid, 98.

¹⁵³ A. Fraile Carmona and al. (n 58) 13; Rory Van Loo (n 53) 250.

a dominant financial platform that holds a grip over the customer interface might become definitive in the further development of Fintech and financial industry in general.

Therefore, competition authorities need to analyse carefully the interactions within this competitive triad (traditional banks, Fintech and Big Tech) and monitor market developments in order to identify tipping points and potential bottlenecks that might lead to the emergence of dominant financial platforms and the exclusion of competitors from the market. Extending a perimeter of access regulations to the tech giants and obliging them to open the access to their data might represent one solution to this concern. Imposing on dominant platforms an obligation to share their data under Article 102 TFEU and its likes is another option to tackle exclusionary practices in finance. In any case, protecting competition in modern financial markets requires careful recalibration of traditional competition law tools and approaches.

1.2. Consequences of digital competition for economic actors and the intangible economy: empirical insights

1.2.1. Country-level effects

The BRICS countries already occupy a significant place in the global digital system, despite significant differences within the group. China takes the lead in the global digital sector. It is the only country not only among the BRICS countries, but globally – with companies in the top 20 internet firms by market valuation, along with U.S. firms (Figure 1.2.).



Figure 1.2. Top 20 Internet leaders by market valuation, 2018

Source: https://www.visualcapitalist.com/visualizing-worlds-20-largest-tech-giants/

Other BRICS countries have their own digital leaders. Forbes Top 100 Digital Companies list¹⁵⁴ also includes, in addition to 16 companies from China, two companies from India and one from South Africa.

The BRICS countries are among the largest in the world in terms of size of their digital economy. Of the 10 countries with the highest eGDP¹⁵⁵ share four places are taken up by BRICS countries. Two of these countries – China and India – have a higher eGDP share than the U.S. (Figure 1.3).

^{154 &}lt;u>https://www.forbes.com/top-digital-companies/list/#tab:rank</u>

¹⁵⁵ eGDP (Gross Domestic Product) is an indicator proposed by the Boston Consulting Group (BCG) that calculates digital/ internet-related expenditure in private consumption, investment, government expenditure and net export.



Figure 1.3. Top 10 countries with highest eGDP share in 2016

The number of internet users – actual and potential – makes the BRICS countries' markets very attractive for global digital players operating in e-commerce, social networks, search, etc. (Figure 1.4.).





Source: Statista

Thus, the BRICS countries are currently in the forefront of global digital competition.

1.2.2. Region-level effects: BRICS

In terms of regional effects of digital competition in the BRICS countries the main barrier to an even distribution of gains between regions is the digital divide within their vast

Sources: (Cheng, 2017)¹⁵⁶, BCG

¹⁵⁶ Cheng W. (2017) The Tale of the Digital Economy in China. Presentation for the 5th IMF Statistical Forum, November 16, 2017.

territories, namely between rural and urban areas. This problem is especially important for China and India. In 2015, half of the world's unconnected population (2.2 out of 4.3 billion people) resided in China and India.¹⁵⁷ However, the countries have targeted that divide and have made tremendous strides towards narrowing it in the last few years.

The latest statistics from India, characterized by the lowest internet penetration rate among the BRICS countries, indicate that while the number of urban users grew 7% in 2018 compared to 2017, the number of rural users increased 35%, reaching 251 million users (expected to reach 290 million in 2019). Consequently, the penetration rate in rural India reached 25% in 2018.¹⁵⁸ China has also been active in increasing internet penetration rate in rural regions. The progress between 2007 and 2017 is presented in Figure 1.5.



Figure 1.5.:Internet penetration in China's rural regions, 2007-2017

Source: China Internet Report 2018

In 2017, Brazil exhibited a 74.8% access rate for urban areas and a 39% for rural areas. Regional disparities exacerbate this scenario: the less connected municipalities in Brazil are in predominantly rural areas of the North and Northeast regions.¹⁵⁹ While in general high prices for internet access ranked as the main reason for lack of connectivity, the lack of infrastructure is listed as a key reason for absence of internet access in the rural households compared to urban households.

South Africa is also characterized by high variance in internet access between provinces. Gauteng has the highest rate with 72.2% of its people having online access, while the Western Cape is second with a 68.5% rate. At the other end of the spectrum Limpopo

¹⁵⁷ West D.M. (2015) Digital divide: Improving Internet access in the developing world through affordable services and diverse content. Center for Technology Innovation at Brookings. https://www.brookings.edu/wp-content/uploads/2016/06/West_Internet-Access.pdf

¹⁵⁸ https://economictimes.indiatimes.com/tech/internet/internet-users-in-india-to-reach-627-million-in-2019-report/articleshow/68288868.cms?from=mdr

¹⁵⁹ https://www.cps.fgv.br/cps/telefonica/

exhibits only 42.4% of residents having any sort of access to the internet, with only 1.6% having an active connection at home¹⁶⁰ (Figure 1.6.).



Figure 1.6. Percentage of households in South Africa with access to internet by province

The situation in Russia is overall more favorable and more even in terms of internet access. Even though the large territory makes it difficult to provide connection in the remote rural areas, and consequently some regions are worse off in terms of connectivity, the high rate of urbanization makes the issue of access a lesser concern overall.¹⁶²

1.2.3. Consumer-level effects

Digital competition is meant to bring consumers many benefits: lower prices, increased variety of available products and products better tailored to the consumer's specific needs, lower transaction costs, etc. However, a lack of competition in the digital sphere can lead to a redistribution of potential consumer gains towards the companies wield-ing high market power. Additionally, benefits from digitalization come with increased risks of identity theft, credit card or banking fraud, data collection by online services and a loss of control over personal data. Low trust in digital businesses on the consumer side can hinder further digital development, when consumers make significant changes to their behavior to avoid the risks associated with digital interactions – including making less payments and purchases via the internet.

The CIGI-IPSOS Global Survey on Internet Security and Trust (2019) shows that this is an acute issue for the BRICS countries, where consumers in the past year have made such

Source: IOA (2017) based on the General Household Survey of Statistics South Africa, 2015¹⁶¹

¹⁶⁰ https://www.thespacestation.co.za/the-latest-sa-internet-connection-stats/

¹⁶¹ In On Africa (2017) The digital divide in South Africa's higher education sector: why public internet access is important in the context of tertiary education <u>https://www.inonafrica.com/2017/08/07/digital-divide-south-africas-higher-educa-</u> tion-sector-public-internet-access-important-context-tertiary-education/

¹⁶² Digital.Report. Russia: State of affairs report. 18.04.2018 <u>https://digital.report/russia-state-of-affairs-report/</u>

behavioral changes more frequently that on average (Figure 1.7).

Figure 1.7.: Aggregated answers to question "How have you changed anything about how you behave online compared to one year ago? (Please select all that apply.)"

		REGIONS							
	Total	North America	LATAM	Europe	APAC	G-8 Countries	BRICS	Middle East/Africa	
Base: All Respondents		n=2001	n=2176	n=6009	n=8011	n=8009	n=5169	n=6017	
Avoiding opening emails from unknown email addresses	45%	49%	47%	43%	46%	44%	50%	40%	
Disclosing less personal information online	41%	39%	47%	34%	41%	34%	46%	41%	
Avoiding certain Internet sites	40%	39%	52%	34%	37%	34%	48%	38%	
Using antivirus software	36%	36%	47%	31%	39%	32%	48%	30%	
Changing your password regularly	33%	32%	37%	26%	33%	26%	39%	35%	
Avoiding certain web applications	32%	29%	40%	26%	31%	25%	41%	31%	
Cutting down on the amount of biographically accurate information you divulge online	29%	26%	36%	23%	30%	23%	31%	24%	
Self-censoring what you say online	21%	26%	20%	14%	22%	17%	25%	25%	
Changing who you communicate with	15%	15%	15%	8%	15%	10%	21%	17%	
Doing fewer financial transactions online		13%	21%	9%	14%	10%	19%	16%	
Making fewer online purchases		10%	15%	9%	11%	9%	16%	13%	
Closing Facebook and other social media accounts, etc.		12%	11%	8%	11%	9%	14%	12%	
Using the Internet less often	8%	6%	8%	5%	6%	5%	8%	10%	
None of these	16%	22%	7%	25%	15%	26%	8%	10%	

Source: Ipsos (2019)¹⁶³

As for the benefits that consumers can derive from digital competition, they are linked with the level of engagement with the digital economy that the consumers exhibit. The BRICS countries show considerable variation in this respect.

In terms of retail e-commerce sales, China is the indisputable leader – its market size in this dimension is larger than the aggregate of other BRICS countries (Figure 1.8.).



Figure 1.8.: BRICS e-commerce sales

Source: UNIDO, ITC (2017)¹⁶⁴, p. 19

Although the size of China's e-commerce market stems from a set of unique conditions impossible to match, it still shows that there is large potential for further e-commerce growth in other BRICS countries.

163 2019 CIGI-Ipsos Global Survey on Internet Security and Trust <u>https://www.cigionline.org/internet-survey-2019</u>

164 UNIDO & ITC. Status, opportunity and challenges of BRICS e-commerce. 2 August 2017 <u>http://www.intracen.org/</u> uploadedFiles/intracenorg/Content/Publications/BRICS%20E-commerce%20_Status%20Opportunities%20and%20 Challenges_22AUG2017_final(1).pdf Digital markets for specific categories of products also have varying popularity among consumers in the BRICS countries. Chinese and Brazilian consumers are actively engaging in the digital music segment, while Russian, Indian and South African consumers are relatively more engaged in the digital markets for video games (Figure 1.9.).







There is also area for further development concerning the engagement in online payment and buying products on the Internet (Figure 1.10.). Although the share of population that was paying bills and buying products on the Internet in 2014 was slightly higher than the world average in China and Russia, the other BRICS countries were behind the world average, with the most significant gap demonstrated by India.

Figure 1.10. Share of population that pays bills or buys things on the Internet, BRICS countries, 2014.



Source: ITC (2017)¹⁶⁶

Consequently, in most BRICS countries there is sufficient room for increasing consumer engagement with digital markets so they can share in the benefits provided by the digital economy. At the same time, developing countries are the ones that exhibit the most

 ¹⁶⁵ International Trade Centre (2017). BRICS countries: Emerging players in global services trade. ITC, Geneva. http://www.intracen.org/uploadedFiles/intracenorg/Content/Publications/28_BRICS_Services_new_270717_final_Low-res.pdf

 ¹⁶⁶ International Trade Centre (2017). BRICS countries: Emerging players in global services trade. ITC, Geneva. http://www.intracen.org/uploadedFiles/intracenorg/Content/Publications/28_BRICS_Services_new_270717_final_Low-res.pdf

caution and distrust towards digital interactions. This provides the reason why the governments of the BRICS countries need to specifically address the consumers' safety and privacy concerns so as not to impede the development of the digital sector.

1.3. The new global digital eco-system and BRICS: a political economy perspective on the relation between industrial policy and competition law and policy

1.3.1. Industrial policy and digital tranformation: an overview

As the digitalization of markets continues, geographic market boundaries expand and gradually become less pronounced, allowing us to talk about global markets for digital services. Network effects, the decrease of transformation and transaction costs and a lowering of barriers to entry characteristic of digital technologies have a substantive part to play in the integration of digital markets, with efficient and innovative firms expanding their operations onto a global scale. Their expansion also brings about an increase of their market power, which poses a challenge for competition policy. On the one hand, hindering efficient expansion can stifle innovation and decrease consumer welfare in a dynamic setting. On the other hand, beside the general negative consequences of abuse of market power, the global aspect of digital markets entails at least two additional complications that make the competition problem not only a matter of efficient allocation of resources, but also a matter of distributive effects. If the dominant firms are based in higher income countries while their consumers are from developing countries, the market power abuse redistributes welfare from countries that are already at a technological disadvantage.

These effects could perhaps ultimately be mitigated by a consistent competition policy on affected markets, even if such a policy does not aim specifically at dealing with distributional impacts and focuses, following a more traditional view, on efficiency. But digitalization affects the economy not only on the level of isolated markets, but also along the global value chains in the digital sphere. The opening up of markets and the expanding of their geographical boundaries due to the spread of digital technologies can potentially induce an effect analogous to the Vanek-Reinert effect.¹⁶⁷

The idea behind the argument is that while developed countries have comparative advantages in increasing-return industries in global value chains, specialization leaves developing countries stuck with specializing in diminishing-return activities. The Vanek-Reinert effect demonstrates that a sudden transition to free trade can destroy the most efficient industries in a less efficient country and send it into a vicious circle of poverty. In the same vein, abruptly removing the barriers for global digital giants to function on domestic markets in a developing country can potentially have chilling effects for the country's own technological companies. Losing the battle to global players might mean cheaper and better services for the country's consumers in the short run. However, ulti-

¹⁶⁷ Reinert E. (2007) How Rich Countries Got Rich... And why Poor Countries Stay Poor. Carrol & Graf, 365 p.
mately the country can become poorer and less technologically developed due to being forced out of the sectors with the most added value and characterized by the highest rates of innovation.

Striking an optimal balance between the stimulating effect of competition on efficiency and the need to enact some protecting measures for national markets and competitors requires a measured approach to industrial policy. While this approach would not completely renounce the benefits of global competition, it would provide enough support for certain national businesses to survive in the rapidly changing digital sector. In this sense industrial and competition policy do not necessarily come into conflict, but can rather be complementary. A horizontal industrial policy¹⁶⁸ can have a more favorable impact on competition than a vertical one: competition effects largely depend on the specific implemented instruments of industrial policy. Competition policy, in turn, can be guided not by a narrow definition of its goals and instruments, but by a more nuanced approach, recognizing the countries' relative positions along the global value chains and the possible distributive effects. Consequently, in this perspective, competition policy could be aligned with the goals of industrial policy and ensure a more holistic approach.

The need for a balanced approach to industrial and competition policy in the world of rapidly developing digital technologies calls for a political economy perspective on their interaction. This is especially important for BRICS countries, which, though sufficiently diverse, have much to gain from increasing digitalization in terms of overcoming internal challenges and enhancing their role in the global economy:

1) *Technological modernization*. Digitalization allows developing countries to skip a few technological stepping stones and proceed to implementing the most modern technologies. The case of China's rise of mobile payments is an example of this: Chinese consumers basically went straight from cash payments to mobile payments, skipping the stage of credit and debit cards.¹⁶⁹ In this regard, China took actions to delay the entry of foreign credit card companies in its territory, despite having clear commitments upon the accession to the World Trade Organization.¹⁷⁰

2) *Digital divide/digital inclusion*. As seen above, most BRICS countries are vast in size and characterized by significant regional economic and social differentiation. Internet access and the differing ability of consumers to navigate the digital sphere can increase regional inequality. Market forces are often not enough to stimulate

¹⁶⁸ There are two ways to interpret vertical and horizontal industrial policy. On an inter-industry level, vertical policies focus on specific industries, while horizontal policies seek to improve operational conditions and capabilities across several sectors (UNCTAD, World Investment Report, 2018, p. 126). On an intra-industry level, vertical policy implies the support of specific enterprises, while horizontal policy allows support of enterprises if they are determined in accordance with objective criteria (Idrisov G., 2016. "Towards modern industrial policy for Russia," Research Paper Series, Gaidar Institute for Economic Policy, issue 169P)

¹⁶⁹ See, e.g., Hill J. Fintech and the Remaking of Financial Institutions. Academin Press, 2018, p.277-278

¹⁷⁰ Bernard Hoekman and Niall Meagher, 'China – Electronic Payment Services: Discrimination, Economic Development and the GATS' (2014) 13 World Trade Review 409, 441.

private companies to provide internet access in underdeveloped territories. Therefore, one of the goals of digital policy in developing countries can be ensuring universal internet access. Regional digital inequality can also contribute to the global digital divide which refers to the disparities of access to the internet and related services between higher income and middle and lower income countries.

3) Access to technology. Technological modernization demands access to technologies that can be concentrated in the hands of foreign companies. A typical problem is the amassing of technological patents by international companies that use them as a source of bargaining power against companies from developing countries. Therefore, the digital industrial policy needs to include provisions concerning possible ways of gaining access to such technologies – by substitution, acquisitions or other measures.

Having outlined the basic framework of our analysis and the main questions we hope to answer, it is now time to turn to the interplay of industrial and competition policy in the digital sphere in BRICS countries.

1.3.2. Framework of digital strategies

The BRICS countries have integrated digitalization into their strategic policies and have both used the already existing government strategic management tools and developed new ones specifically for the purposes of promoting digitalization.

In China the state plays a dominant role in shaping the digital economy. The current digital strategies and plans in China include the major "Made in China 2025" program as the overall planning strategy and number of more specific planning policies (Table 1.2.).

Overall planning policy	Specific planning policies
Made in China 2025	Action Outline for Promoting the Development of Big Data, Guiding Opinions on Vigorously Advancing the "Internet Plus" Action, and Guiding Opinions on Enhanc- ing the Integrated Development of the Manufacturing Industry and the Internet

 Table 1.2.. Digital economy strategies and plans in China

Source: (CACS, 2018, p. 124)171

"Made in China 2025" is a strategy enacted in 2015 and aimed at achieving the industrial modernization of the Chinese economy. The strategy corresponds to the "Industry 4.0" program of the German government. Its focus is promoting "smart manufacturing" technology as a means of upgrading industrial processes in order to boost the competitiveness of Chinese companies both on domestic and global markets. While in the short run this policy might provide attractive business opportunities for foreign firms, the policy's end goal is to grow Chinese companies that are technologically advanced enough to compete in international markets in the sphere of cutting-edge technology.

¹⁷¹ Chinese Academy of Cyberspace Studies (2018) World Internet Development Report 2017. Springer. 312 p.

There are several government programs relevant to the digital economy in India. In 2015 the Government of India launched its "Digital India" campaign, aimed at building digital infrastructure and increasing the availability of Internet among citizens, especially living in poor regions, as well as promoting government services online, and supporting a number of industries. Domestic groups of interests that were affected by promoting the program include not only local IT firms supplying goods and services *for government programs of providing government services online*, but also digital firms gaining from the growing demand that stems from an increased population involvement in e-commerce¹⁷². One of the main targets of the "Digital India" campaign is improving digital literacy of the population and thus increasing involvement in digitalization and developing digital markets. A more widespread use of digital services in traditional industries is believed to improve the effectiveness of the Indian economy.

A more generalized policy that builds a framework around India's targets in digital economy development and its place in global digital value chains along with ensuring digital sovereignty is the National Digital Communications Policy (2018). Taking into account the major role that India plays in software development, an important addition to the National Digital Communications Policy is the National Policy on Software Products (2019). The latest policy proposals include the Draft National e-Commerce Policy (2019), which addresses the provision of data sovereignty, as well as a large array of e-Commerce issues, including FDI rules, consumer protection and standardization; Draft e-Pharmacy Rules (2018) and Draft Digital Information Security in Healthcare Act (2017).

Brazil has also recently established its National Digital Transformation System centering around the Brazilian Digital Strategy ("EDB", "E-Digital"). The strategy describes a system of 100 actions aimed at ensuring digital development. The main goals set in the strategy concern network infrastructure and broadening Internet access; research, development and innovation; trust in the use of ICT; education and professional training; international interaction; economical digital transformation (a data-based economy, a world of connected devices and new business models); citizenship and digital government, in articulation with the strategy of digital governance and the platform of digital citizenship¹⁷³. The governance structure of the Brazilian Digital Transformation Strategy was formally set up by Decree n 9.319, of 21 March 2018.

In Russia the framework strategic document in the digital sphere is the "Strategy for the Development of the Information Society in the Russian Federation for 2017-2030', adopted in 2017. The strategy is supported by the State Programme on 'Digital Economy of the Russian Federation' (replaced by the Passport of the National Programme 'Digital Economy of the Russian Federation' in 2019). Much like in other BRICS countries, Russia's digital strategy concerns the development of digital infrastructure, increasing the global competitiveness of Russian companies, creating new markets, decreasing entry

¹⁷² An example of promoting such initiatives is the innovation of Data Xgen Technologies Pvt Ltd that proposed the opportunity of creating email addresses in different languages named DataMail https://www.datamail.in/aboutus.html

¹⁷³ Deloitte. Insights about Digital Transformation and ICT Opportunities for Brazil Report and Recommendations. January 2019, edition No 2 https://www2.deloitte.com/content/dam/Deloitte/br/Documents/technology-media-telecommunications/ICT-insights-report-eng.pdf

barriers in the digital sphere and treating data as a valuable resource. A feature that perhaps distinguishes Russia's strategy is the explicitly stated role of competition policy and its need to be updated to better correspond to the issues of the digital economy. This point serves to underscore the comparatively more active role that the Russian competition authority plays in digital industrial policy, which will be touched upon later.

1.3.3. Degree of prudence in introducing regulation

The BRICS countries mostly strive to adhere to a measured approach to regulating the digital sphere, taking care not to stifle new and emerging markets and technologies with over-regulation. When serious issues do arise, the goal is to react swiftly to avoid large losses in terms of consumer welfare and security. So far most of the regulations have had to do with security concerns, mainly concerning data storage and access, as well as cybersecurity.

Concerning specific regulation, China has promoted a "tolerant and prudent" approach to regulating the digital sphere, being careful not to stifle innovation with excessive regulatory reaction to emerging technologies and business practices. That is not to say that the state has been inactive in digital regulation, prompting the authors of the "China Internet Report 2018" to name the government "The Visible Hand" in China's digital development¹⁷⁴. As can be seen from Figure 1.11, the prohibitive regulations imposed in 2017-2018 have mostly been based on security concerns.



Figure 1.11. Chinese regulation measures in the digital sphere in 2017-2018

Source: https://www.abacusnews.com/china-internet-report/

In this stance, China is accompanied by India, which is also choosing a cautious approach to regulation in the digital sphere, avoiding excessive regulatory intervention. The position is also shared by the competition authority. Most of the specific regulations and policies are either recently enacted or currently being drafted and discussed, while the digital sector mostly operates under the already established general framework of rules

¹⁷⁴ South China Morning Post (2019). China Internet Report 2019. China Internet Report. [online] South China Morning Post Publishers Ltd. Available at: https://www.abacusnews.com/china-internet-report [Accessed 1 Aug. 2019].

and regulations. The specific issues that have been identified in India's digital economy – now being addressed through regulation – are issues of personal data security (Draft Personal Data Protection Bill, 2018), FDI in e-Commerce (Press Note 2 of 2018 clarifying The Consolidated FDI Policy, 2017) and payment data localization (RBI Notification on Storage of Payment System Data, 2018). Yet, as has been shown above, a prudent regulatory approach does not mean a lack of industrial policy in the digital sphere.

Russia has enacted an array of security-centered laws that entail a significant increase of costs for ICT firms (and therefore have been met with criticism). These include laws known as the 'Yarovaya package' and Russia's Sovereign Internet Law. The 'Yarovaya package', among other things, concerns the mandatory storage of citizens' digital communication data and providing the authorities access to encrypted data from messaging services, emails and social networks. Russia's Sovereign Internet Law that will take effect in November 2019 is meant to ensure the safe and sustainable functioning of the Russian segment of the internet, but it imposes large additional costs on the internet providers, i.e. by obliging them to install devices to filter traffic. Those laws apply to ICT and digital companies that function in Russia but that does not ensure that the competitive effects will be fairly distributed. For example, national companies whose main business is in Russia, but which also compete internationally, will be burdened with significant additional costs of complying with new regulation – costs that may very well undermine their international competitiveness.

In Brazil, regulators have taken a cautious stance regarding issues in digital markets. Regulations affecting digital platforms are enacted by different regulatory authorities, responsible for telecommunications, data protection, consumer protection, e-government, and intellectual property among others. The sectoral regulators are generally well placed and equipped to deal with the digital aspects of their sectors, but they have been careful not to overstep their powers. They have generally avoided undue intervention in very dynamic markets. This has not deterred the authority from intervening in certain competition cases, as reported in Brazil's media.

1.3.4. Providing internet access

The backbone of digital development is access to the internet for businesses and citizens. The BRICS countries have each developed measures to ensure increasing coverage through broadband and mobile internet. In Russia, the Federal Law 'On Communication' places additional obligations to provide internet access in settlements with small population sizes onto operators that occupy a significant position in the public communication network on the territories of not less than 2/3 of the regions of the Russian Federation. Currently the only company that qualifies for the status is the state-owned company Rostelecom. China is implementing a special "Broadband China" strategy that aims to significantly increase the levels of fixed broadband and 3G/ Long-Term Evolution (LTE) access as well as to ensure higher speed of access. In India the National Digital Communications Policy 2018 set one of its goals to be universal digital access in 2022. Brazil has been using General Plans of Universalization Goals (in Portuguese, *Plano Geral de Metas de Universalização* or "PGMU") to set universal access targets for telecom companies that have emerged after the privatization of the previously state-owned telecom giant Telebrás in 1998. The current plan is focused on expanding backhaul infrastructure and mobile Long-Term Evolution (LTE) in small cities, to make broadband access available to all; a major challenge in a country of continental dimensions and deep inequality.

The states' efforts are often backed by forces of competition between mobile operators.



Figure 1.12 . Percentage of individuals using the internet in BRICS (U.S. and France included for reference) in 2017



One of the problems that remains acute for BRICS countries is, as mentioned earlier, the digital divide between a country's regions, specifically between rural and urban areas. Consequently, decreasing the divide remains a policy target for each BRICS country.

Internet and mobile penetration rates are only one side of the coin when it comes to accessibility. The other side is affordability – and here the BRICS countries are demonstrating a positive dynamic, offering affordability on a level similar and even exceeding some of the higher income countries.

One way to capture these aspects is the Inclusive Internet Index that measures for categories: availability, affordability, readiness (literacy, trust and safety, policy) and relevance (local content, relevant content).¹⁷⁵ Table 1.3. shows where each BRICS ranked by the Inclusive Internet Index in 2017.

¹⁷⁵ The Economist Intelligence Unit Limited (2017). The Inclusive Internet Index: Bridging digital divides. The Inclusive Internet Index. [online] The Economist Intelligence Unit Limited. Available at: https://theinclusiveinternet.eiu.com/assets/ external/downloads/3i-bridging-digital-divides.pdf [Accessed 1 Apr. 2019].

Country	Rank in 2017
Russia	15
Brazil	18
South Africa	27
China	29
India	36

Table 1.3. BRICS countries in the Inclusive Internet Index ranking

Source: https://theinclusiveinternet.eiu.com/assets/external/downloads/3i-bridging-digital-divides.pdf

In some of the BRICS countries competition authorities have contributed to making internet access and mobile telephony more affordable. In Russia the Federal Antimonopoly Service has led a series of cases against mobile operators dealing with excessive prices for intra-network and national roaming which have later been supported by industry regulation banning both types of excess roaming charges.¹⁷⁶ In China competition authorities have also conducted several investigations against its three network operators (China Mobile, China Telecom, China Unicom) which ended up suspended due to the companies making commitments to improve their conduct in line with the requirements of antitrust law, as reported in China's media. In Brazil, there has been some significant competition enforcement in infrastructure access, especially in telecommunications markets that give support to internet services. Merger control and settlements were used to tackle the access to infrastructure and to public utilities owned by former incumbents, as highlighted in the Brazilian press.

1.3.5. Data sovereignty

All the BRICS countries have demonstrated awareness of the specific problems that customers face when participating in digital markets and have implemented regulation changes in order to better reflect these new challenges, in particular concerning data and privacy protection. What, in a sense, sets the BRICS countries apart from the more developed countries is the particular challenges the former face in terms of data protection and the subsequent goals that are to be achieved in this field.

One such challenge is the provision of 'digital sovereignty', a definitive part of which is data sovereignty. The term has not been defined either in literature, or across formal country policies, but in a general sense it can be viewed to mean an "attempt by nation states to subject data flows to national jurisdictions".¹⁷⁷ Though the concern is communal for BRICS countries, Polatin-Reuben and Wright (2015) point out the difference in approaches: while China and Russia are considered by them to lean towards "strong data sovereignty" ("a state-led approach with an emphasis on safeguarding national

¹⁷⁶ En.fas.gov.ru. (2019). ABOLISHING ROAMING IN RUSSIA IS RECOGNIZED THE BEST FAS CASE | Федеральная Антимонопольная Служба - ФАС России. [online] Available at: http://en.fas.gov.ru/press-center/news/detail. html?id=54111 [Accessed 1 Aug. 2019].

¹⁷⁷ Polatin-Reuben, Dana, and Joss Wright. 2014. "An Internet with BRICS Characteristics: Data Sovereignty and the Balkanisation of the Internet," July. https://www.usenix.org/system/files/conference/foci14/foci14-polatin-reuben.pdf

security^{"178}), India and South Africa choose the "weak data sovereignty" ("private sectorled data protection initiatives with an emphasis on the digital-rights aspects of data sovereignty"¹⁷⁹) approach, with Brazil's position being more centered between these poles. But the increasing relevance of the challenges of data protection has led to a shift of approaches: since the work of Polatin-Reuben and Wright was published in 2015, India is currently in the process of developing digital sovereignty and data localization regulations, along with establishing preferences for local companies in acquiring access to data, which would move it into the "strong data sovereignty" category.

The possible effects for competition of data sovereignty (including data localization) regulations depends on the specific forms. Generally speaking, these measures are seen by affected parties and countries as protectionist¹⁸⁰ and hindering global competition.¹⁸¹ They might be viewed as a type of industrial policy. If these regulations are complemented by provisions of preferential access to data for local companies, as proposed by the draft regulation in India, then these regulations can contribute to leveling the playing field with global companies. BRICS national markets are large enough to provide significant competitive advantages through processing their data.

As for competition authorities, their approach to the need to incorporate privacy, data protection and data access effects in their analysis is not uniform. Brazil's competition authority has repeatedly concluded that data and privacy concerns do not come under its authority. On this matter, the Brazilian Administrative Council for Economic Defense (CADE) acknowledged the importance of the data and privacy discussions, but confirmed that the evaluation of privacy concerns should be carried out by authorities such as the Department of Consumer Protection, the telecommunications regulator, and the Internet Management Committee.¹⁸² On the other hand, the Russian competition regulator has attempted to include into competition law provisions concerning access to data.¹⁸³

1.3.6. Protectionist aspects of digital policy

As pointed out earlier in discussion of the Vanek-Reinert effects, although typically barrier reduction and easier market penetration are associated with more vigorous competition, such unbounded competition may be detrimental to local businesses. In terms of market concentration, this may lead to more concentrated markets after international corporations take over domestic markets. The outcome is especially detrimental to the less developed countries' digital sphere, which, as seen before, is globally dominated by

¹⁷⁸ Ibid, p.1

¹⁷⁹ Ibid, p.1

¹⁸⁰ Ustr.gov. (2019). 2018 Fact Sheet: Key Barriers to Digital Trade. [online] Available at: https://ustr.gov/about-us/policyoffices/press-office/fact-sheets/2018/march/2018-fact-sheet-key-barriers-digital [Accessed 1 Aug. 2019].

¹⁸¹ A more technical analysis of protectionism under the international trade rules is provided in section 1.8 below.

¹⁸² Eg. See BRAZIL, Administrative Council for Economic Defence. Vote of Commissioner Ruiz and Verissimo on Administrative Proceedings 08012.010585/2010-29, involving Phorm and Telefonica Data S.A available at www.cade.gov.br .

¹⁸³ Alrud. Russian Antimonopoly Enforcement: Developments for 2018 and Trends for 2019 <u>http://www.alrud.com/upload/</u> iblock/5b8/Russian%20Antimonopoly%20Enforcement_Developments%20for%202018%20and%20Trends%20for%20 2019.pdf

firms from more developed countries. This leaves the less developed countries' domestic production to concentrate on industries that yield a significantly lesser amount of value in the global value chains, thus furthering inequality between countries.

Some of the BRICS countries see their strategies for the support of their digital transformation as an opportunity to lessen their dependence on imports of technology. This intent is clear, for example, in the regulations introduced and currently being proposed in the Russian software markets. For example, in 2015, public authorities became obligated to only purchase Russian software¹⁸⁴. Exceptions can be made only in those cases when foreign software does not have Russian substitutes or when those substitutes do not fulfill the buyer's requirements¹⁸⁵. Later on, software from the Eurasian Economic Union was also admitted into the procurement process. Additionally, one of the latest government initiatives (not yet in force) is the requirement to pre-install Russian apps on smartphones that are sold in the country.

As for China's "Made in China 2025" strategy, Wübbeke et al. (2016)¹⁸⁶ argue that, judging by the wording of the strategy, it aims at gradually replacing foreign technology with Chinese technology. The strategy is not only domestic: the goal is also to prepare the ground for Chinese technology companies entering international markets. According to the report, the strategy intends to increase the domestic market share of Chinese suppliers for "basic core components and important basic materials" to 70 per cent by the year 2025. Semi-official documents related to the strategy set very concrete benchmarks for certain segments: 40 per cent of mobile phone chips on the Chinese market are supposed to be produced in China by 2025, as well as 70 per cent of industrial robots and 80 per cent of renewable energy equipment.¹⁸⁷ These targets confirm the import substitution trend.

A number of barriers either naturally exist or are maintained that carve out a market for Chinese firms to improve and develop, to the point where some of them become globally competitive. Firstly, there is the language barrier, but other barriers are put in place mostly through government policy. The combination of regulations known as "The Great Firewall of China", for example, by limiting access to foreign websites, search engines and apps, has channeled the existing demand for these services into Chinese analogues.

India's regulatory framework allows for differing regulations concerning foreign and local digital companies, especially in sectors where there are restrictions on the share of FDI allowed to take place. The proposed restrictions that accompany the digital sover-

187 Ibid, p. 7

¹⁸⁴ The Decree of the Government of the Russian Federation No. 1236 of 16 November 2015 "On Prohibition of Admission of Computer programs originating from Foreign Countries for the Purposes of Procurement for State and Municipal Needs"

¹⁸⁵ In practice many buyers circumvent this restriction, either because Russian substitutes for the software in fact do not exist, or by formulating requirements in such a way that the substitutes do not fulfill them.

¹⁸⁶ Wübbeke J., Meissner M., Zenglein M.J., Ives J., Conrad B. (2016) Made in China 2025: The making of a high-tech superpower and consequences for industrial countries. Mercator Institute for China Studies, MERICS Papers on China https:// www.merics.org/sites/default/files/2017-09/MPOC_No.2_MadeinChina2025.pdf

eignty policy and concern access to Indian data for foreign firms are also a measure that can provide support to local digital players.

1.3.7. Role of the competition authority

In the majority of BRICS countries, the competition authority's main focus concerning digital industrial policy is twofold. The first major function is careful antitrust enforcement based on the understanding of the specific features of digital businesses and the associated factors of risks and benefits. In this way, the competition authority ensures that competition in the digital sector remains fair and that the losses of consumer welfare do not outweigh the benefits of the digital economy. The second major function is the assessment of the competitive effects of policies and regulations introduced in the digital sphere.

Brazil's competition authority demonstrates a focus on competition effects and a commitment to the traditional goals of antitrust policy, ensuring that these are not forgotten among discussions of other issues pertaining to digital markets. Existing competition law is successfully applied to digital platforms and markets, and CADE and the Secretariat for Competition Advocacy and Competitiveness of the Ministry of Economy ("SACC", in the Portuguese acronym) additionally undertake efforts to advocate and promote competition in the digital sector. Although SACC takes the primary role of competition advocacy, championing pro-competition regulatory actions within the government, CADE may also have specific advocacy initiatives.

India's current enforcement of competition law in the digital sector has so far presumed the possibility to adapt the already existing law to the particular issues of digital markets. As noted earlier, India exhibits a rather prudent approach to both regulation and competition law enforcement in the digital sphere. In 2018-2019 the Government of India has been taking steps to begin a review of competition law, which might result in the competition authority acquiring new instruments for dealing with violations in digital markets.

India's competition authority also has the power to provide expertise concerning possible anticompetitive effects of decisions made by sectoral regulators upon request. However, the authority's opinion is not binding for the regulator, the competition authority's influence being limited.

In recent years China has established a fair competition review system encompassing policies enacted at the central and local government levels, which ensures that digital policies that pose significant competition risks will not be implemented. The competition authority can make suggestions and offer opinions during the policy-making stage. Additionally, the authority has powers to address the abuse of administrative power – in case a policy is enacted and leads to a restriction of competition – by proposing higher authorities to deal with the authority that enacted the policy under concern. As for competition law enforcement, the authority tries to avoid overenforcement, guided by the understanding that digital markets are still emerging. Nevertheless, a draft addition to

the competition law ("Provisions on the Prohibition of Abuse of Market Dominant Status (Draft for Comment)") demonstrates a recent shift towards explicitly recognizing the role of data as a source of dominance in digital markets.¹⁸⁸

The Russian competition authority, in its turn, appears to be playing a much larger role in digital industrial policy than its colleague in other BRICS countries. Aside from ensuring antitrust enforcement in digital markets, the Russian competition authority has proposed to introduce major changes to competition law that are meant to better reflect the specific traits of the digital economy, including platform markets, the role of Big Data and network effects. The cases investigated by the Federal Antimonopoly Service of Russia (FAS) have also become the basis for and aligned with the regulation that was subsequently introduced or has been proposed in the digital sector. Examples include the authority's decisions on intra-network and national roaming charges by mobile operators that were later abolished by sector regulation, as well as the current proposal to introduce obligations of pre-installment of Russian apps on smartphones sold in Russia – based on the case of Yandex v. Google.¹⁸⁹

The digital strategies introduced in the BRICS countries in a sense influence competition law enforcement. These strategies underscore the importance of the digital sector for modern development, which ensures that special attention is paid to all the antitrust investigations and merger reviews concerning digital markets. Moreover, there is an increased awareness that these cases pose distinct challenges for competition law enforcement stemming from the particular characteristics of digital businesses and markets. Therefore, authorities view these cases as relatively complex and give them even more attention.

1.3.8. Mergers

Concerning merger review, competition law enforcement in the BRICS countries seems to recognize the specific efficiencies in digital markets that accompany the increase of market share. For example, despite some interventions, Brazil's competition authority has cleared the vast majority of mergers in the digital economy without restrictions. The decisions which involved restrictions ranged from the exclusion of non-competition clauses to the assumption of behavioural and structural commitments, some of them related to the provision of internet connectivity. Russia's competition authority, as well, has recently analyzed – and approved – a major deal between Uber and Russia's Yandex.Taxi concerning the consolidation of their online taxi hailing business in Russia and neighboring states.

The amassing of patents in the hands of global firms is a widespread challenge for different industries in developing countries. The merger approval process is one of the ways to alleviate this problem and to provide general access to technologies or access on better conditions. To illustrate, in Brazil, the transfer of IP rights is among the struc-

¹⁸⁸ See files on China's media.

¹⁸⁹ See files on Russia's media.

tural remedies that can be imposed by CADE or agreed by the parties to a notified transaction and compulsory licensing of IP rights is one of the measures that can be imposed to approve a merger.¹⁹⁰

A practical example is the recent Bayer-Monsanto merger, which was reviewed, analyzed and approved by all the BRICS competition authorities. Some of the decisions on this merger included provisions of access to technologies. For instance, China's MOFCOM, aside from structural conditions on the divestiture of parts of Bayer-Monsanto's global business, required the merged firm to provide access to its digital agricultural platform for Chinese agricultural software and application developers (and to allow Chinese users to register and use the products or application programs of digital agriculture). Such measures have the potential to promote the dissemination of technologies, strengthen the bargaining power of the merged firm's counterparts on different sides of the market and promote competition in adjacent markets.

A complementary issue is the reflection of BRICS's digital strategies in foreign merger policies. Apart from acquiring access to technologies through merger approval conditions, as in the Bayer-Monsanto case, another way of gaining access, as mentioned, is acquiring foreign technological companies. Here Chinese companies have had varying success. The largest deal so far has been the acquisition of the Swiss Syngenta company by ChemChina, a deal prompted by China's desire to use Syngenta's portfolio of top-tier chemicals and patent-protected seeds to improve domestic agricultural output¹⁹¹.

Other deals – concerning, for instance, US companies – have been blocked by various reasons, mainly through the invocation of legislation concerning foreign investment. The examples include the attempts of Ant Financial (sister company of the Alibaba Group) to buy the US money-transfer provider MoneyGram, of a Chinese-funded private equity firm to purchase Lattice Semiconductor, an American chip manufacturer and of another proposed deal by a Chinese fund to buy Xcerra (a provider of equipment for testing computer chips and circuit boards).¹⁹² As will be developed in Section 1.8.1, the trade wars exacerbate the fears of foreign investments for strategic acquisitions.

1.3.9. Investigations of competition law violations

The countries' digital strategies seem to also have an impact on the cases investigated by the competition authorities. Mainly this is reflected in the types of conduct that draw inquiries from the competition authorities – especially in cases dealing with foreign firms. If these cases end up being decided in favor of local companies, this might evidence certain protectionist aims. However, overall the outcomes of the cases vary and are not always in favor of the domestic firms.

¹⁹⁰ See Law 12,529, of 30 November 2011, art. 61, §2, V.

¹⁹¹ Fortune. (2017). ChemChina Clinches Its \$43 Billion Takeover of Syngenta. [online] Available at: http://fortune. com/2017/05/05/chemchina-syngenta-deal-acquisition/ [Accessed 1 Apr. 2019].

¹⁹² New York Times. (2018). China Microchips. [online] Available at: https://www.nytimes.com/2018/02/23/technology/ china-microchips-c us-xcerra.html [Accessed 1 Apr. 2019].

An example of conduct that draws scrutiny from competition authorities in BRICS is dominant foreign companies using data gathered from local consumers to further increase their market power and earnings. In the case *Shri Vinod Kumar Gupta against WhatsApp Inc.* in India the alleged abusive conduct of WhatsApp consisted of sharing users' private information with Facebook (which has owned WhatsApp since 2014), which in turn was being used by Facebook for targeted advertisements, as well as predatory pricing – by providing free services since 2016. The CCI, after considering the case, did not find a violation. However, the case emphasizes how the importance of data in the digital economy in conjunction with private information protection issues coincide with the low rate of digital literacy in India. The case with WhatsApp demonstrates that the privacy policy implemented by one firm can affect the market share of another firm in the same group. Thus one digital product supplied for free can be the source of data for another product which can be monetized (for example) through advertising. It follows that privacy policies and the level of digital literacy can affect data distribution and allocation efficiency in different markets.

A case that addresses the opportunity of platforms to gain market share using network effects and the interaction of international firms with local competitors is the *Meru Travel Solutions Pvt. Ltd. against Ola and Uber* case in India. The alleged anticompetitive conduct of Ola and Uber related to the incentive model of providing unrealistic incentives to the drivers and discounts to customers in addition to low fares. According to the claim, this was aimed at gaining a high market share and foreclosing competition in the market by creating entry barriers through anticompetitive agreement between Uber/Ola and its driver-partners. The CCI again found no violation, indicating that drivers and riders can easily switch from using one aggregator to another, thus there is no entry barriers and no dominant position of any one aggregator.

Although both cases were resolved in favor of the foreign digital companies (with the exception of Ola, which is one of the biggest Indian online transportation network companies), they indicate a sense of unfairness expressed by the plaintiffs and the perception that local firms and consumers should be protected against the bargaining power of global digital players.

An adjacent issue is not simply protection, but active support of local companies as global players. China's Qualcomm case illustrates the challenge of achieving strategic goals in the digital sphere and promoting innovation while being dependent on foreign technology. In 2015 China fined Qualcomm more than 6 bn yuan for abusing its dominant position and charging unfairly high licensing fees, improperly bundling unrelated licenses and including "no-challenge" clauses in its licensing agreements¹⁹³. The case highlights the key problem with access to technology and its distributional effects. Chi-

¹⁹³ the Guardian. (2015). Qualcomm given record £631m fine in Chinese anti-monopoly case. [online] Available at: https:// www.theguardian.com/technology/2015/feb/10/qualcomm-record-breaking-631m-fine-chinese-anti-monopoly-case [Accessed 1 Feb. 2019]. And materials taken from: Board, E. (2015). China's NDRC Provides Guidance Regarding Licensing of Standard-Essential Patents in <i>Qualcomm</i> Decision. [online] Antitrust Watch. Available at: https://blogs. orrick.com/antitrust/2015/04/24/chinas-ndrc-provides-guidance-regarding-licensing-of-standard-essential-patents-inqualcomm-decision-2/ [Accessed 18 Jan. 2019].

na's position as a hub for manufacturing devices for internet access makes it dependent on certain high-tech components supplied by global companies. As these companies hold the bulk of patents for these technologies, substitution is unlikely. This opens up opportunities for global companies to exploit their market power and redistribute value from Chinese companies. Competition policy, by imposing constraints on the types of behavior such a dominant firm can engage in, can serve to improve the conditions of access to important technologies and redistribute in return some of the value that was originally absorbed by the global companies.

Russia's biggest cases in the digital and tech spheres – Yandex v. Google and Kaspesky Laboratory v. Microsoft¹⁹⁴ – have also been resolved in favor of domestic companies that also compete on international markets (Yandex and Kaspersky Laboratory respectively). This does not necessarily indicate a protectionist bias, but it is important to note that the FAS has previously been criticized for appearing to underenforce the law when large foreign firms are concerned and over-enforce it to the detriment of smaller domestic companies¹⁹⁵. In any case – whether it was intentional or not – the decisions in favor of Yandex and Kaspersky Lab help mitigate this criticism. However, the protectionist *effect* of at least one of these decisions – the Yandex v. Google one – has been further enhanced by FAS's policy proposal to require the pre-installment of Russian apps on smartphones.

As for the issue of underenforcement or overenforcement in the case of platforms, competition authorities in the BRICS countries have proven that they are not afraid to take on cases of digital platforms. Good illustrations are the WhatsApp and Ola/Uber cases in India, mentioned above along with the CCI case against Google on issues of search and advertising; the Google and Microsoft cases in Russia; the Renren v. Baidu case in China and cases concerning Tencent's messaging platform WeChat; and the Brazilian cases against hotel booking platforms and credit card companies. Some of these cases like the Google cases in India and Russia correspond to cases brought against Google by the EU. Taking into account some of the methodological difficulties associated with bringing cases against digital platforms, it is unwise to assume an overenforcement trend.

A recent trend in public discussion centers around data showing an increase of economic concentration in some of the major economies in recent years. For the U.S., Shapiro (2018) presents a thorough summary of the data, press articles and policy papers describing the growth of economic concentration during the past two decades, as well as a critique of the data and some of its interpretations.¹⁹⁶ Generally speaking, the main issue to discuss concerning the links between the apparent increase in global market concentration and the need for a more vigorous competition policy is whether the in-

¹⁹⁴ See files on Russia`s media.

¹⁹⁵ Forbes.ru. (2014). Попкорн, сахар и такси: как ФАС борется с малым бизнесом | Мнения | Forbes.ru. [online] Available at: https://www.forbes.ru/mneniya-column/konkurentsiya/270499-popkorn-sakhar-i-taksi-kak-fas-boretsya-s-malym-biznesom [Accessed 18 Feb. 2019].

¹⁹⁶ Shapiro, Carl (2018) Antitrust in a time of populism, International Journal of Industrial Organization, Volume 61, 2018, P. 714-748, [accessed on 01.03.2019] https://doi.org/10.1016/j.ijindorg.2018.01.001. https://www.sciencedirect.com/science/article/pii/S0167718718300031?via%3Dihub#keys0002

crease in industry concentration (if it really exists) signifies an increase in market power.

There are two main suggestions on the limitation of industry concentration data. First, that industry concentration is too aggregated a measure for competition analysis that usually deals with market concentration, and there is no method reliable enough to infer market concentration from industry-level data. Second, that even market level concentration is an imperfect indicator of market power, and perhaps we should be using alternative measures if we want to find out whether there in fact was an increase in market power of firms in the last two decades. Finally, the rise in levels of concentration is frequently being associated with the digital sector, with its large economies of scale and scope enhanced by network effects that logically lead to high levels of market concentration and the emergence of "superstar firms". As the digital sector gains importance and weight in the economy, its high concentration can affect the overall level. It follows that another issue to be analyzed is whether the digital sector is the main contributor to the growth of aggregate concentration levels.

In the literature, an increase in industry-level concentration in the U.S. has been confirmed in Furman & Orszag (2015),¹⁹⁷ – who also note some upward trends in profits in earnings inequality, Autor et al. (2017)¹⁹⁸, Bessen (2017)¹⁹⁹, Gutierrez & Philippon (2016, 2017)²⁰⁰, Döttling et al. (2017)²⁰¹, Grullon et al. (2018)²⁰². The latter also find that the industries with the largest increases in concentration are characterized by higher profit margins and more profitable M&A deals, while the overall increase in concentration found in the study is not accompanied by a significant operational efficiency difference. This in sum suggests that market power is becoming an important source of value. Increased mark-ups in the U.S. are also demonstrated in De Loecker, & Eeckhout (2017)²⁰³, who also find that the increase is due to a sharp increase in high mark-up firms. Gutierrez & Philippon (2016, 2017) find that increased market concentration is accompanied by reduced capital investment. Barkai (2017)²⁰⁴ shows that increased concentration trends are connected with a sharp rise in excess profits (capital return above the level

¹⁹⁷ Furman J., Orszag P. A Firm-Level Perspective on the Role of Rents in the Rise in Inequality. Presentation at "A Just Society" Centennial Event in Honor of Joseph Stiglitz, 2015, Columbia University.

¹⁹⁸ Autor D., Dorn D., Katz L., Patterson C., Van Reenen J. The Fall of the Labor Share and the Rise of Superstar Firms. NBER working paper No. 23396, Issued in May 2017 <u>https://www.nber.org/papers/w23396</u>

¹⁹⁹ Bessen J. E. Information Technology and Industry Concentration. Law and Economics Research Papers, 2017, No17-41, Boston University School of Law

Gutiérrez G., Philippon T. Investment-less growth: An empirical investigation. NBER Working Paper No. 22897, 2016;
 Gutiérrez G., Philippon T. Declining Competition and Investment in the U.S. NBER working paper 23583, 2017

²⁰¹ Döttling, Robin and Gutierrez Gallardo, German and Philippon, Thomas, Is There an Investment Gap in Advanced Economies? If So, Why? (July 2017). Available at SSRN: https://ssrn.com/abstract=3002796 or http://dx.doi.org/10.2139/ ssrn.3002796

²⁰² Grullon, Gustavo and Larkin, Yelena and Michaely, Roni, Are U.S. Industries Becoming More Concentrated? (October 25, 2018). Forthcoming, Review of Finance. Available at SSRN: https://ssrn.com/abstract=2612047 or http://dx.doi. org/10.2139/ssrn.2612047

De Loecker J., Eeckhout J. The Rise of Market Power and the Macroeconomic Implications. NBER Working Paper 23687,
 2017.

²⁰⁴ Barkai S. Declining labor and capital shares, working paper, University of Chicago, 2017.

required to attract investors). All of these studies seem to indicate that market power, measured from different angles, is rising. Still, the level of aggregation remains a point of critique. In this vein, Rossi-Hansberg et al. (2018)²⁰⁵ find that national concentration trends, when disaggregated to the local level, become a pattern of de-concentration in a number of industries.

Among studies dealing with estimates for market power dynamics in other countries, Bajgar et al. (2019)²⁰⁶ take a look at 10 industries both in Europe and in North America from 2000 to 2014 and demonstrate an increase of the level of concentration (measured as the share of the 10 largest companies in an industry). By contrast, Döttling et al. (2017) are able to confirm an increase in the U.S., but a decrease in Europe, using HHI for measuring concentration).

Concerning industry mark-ups as a possible measure of market power, Andrews et al., 2018²⁰⁷, show industry data in a sample of 22 OECD countries revealing an upward trend in industry mark-up level. In Calligaris et al., 2018²⁰⁸, firm-level data in a sample of 26 countries (including, out of the BRICS countries, India) is studied in the period from 2001 to 2014, and the upward trend in mark-up level, on average across country, is confirmed. Pertaining to the analysis of BRICS countries, the most interesting is the study by De Loecker and Eeckhout (2018)²⁰⁹, who extract data from the financial statements of over 70,000 firms in 134 countries, including the BRICS. They show that in the last four decades the average global mark-up has increased from 1.1% to 1.6% (Figure 1.13.).

Figure 1.13. Mark-up by country in 2016



Source: (De Loecker, Eeckhout, 2018, p. 8)

- 205 Rossi-Hansberg E., Sarte P.-D., Trachter N. Diverging Trends in National and Local Concentration. Working Paper. 2018 https://www.princeton.edu/~erossi/DTNLC.pdf
- 206 Matej Bajgar, Giuseppe Berlingieri, Sara Calligaris, C. C. and J. T. (2019). Industry Concentration in Europe and North America (OECD Productivity Working Papers). Retrieved from https://doi.org/10.1787/24139424
- 207 Andrews, D., P. Gal and W. Witheridge (2018), "A genie in a bottle?: Globalisation, competition and inflation", OECD Economics Department Working Papers, No. 1462, OECD Publishing, Paris, http://dx.doi.org/10.1787/deda7e54-en.
- 208 Calligaris, S., C. Criscuolo and L. Marcolin (2018), "Mark-ups in the digital era", OECD Science, Technology and Industry Working Papers, No. 2018/10, OECD Publishing, Paris, http://dx.doi.org/10.1787/4efe2d25-en
- 209 De Loecker, Jan and Eeckhout, Jan, Global Market Power (June 2018). NBER Working Paper No. w24768. Available at SSRN: https://ssrn.com/abstract=3206443

As can be seen from Figure 1.13 the highest mark-up among the BRICS countries is exhibited by Russia (higher than 1.16). Brazil falls in the category of 1.5-1.75 mark-ups. China, India and South Africa exhibit average mark-ups in the lower range of 1.25-1.5.

The increase in mark-ups in 1980-2016 is distributed unevenly across regions: mark-ups have risen the most in North America and Europe, and the least in emerging countries in Latin America and Asia (Figure 1.14.).





Source: (De Loecker, Eeckhout, 2018, p. 13).

Here Russia stands out among other BRICS countries with an exceptionally high markup growth, but taking into account the period of measurement, the time coincides with the transformation from a planned economy to a market economy. Thus the substantial mark-up increase should not be too surprising.

As for the role of the digital sector in the rise of concentration levels, the evidence appears to be inconclusive. Bessen (2017) finds a general link between levels of concentration and the use of information technology. Mandel (2018)²¹⁰ points out that in the results of Autor et al. (2017) most of the rise in concentration in services happened in the 1990s and early 2000s, when the "superstar" digital companies such as Facebook, Google and Amazon either did not exist or were very small in size. Bajgar et al. (2019), studying 10 industries in Europe and in North America, have demonstrated, as mentioned, an increase in the level of concentration, but at the same have found no significant difference in the dynamics of the digital-intensive sectors. Calligaris et al. (2018), by contrast, have found that mark-ups are higher in digital-intensive sectors than in less-digitally intensive sectors also have increased significantly over time.

In conclusion, the rise of industry concentration and mark-ups appears to be a trend in most of the world. However, as this rise is observed on a highly aggregated level – that is at a level above the product and geographical boundaries of actual markets – it does not

²¹⁰ Mandel M. Competition and Concentration: How the Tech/Telecom/ Ecommerce Sector is Outperforming the Rest of the Private Sector. Progressive Policy Institute, November 2018 <u>https://www.progressivepolicy.org/publications/com-</u> petition-and-concentration-how-the-tech-telecom-ecommerce-sector-is-outperforming-the-rest-of-the-private-sector/

strictly prove a rise in market power. Even if we do merge these phenomena together and consider industry concentration and mark-ups to approximate market power, the upward trend seems to be less pronounced in less developed countries, particularly in BRICS. As for the high concentration of digital markets, its role in the overall trend remains inconclusive, although it is hard to deny the "natural" tendency of digital markets to become concentrated.

1.4. Digital trade and markets: an international governance perspective

1.4.1. General context of digital trade

The World Trade Organisation (WTO) has long recognized that global digital trade²¹¹ is growing and creating new opportunities,²¹² and established a work programme on e-commerce.²¹³ It defined e-commerce as "the production, distribution, marketing, sale or delivery of goods and services by electronic means."²¹⁴ At the end of 2017, ministers of trade of WTO member states discussed whether the WTO should start negotiations on digital trade. The members were unable to consolidate the several proposals on digital trade, including a call for the creation of a central forum on e-commerce negotiations. Although a group of 70 WTO members decided to start the work on consolidated e-commerce rules,²¹⁵ it is clear that consensus is far away.

That same year the BRICS countries signed the E-commerce Cooperation Initiative²¹⁶ and established the E-Commerce Working Group. The United Nations Industrial Development Organization (UNIDO) and the International Trade Centre (ITC) analysed the BRICS e-commerce ecosystem. Apart from challenges unique to each country, they identified a number of challenges common to all BRICS countries, including "bureaucratic procedures, unfavorable tax regimes, underdeveloped delivery infrastructure, a lack of e-commerce skills in SMEs, hindering their ability to compete with larger companies, and adequate mechanisms for ensuring privacy and security of data."²¹⁷

In this regard, several tendencies in the changing global trade landscape can be outlined. First, digital trade does not simply mean automation of processes and stages typical for traditional trade. The very centers of value creation are changing, and new market mod-

²¹¹ Digital trade and e-commerce are used interchangeably for the purposes of this chapter.

²¹² See Declaration on Global Electronic Commerce adopted on 20 May 1998 at the WTO Ministerial Conference in Geneva, available at: https://www.wto.org/english/tratop_e/ecom_e/mindec1_e.htm.

²¹³ Work programme on electronic commerce. Adopted by the General Council on 25 September 1998, available at: https://www.wto.org/english/tratop_e/ecom_e/wkprog_e.htm.

²¹⁴ ibid.

²¹⁵ New initiatives on electronic commerce, investment facilitation and MSMEs, available at: https://www.wto.org/english/ news_e/news17_e/minis_13dec17_e.htm

²¹⁶ BRICS E-Commerce Cooperation Initiative: https://www.brics2017.org/wdfj/201708/t20170831_1827.html

²¹⁷ Status, Opportunities and Challenges of BRICS e-Commerce. A report prepared by UNIDO and ITC for submission of the BRICS Trade Ministers Meeting Shanghai, China 2 August 2017, available at: http://www.intracen.org/publication/ Status-Opportunities-and-Challenges-of-BRICS-e-commerce/, p. 8

els emerge (e.g. the sharing economy, crowdsourcing). Further, the product life cycle in the digital environment involves storage, transfer and tracing of its digital twin – a virtual representation thereof reflecting the key characteristics of a real object. This means that e-commerce may involve trade in digital twins rather than the goods themselves. Beyond that, a pertinent regulatory problem is the fading boundary between goods and services and ensuing uncertainty in application of trade rules, as will be seen. The share of services in the production processes has increased. This includes engineering, design, research and other services which are often coordinated electronically. Thus, services are becoming an integral part of "smart goods" and the incorporated technology is increasingly protected by intellectual property rights. Companies are changing the focus of their main activities, removing boundaries between traditional sectors.

Second, as new roles and market participants emerge, one can notice the replacement of a number of players and the transformation of the intermediary layer. Producers begin to engage with consumers directly. This leads to an internal transformation of companies: they change their internal structures, reorganize their storage systems, decision-making systems, and channels of communication. Companies that manage to form their own ecosystems become more competitive. Thus, considerable market share of transportation, digital trade, and payments are now occupied by companies initially formed in the IT sector (e.g. Google or Yandex). Retailers that use digital trade channels start developing and implementing accompanying services, such as warehouse management, logistical networks, e-payments, and lending and insurance services.

Third, markets are dominated by global ecosystems (such as Alibaba or Amazon) as they ensure effective processes and fast interaction with partners, which is not available for small and isolated companies. Global ecosystems expand geographically claiming new sectors and market segments and attracting new participants both on the consumer and producer sides. This definitely brings challenges to digital trade governance.

Fourth, consumers are becoming active participants of digital trade. Trade platforms often do not own the goods they trade. The loyalty of their customers becomes their main asset. Trying to improve consumer experience, digital platforms and producers selling via internet propose new services, striving to accelerate supply chains and to create new trade channels. This is a two-way street that jointly creates value with platform participants. Approaches to building relations between producers and consumers are also undergoing profound changes, bringing data transfers to the forefront as consumers become co-producers and co-designers. They actively participate with their data, as well creating the content independently in the form of reviews, comments and complaints. The consumer also becomes a "seller" by providing data about his or her preferences and models of behaviour. Such data open massive opportunities for forecasting, and the improvement of consumer properties of goods, managing inventory, etc., turning them into selling assets that ensure the competitiveness of market participants. In the end, consumers and digital platforms determine what relationship models are to be formed in the digital environment. This requires international trade rules that encompass the new reality.

Such internet presence leaves a digital footprint, which includes browsing and shopping history, goods ratings, inquiries, opinions, emotions and the influence of community leaders. This data can serve as an invaluable asset for companies. Data analysis allows the creation of more attractive recommendations for consumers and the formation of targeted marketing strategies. Companies also use data to adjust production plans, reduce warehouse costs, and increasing business effectiveness. Development of successful models of data monetization becomes a vital issue for companies of all sectors.

1.4.2. Inter-jurisdictional data transfers: an overview

Given these developments, data is becoming the main resource and source of capitalization in digital trade. According to the World Bank, "firms need a free flow of data to operate across national borders, especially as production processes become more fragmented and goods and services become more digitized."²¹⁸ Between 2005 and 2014 the volume of cross-border data flows has increased 45 times and added USD 2.8 trillion to world GDP, surpassing global trade in goods.²¹⁹ The explosive growth is ongoing.²²⁰ As argued in the note by the UNCTAD Secretariat:

Digital data are becoming an essential input in decision-making, production processes, transactions and relationship management across an ever-increasing swath of the agricultural, manufacturing and services sectors. As the digital economy evolves further, data will become even more inextricably interwoven with all aspects of the world economy, including the functioning of the Internet, global value chains and international trade.²²¹

The provision of communication, health, education, retail, tourism, entertainment or financial services on an international basis naturally leads to cross-border data flows. The increase in the role of data and data flows has been reflected in the servicification²²² of production allowing producers to increase added value and create sustainable relations with consumers. Therefore, there is a close linkage between international trade in services – in the form of the digital provision of international services – and the collection of data.²²³

Reaping Digital Dividends: Leveraging the Internet for Development in Europe and Central Asia. World Bank, – 2017. – P.
 146. – URL: https://openknowledge.worldbank.org/bitstream/handle/10986/26151/9781464810251.pdf.

²¹⁹ Digital Globalization: the new era of digital flows. McKinsey Global Institute, – 2016. – P. 75, 77. – full report available at: https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/digital-globalization-the-new-era-ofglobal-flows

²²⁰ Globalization in Transition: The Future of Trade and Value Chains. McKinsey Global Institute, 2019. p. 14.

²²¹ The value and role of data in electronic commerce and the digital economy and its implications for inclusive trade and development. Note by the UNCTAD secretariat. Doc. № TD /B/EDE/3/2. 23 January 2019. – P. 5.

²²² Sébastien Miroudot and Charles Cadestin, 'Services in Global Value Chains: From Inputs to Value-Creating Activities' (2017) OECD Trade Policy Papers No. 197.

Aaditya Mattoo and Joshua P Meltzer, 'International Data Flows and Privacy: The Conflict and Its Resolution' (2019) 21 Journal of International Economic Law 769, 770.

Not all cross-border data flows bring direct information about trade. Data flows can provide information on markets or can coordinate production processes. However, barriers which hinder cross-border data flows inevitably influence digital trade,²²⁴ as will be discussed in the next section.

1.4.3. International regulation of the digital economy

1.4.3.1. Regulation of cross-border data flows

1.4.3.1.1. Data protection

Data management is a new feature of the digital economy. The change in the value structure, the measurement of the potential value of data and the increase in the weight of digital services in production are new challenges for regulators. The growth of cross-border data flows raises the issues of data localization and exterritorial application of legislation on personal data protection, emphasised in Section 1.7.5. Countries and international institutions are concerned about ensuring personal data protection not only in their own territories but also in cross-border data flow restrictions on economic growth outweigh all positive effects of data protectionism.²²⁵ The possible potential costs of data flow restrictions, particularly data localization requirements, include limited access to digital commercial networks, limited abilities for companies to work with Big Data and a negative influence on the productivity and competitiveness of companies.²²⁶

The EU has adopted some of the most advanced rules on cross-border data flows, and also promotes its approaches abroad.²²⁷ The two main regulatory acts are the Regulation on the free flow of non-personal data²²⁸ and the General Data Protection Regulation (GDPR).²²⁹ Thus, the EU provides for regulatory approaches to both personal and non-personal data.

The Regulation on non-personal data ensures the free flow of non-personal data across borders (the ability to store and process data in any EU country); the accessibility of such

²²⁴ See e.g. William J. Drake, Background Paper for the workshop on Data Localization and Barriers to Transborder Data Flows, 14-15 September 2016, The World Economic Forum, Geneva, available at http://www3.weforum.org/docs/Background_Paper_Forum_workshop%2009.2016.pdf

²²⁵ Meltzer J.P., Lovelock P. Regulating for a Digital Economy: Understanding the Importance of Cross-Border Data Flows in Asia // The Brookings Institution, Working Paper 113. 2018.

²²⁶ ibid.

²²⁷ See e.g. Horizontal provisions for cross-border data flows and for personal data protection (in EU trade and investment agreements), available at: http://trade.ec.europa.eu/doclib/docs/2018/may/tradoc_156884.pdf.

²²⁸ Regulation (EU) 2018/1807 of the European Parliament and of the Council of 14 November 2018 on a framework for the free flow of non-personal data in the European Union.

²²⁹ Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation) // Official Journal of the European Union. 2016. L 119/1.

data for regulatory control (competent authorities retain access to data even when they are located in another state or processed in the cloud); easier switching between cloud service providers (by encouraging the development of self-regulatory codes of conduct); and full compatibility and synergy with cybersecurity measures.

Nevertheless, the following issues – essential for the data economy as identified by the European Commission – are not yet comprehensively addressed:

- data access and transfer (whether 'ownership' rights exist on non-personal data generated as part of a business process or *de facto* in the possession of a business; the conditions of usability and access to such data);
- liability (how to provide certainty to both users and manufacturers of data technologies and services in relation to their potential liability);
- partially portability, interoperability and standards (how non-personal data exchange and competitive data markets could be stipulated).²³⁰

The reason for that lies in differences in market maturity, among other issues. Barriers for data flows have been largely identified and narrowed down to the forced storage or processing of data within a geographical area or IT environment.²³¹ The implications of other data issues are not yet clear and they have a different source: "disruptive business models emerging from the digital transformation of the industry, technological advances and a fast-evolving data market."²³²

The GDPR is aimed at giving greater control to individuals over their personal data, simplification of the regulatory environment for international business and the improvement of business opportunities by facilitating the free flow of such data. However, the GDPR has a considerable impact on third countries, which is often negative especially in the case of less developed countries. There are clear economic and trade opportunities for less developed countries, especially those relying on exports of services: restrictions on data flows affect them in particular.²³³ This is due to the high compliance costs with the new requirements as data restrictions raise the cost of the trade transactions.²³⁴

The extraterritorial reach of EU regulations for the provision of international services is a technique to impose EU requirements abroad, the inclusion of equivalence clauses being an example of the requirements` inherent flexibility.²³⁵ The existence of inter-

231 Commission Staff Working Document Impact Assessment accompanying the document Proposal for a Regulation of the European Parliament and of the Council on a framework for the free flow of non-personal data in the European Union {COM(2017) 495 final} {SWD(2017) 305 final}, p. 3.

- 234 Nivedita Sen, 'Understanding the Role of the WTO in International Data Flows: Taking the Liberalization or the Regulatory Autonomy Path?' (2018) 21 Journal of International Economic Law 323, 323.
- Joanne Scott, 'Extraterritoriality and Territorial Extension in EU Law' (2014) 62 American Journal of Comparative Law 87, 117.

²³⁰ Commission Staff Working Document on the free flow of data and emerging issues of the European data economy accompanying the document Communication Building a European data economy {COM(2017) 9 final}.

²³² ibid.

²³³ UNCTAD, 'Enhancing Productive Capacity through Services' (United Nations 2019) Note by the UNCTAD Secretariat TD/ B/C.I/MEM.4/20 13–14; Mattoo and Meltzer (n 223) 770.

national commitments taken by the third country is one of the factors considered by the EU Commission to verify whether there is an adequate level of protection for data flows.²³⁶ However, this flexibility may allow a certain degree of inconsistency in the EU evaluation, which is essentially unilateral.

Box 1 – India and EU Privacy Regulation

India is an important exporter of software and IT-enable services. Most part of the provision of those services is cross-border and a smaller fraction is provided through the presence of a company (investment) or individuals outside India.

The EU has not deemed India's privacy legislation adequate according to its required levels. India has consciously chosen a balance that emphasises economic and trade opportunities over privacy. As an example, it is considered that the access to consumer credit history facilitates the provision of and resort to financial services, as digital inclusion is key for poor Indian citizens.

The enactment of a stringent national law in India would also submit all domestic companies to the same requirements, which is costly. The adoption of specific schemes (Binding Corporate Rules-BCRs and Standard Contractual Clauses-SCCs) is extremely expensive and takes time to implement. The result is that India's international trade is severely restricted due to EU rules.

Source: Adapted from Mattoo and Meltzer (2019). 237

Therefore, the balance between data protection and trade promotion has not yet been effectively sorted out on the global or regional level. This is especially vivid in the example of mixed data sets. Most of the times data sets consist of both personal and non-personal data with the prevalence of the latter. Application of stricter personal data rules to such sets of data can limit economic effects and will have a particularly adverse effect on developing countries and smaller companies to comply with such rules. The EU's internal approach, for instance, is to apply personal or non-personal rules respectively in case such data sets can be easily separated.²³⁸ However if such data are inextricably linked, the non-personal rules "shall not prejudice the application of the [GDPR]."²³⁹

The fact is that data protection legislation affecting international trade has to adhere to WTO rules. Brazil, India and South Africa are founding members of the WTO, since 1 January 1995; China acceded on 11 December 2001 and Russia, on 22 August 2012. All BRICS countries are now WTO members and subject to WTO agreements.²⁴⁰ Although Russia has transferred part of its regulatory competences to the Eurasian Economic

²³⁶ Mattoo and Meltzer (n 223) 775.

²³⁷ ibid 777–779.

²³⁸ Art.2(2) Regulation (EU) 2018/1807 of the European Parliament and of the Council of 14 November 2018 on a framework for the free flow of non-personal data in the European Union.

²³⁹ ibid.

²⁴⁰ Marrakesh Agreement Establishing the WTO (15 April 1994).

Union,²⁴¹ the rules adopted on the supranational level must still conform to WTO law.²⁴²

However, WTO rules are organised in the categories of "goods", "services" and "intellectual property" and data flows challenge those categories, as argued in section 1. This framework was inherited from the Uruguay Round, one of the most difficult and complex negotiations that have ever taken place. All the trade commitments and concessions followed those categories and are reflected in the so-called *schedules*. The founding rights and obligations of national treatment, most favoured nation and reciprocity refer to them. This took place though before the digital revolution. Through path dependence, international governance still uses those categories even in the new regional trade agreements, but there are visible changes, such as the e-commerce chapters, as will be seen.

Beyond the GATT,²⁴³ the WTO rules have acted as "enabling data flows by liberalising infrastructure" by initially boosting value chains for IT trade through the Information Technology Agreement.²⁴⁴ Moving forward, rules that impact international trade of "smart goods" – incorporating data flow-dependent services (e.g. smartphone, Internet of Things) – might also be subject to the WTO regulation of services²⁴⁵ and intellectual property.

Breaches in the WTO rules may arise from *de jure* discrimination (e.g. local data storage or production requirements) or *de facto* discrimination (e.g. privacy or data protection laws to protect citizens) resulting from measures that limit the ability of data to move globally.²⁴⁶ In this line, it is argued that some aspects of data protection and firewall legislation do not comply with the General Agreement of Trade in Service – GATS rules.²⁴⁷

²⁴¹ Eurasian Economic Union (EAEU) is an international organization of regional economic integration that seeks to create a common market for goods, services, capital and labour. It has been established on 1 January 2015 and the member states are Armenia, Belarus, Kazakhstan, Kyrgyzstan and Russia. See http://www.eaeunion.org/?lang=en.

²⁴² Art.2(1) of the Treaty on the Functioning of the Customs Union within the Multilateral Trading system of May 19, 2011, available at: https://www.wto.org/english/thewto_e/acc_e/kaz_e/WTACCKAZ69_LEG_1.pdf. The treaty has been incorporated into the legal system of the Eurasian Economic Union by the means of the Protocol on the Functioning of the Eurasian Economic Union within the Multilateral Trading System, which is Annex 31 to the Treaty on the Eurasian Economic Union, available at: https://docs.eaeunion.org/docs/en-us/0017353/itia_05062014_doc.pdf.

²⁴³ General Agreement on Tariffs and Trade (15 April 1994) Marrakesh Agreement Establishing the WTO Annex 1A 1867 UNTS 183 (GATT).

See Information Technology Agreement – ITA (13 December 1996) and see Mira Burri, 'The Governance of Data and Data Flows in Trade Agreements: The Pitfalls of Legal Adaptation' (2017) 51 University of California Davis Law Review 65, 77–80.

²⁴⁵ Sen (n 26) 330–331.

²⁴⁶ ibid 325.

²⁴⁷ General Agreement on Trade in Services (15 April 1994) Marrakesh Agreement Establishing the WTO Annex 1B 1869 UNTS 183 (GATS).

Provision	Examples of Breach	Possible Defences
Most favoured nation treatment	De facto discrimination among	- Public morals or public order – Art.
– Art. II	WTO members in relation to data	XIV (a)
	flows	- Secure compliance with laws and
		regulations Art. XIV (c)
Mutual recognition – Art. VII	Not providing adequate oppor-	(i) prevent deceptive or fraudulent
	tunities for negotiation of mutual	practices
	recognition agreements concern-	(ii) protection of the privacy of individ-
	ing data	uals
Market access limitations – Art.	Ban on cross-border transfer of	PLUS (chapeau) art. XIV
XVI	data – equivalent to a ban in the	no arbitrary or unjustifiable discrimi-
	provision of certain cross-border	nation or disguised restriction
	services (zero quota)	
		- Security exception (essential securi-
		ty interests) ²⁴⁸ – Art. XIV <i>bis</i>
National treatment – Art. XVII	De jure differential data treatment	
	related to national compared to	
	foreign produced services	

Table 1.4 Possible Breaches and Defences in the GATS

Source: Adapted from Mattoo and Meltzer²⁴⁹ and Sen²⁵⁰

States with data legislation and firewalls may justify their measure using the defenses, as stated in the third column of Table 1.4.. However, they face the high hurdle of the test of the *chapeau* of art. XIV: all the restrictive data measures have to be consistently applied among the WTO members. A state cannot condition market access to the requirements of regulatory cooperation, if this is not done consistently.²⁵¹ The takeaway is that whenever states desire to use regulatory cooperation as criteria for allowing data flows, they must ensure an objective and coherent determination of the outcome of the cooperation (e.g. actual treaties or effective assurance mechanisms).

1.4.3.1.1.1. Economic regulation

The current status of international governance in data flows connects to the regulation of trade in goods, services and intellectual property as seen above. Domestic laws, regulations and requirements on data cannot result in discrimination among foreign digital

²⁴⁸ Most recently, the WTO Panel has decided that the national security exception in the GATT art. XX is not self-judging but requires an objective assessment of the circumstances and has to be done in good faith. WTO, Russia: Measures Concerning Traffic in Transit – Panel Report (5 April 2019) WT/DS512/R [7.102-7.104]; [7.132]-[7.135] and [7.138-7.139].

²⁴⁹ Mattoo and Meltzer (n 16) 777–782.

²⁵⁰ Sen (n 26) 336.

²⁵¹ WTO, Argentina: Measures Relating to Trade in Goods and Services – Report of the Panel (30 September 2015) WT/ DS453/R [7.761], [7.764]. The AB analysis is more ambiguous, since likeness between non-cooperative and cooperative countries was not established. WTO, Argentina: Measures Relating to Trade in Goods and Services – Report of the Appellate Body (14 April 2016) WT/DS453/AB/R.

goods (e.g "smart goods") or between foreign and national digital goods.²⁵²

When it comes to the conformity of these measures with the GATS market access and national treatment provisions, the first step is to figure out whether these new digital services are already included in the schedules, as a technology neutrality argument would suggest.²⁵³ Countries only classified and divided the different services in the schedules of the GATS for the purposes of liberalisation. A functional approach to the classification of services – focussed on the function achieved by the service – leads to more legal certainty and constructive liberalisation of services.²⁵⁴ In this regard, there are truly no new services, but just different ways to supply the service and the debate should focus on whether the data regulatory measure affects the supply of services, even if it regulates digital goods.²⁵⁵ In any case, an amendment in the WTO classification system – for example, to CPC Version 2.1 – might provide clarity to determine the sectors to liberalise in the future.²⁵⁶

Beyond the *status quo*, some solutions for the economic regulation of data flows under the framework of the WTO have been put forward and include:

- Recognition Agreements: GATS art. VII members' recognition of the protection standards of the others on a bilateral basis;
- Offering transparency and predictability on data flows as additional commitments: GATS art. XVIII – members' unilateral offer;
- Common principles incorporated in a WTO Reference Paper on Privacy similar to the *binding* WTO Telecommunications Paper.²⁵⁷

A way forward to address the regulation of data flows under the framework of the GATS WTO is the use of a data differentiated approach. GATS commitments do not differentiate between the types of data flows inherent to the provision of services. Thus, this approach involves different regulation according to the type of data (e.g. personal data, company data, business data, social data). Greater liberalization could ensure market access and national treatment for some types of data (e.g. company data) while maintaining regulatory autonomy in relation to other types of data (e.g. personal data). This could be achieved by the assumption of horizontal commitments in the schedules on certain types of free data flows, as suggested by Sen.²⁵⁸

There are several common justifications for data localisation measures, among them:

²⁵² GATT art. l(1) and art. lll(1) c/c lll(4).

²⁵³ WTO, US: Measures Affecting the Cross-Border Supply of Gambling and Betting Services – Report of the Panel (10 November 2004) WT/DS285/R [6.285]. See also WTO, China: Certain Measures Affecting Electronic Payment Services – Report of the Panel (31 August 2012) WT/DS413/R.

²⁵⁴ Ines Willemyns, 'GATS Classification of Digital Services – Does "The Cloud" Have a Silver Lining?' (2019) 53 Journal of World Trade 59, 71.

²⁵⁵ ibid 80.

²⁵⁶ Sen (n 26) 342.

²⁵⁷ Mattoo and Meltzer (n 223) 787.

²⁵⁸ Sen (n 245) 343–347.

foreign surveillance, domestic law enforcement, individual privacy and security, economic development and internet control.²⁵⁹ However, from the point of view of international trade governance, data localization is seen more as a barrier to digital trade than an instrument of jurisdictional control. The restriction of internet access and data flows to protect domestic companies is often seen as a form of digital protectionism.²⁶⁰ A change in this mindset would require an adjustment to the current rules. A ban on localization measures could be incorporated as an horizontal or additional commitment in the schedules of the WTO members that desire to do so, to signal credibility towards other members.

Box 2 – Russia and data localisation.

Russia's requirements on local storage of data are in force since 2015. The data localization provisions may have been driven by national security and fiscal objectives. There are important costs for their implementation involving the adaptation of infrastructure of companies, but it is still debatable whether it substantially enhances security and protection of data subjects or imposes losses to the economy²⁶¹. *LinkedIn* was blocked in Russia due to the failure to comply with those requirements.

Since its WTO accession, Russia liberalised the relevant sectors under the GATS agreement as there are no limitations on market access for digital, IT or data storage, processing and transmission services in Russia *schedules*. Therefore, some have sustained that there may be a potential violation of national treatment and market access obligations.

The exceptions in the GATS require that the stated goals of the measure (protect citizens' data from unlawful access) are actually achieved, which is debatable as there is no prohibition to transfer the data abroad. Some argue that it must be established that the storage inside the country is more secure than outside for the GATS exception to apply.

Source: Sen²⁶²

As WTO rules and trade agreements regulate "intellectual property" they also shape the regulatory environment of data flows.²⁶³ The TRIPS²⁶⁴ requires members to ensure the protection of copyrights, patents, trademarks, layout-designs of integrated circuits and undisclosed information. Intellectual property chapters in trade agreements may include "TRIPS-plus" and "TRIPS-extra" provisions, such as ensuring the implementation of technical protection measures (TPMs) and the responsibility of internet service providers.²⁶⁵ Company data is usually protected by intellectual property rights such as trade-

Anupam Chander and Uyen P Le, 'Data Nationalism' (2014) 64 Emory Law Journal 677.

²⁶⁰ Joshua P Meltzer, 'Governing Digital Trade' (2019) 18 World Trade Review S23 46-48.

Alexander Savelyev, 'Russia's New Personal Data Localization Regulations: A Step Forward or a Self-Imposed Sanction?'
 (2016) 32 Computer Law & Security Review 128.

²⁶² Sen (n 245) 337.

²⁶³ Burri (n 244) 68; 100.

²⁶⁴ Agreement on Trade-Related Aspects of Intellectual Property Rights (15 April 1994) Marrakesh Agreement Establishing the WTO Annex 1C 1869 UNTS 299 (TRIPS).

²⁶⁵ Burri (n 36) 105; 111–113.

mark and trade secrets.²⁶⁶ For example, the CPTPP highlights the protection of trade secrets "including by means of a computer system".²⁶⁷ This may be further regulated by cybersecurity laws. However, BRICS countries do not seem to play a major role in those new initiatives and have generally been defensive when it comes to intellectual property protection.

Box 3 - China Cybersecurity Law in the WTO

China measures adopted and under development relating to its Cybersecurity Law have been discussed in the WTO Council for Services throughout 2018 and 2019. Jurisdictions such as the United States, Japan and the EU have sought clarification due to its possible adverse effect in services supplied through a commercial presence and on a cross-border basis. Members have sought explanation on the conformity with the GATS of the obligation of foreign operators to store data domestically and to conduct security assessment on cross-border transfers. Members are unsure about the meaning of legal terms such as "critical data" and "critical information infrastructure".

On the other hand, China has argued that it faces great challenges to national cybersecurity and aims to protect societal public interests. China is still in the process of drafting and implementation of its domestic framework and is ready to receive suggestions and inputs.

Source: WTO Council for Trade in Services – Report of the Meeting 7 December 2018 – S/C/M/137

Another recent topic that touches upon international economic regulation is the range of issues arising out of the trade war between China and the United States. They have changed the dynamics of international digital governance, and consequently, data governance. As the two major world trade powerhouses, both countries are more than able to set a bilateral governance system to rule their relations, to the detriment of the World Trade Organisation forum. The trade frictions of the last five years reached a peak stage of tit-for-tat retaliation. This involved all the repertoire of trade relations and sanctions (trade in goods, trade in services, investment and intellectual property) and has an important digital component, as highlighted in Section 1.7.8.

Box 4 – Trade war and restrictions to investments

A special chapter of that trade war is the US decision to ban Huawei's equipment from its networks. As a result, Google had to pull Huwaei's Android licence. While Android would still run on Huawei's phone, Google would not provide technical support and collaboration for Huawei phones. There are obvious implications for competition from the decision of Google not to pair with Huawei. This may lead to an impairment in innovation to the detriment of consumers, for example, in the design of smartphones. However, the latest developments of the trade talks between both countries is that US will issue special licences for companies that want to trade with Huawei.

²⁶⁶ Sen (n 245) 345.

²⁶⁷ Comprehensive and Progressive Agreement for Trans-Pacific Partnership (signed 8 March 2018) – CPTPP art. 18.78.

This might mean that Google may be able to apply for this special licence. In the UK, the authorities considered that there were no grounds to prevent Huawei from getting involved in its 5G networks, despite of US pressure.

Source: That Global Ban on Huawei? Not So Much Anymore WIRED <u>https://www.wired.</u> <u>com/story/global-ban-huawei-not-so-much/</u>

1.4.3.2. International regulation of digital consumer protection

Although e-commerce is gradually absorbing traditional trade, trade via traditional channels is still dominant. Nevertheless, there is a trend showing the outflow of consumers from traditional trading centers to online platforms, which is also true for BRICS countries. For example, in Russia in 2018 the growth in B2C sales through digital trade channels was 22%, and the growth of purchases through foreign internet platforms was 24%.²⁶⁸

E-commerce chapters in trade agreements also affect the regulation of data flows. Reflecting the lack of progress of the WTO in the area,²⁶⁹ they highlight the non-differenciation of treatment between digital products and their offline equivalent and include a duty free-moratorium on international trade by electronic transmission. They may also include rules related to IT standards and interoperability, cybersecurity, payments and electronic signatures and establish a common ground for the digital marketplace, such as the fair use of the internet for e-commerce, network neutrality and restrictions on data localization and no requirement of transfer of source codes.²⁷⁰

It is in those chapters that the international governance of digital consumer protection is found. A system of governance for e-commerce depends on building online trust: increased consumer confidence will stimulate cross-border electronic transactions.²⁷¹ Global regulation for digital consumer protection would naturally contribute to system-wide trust.²⁷² As most consumer protection is nationally enforced, international regulation will promote convergence between national protection standards, identify function-al equivalence or compatibility or promote cooperation between enforcement agencies.

The nonexistence of WTO regulation on consumer protection does not mean that the topic is not discussed in the e-commerce negotiations, as noted above. In this forum, some WTO proposals on online consumer protection were brought. Russia, for instnce,

²⁶⁸ Rynok elektronnoi torgovli v Rossii: sostoianie I prognoz 2014-2018 [E-Commerce in Russia: Status and Forecast 2014-2018]. E-Commerce Russia, available at <u>http://ecomrussia.ru/dlya-biznesa/issledovaniya/obshhie-dannyie-o-sostoyaniiryinka-rossii/obzor-sostoyaniya-ryinka-elektronnoj-torgovli-v-rf-2018-g.html.</u>

²⁶⁹ However, see, recent communications from China (9 May 2019) WTO/INFO/ECOM/32, Brazil (30 April 2019) WTO/INFO/ ECOM/27 and the EU (26 April 2019) WTO/INFO/ECOM/22, available at: https://docs.wto.org/dol2fe/Pages/FE_Search/ FE_S_S001.aspx

²⁷⁰ Burri (n 244) 113-117; 101-102.

²⁷¹ Sen (n 26) 345.

²⁷² Ioannis Lianos and others, 'The Global Governance of Online Consumer Protection and E-Commerce: Building Trust' (World Economic Forum 2019) White Paper.

has expressed interest to ensure security of cross-border e-commerce and to create a digital platform to share information on unsafe online goods and services. It has also recognised the importance of agency cooperation to prevent dishonest activity in e-commerce.²⁷³

The topic is therefore considered to be "WTO-extra". In this regard, regional agreements may encourage or incentivise regulatory convergence for the protection of consumers between the jurisdictions involved; commitments on cooperation among consumer agencies can also be present in those agreements.²⁷⁴ A component of that cooperation could take the form of technical assistance from better developed jurisdictions towards less developed ones.²⁷⁵ Consumer protection provisions may be powerful and truly precipitate change in domestic policies, although this highly depends on how they are phrased.²⁷⁶ Soft law initiatives may shape convergence of principles in a move towards "principles-based" consumer regulation on a global level; this is in consonance with dynamic performance standards and the interaction between traders and regulators in light of technological developments.²⁷⁷

1.4.4. Prospects for the future: global digital regulation and competition policy

The long-term trend in digital trade is erasing the boundaries between goods, services and intellectual property. More goods are being sold bundled with a mandatory set of services, which effectively constitute the main object of trade. In addition, digital twins are becoming a type of good. In essence, we are moving from the consumption of goods and services to the consumption of technologies, which determine the value of services regarding the usage of goods. Profound changes are also taking place in the value chains: new models provide for "compression" of trade value chains, reduction of the number of intermediaries between consumers and producers, and transformation of the internal processes of all participants in the supply chain and marketplace. Markets are increasingly dominated by global ecosystems, and consumers are progressively more active participants in digital trade. Data is effectively becoming the new fuel of the global economy. These changes raise profound regulatory challenges for global digital trade and cross border data flows, where regulators must confront competing interests including those revolving around data protection and economic development.

Some are incredulous of the suitability of trade forums such as the WTO to regulate digital trade issues – and consequently, data issues – and recognize its inherent limitations.²⁷⁸ On the other hand, international trade governance has achieved a great deal of institutionalization and some results in terms of enforcement. It would be unwise to avoid exploring the potential of this forum to set and enforce rules, in favour of "soft

²⁷³ ibid 13.

²⁷⁴ ibid 15–16.

²⁷⁵ ibid 17.

²⁷⁶ Burri (n 244) 102.

²⁷⁷ Lianos et al. (n 69) 11–12; 17.

²⁷⁸ Burri (n 36) 129.

law" alternatives or principles or private standards.

In any case, regulatory cooperation seems to be the way forward for the governance of the digital economy and regional trade agreements may be laboratories for interaction.²⁷⁹ New approaches can be found in the CPTPP and in the new US-Mexico-Canada agreement. Those solutions may constitute points for convergence for future regulation. This requires a parallel agenda on building up the confidence of domestic regulators to allow data to leave the jurisdiction without undermining regulatory goals.²⁸⁰Alternatively, one could say "multilateralism" and "regionalism" may not work well for the digital economy and "unilateral" approaches coupled with "bilateral" recognition agreements could provide the basis for a pragmatic and reciprocal approach for economic cooperation. However, there is a strong claim that the model for the future will not be based on unilateralism but on persuasion and a global community of shared approaches with a structured engagement for coordination and harmonization: the future of data trade will turn on concessions and compromise.²⁸¹

It is hard to know which model would fully reflect the interest of the BRICS countries, as they are the ones that have adopted some of the data measures under international scrutiny (see Boxes II and III), though some may lose out from data restrictions imposed by other countries (see Box I). The cautious approach by the BRICS countries to embark on these initiatives may change. The dynamic needs of the digital economy in those countries could soon shape a new common discourse in the area.

1.5. A brief description of digital technologies

1.5.1. Artificial Intelligence

In 2016 the founder and executive chairman of the World Economic Forum Klaus Schwab named AI as one of the main forces of the fourth industrial revolution.²⁸² According to some calculations, the GDP growth contribution of AI will be no less

²⁷⁹ ibid 132.

Joshua P Meltzer, 'Governing Digital Trade' (2019) 18 World Trade Review S23 48.governments and regulators have to determine how to benefit from these developments while maintaining the integrity of their domestic regulations. Currently, governments are increasingly restricting global data flows and requiring data localization, undermining the economic benefits of digital trade. To address this trend will require a system of digital trade governance that has two key elements. One element is new digital trade rules, some of which exist in the WTO and others which are being developed in free trade agreements. The other is international regulatory cooperation to develop standards and mutual recognition agreements in areas such as privacy and consumer protection that gives domestic regulators confidence that allowing data to leave their jurisdiction will not undermine achievement of domestic regulatory goals. In the absence of such regulatory cooperation, governments are likely to continue to restrict data flows, relying on the exceptions provisions to their digital trade commitments.", DOI:*10.1017/S1474745618000502, SISN:*1474-7456, 1475-3138, Jan guage:*en, author::[{{family:*Meltzer, given:*Joshua P...}], sissued:{{cdate-parts::[[«2019, 4]]}}], schema:*htt ps://github.com/citation-style-language/schema/raw/master/csl-citation.json}}

Paul M Schwartz and Karl-Nikolaus Peifer, 'Transatlantic Data Privacy Law' [2017] Georgetown Law Journal 115, 174–176

²⁸² Klaus Schwab, The Fourth Industrial Revolution, World Economic Forum, 2016.

than 5% in 2030, and much larger in the case of more advanced countries.²⁸³ Opportunities are many, sometimes not even foreseen, however, there are also multiple challenges (such as ethical, legal and cybersecurity), which depend on our ability to understand, control and predict AI-based systems.²⁸⁴

To address both opportunities and challenges, many jurisdictions have adopted strategies of AI development.²⁸⁵ The BRICS countries have also been working in this direction. In 2017 China adopted one of the most comprehensive strategies "A Next Generation Artificial Intelligence Development Plan" setting out an ambition to lead the world in AI by 2030.²⁸⁶ India in its 2018 discussion paper on AI strategy is focusing on leveraging AI not only for economic growth, but also for social inclusion ("AI for all").²⁸⁷ Russia, Brazil and South Africa do not yet have dedicated AI strategies. However, Russia is actively working on its national strategy on AI development.²⁸⁸ The Brazilian digital transformation strategy "E-Digital" of 2018 addresses digital transformation, including AI.²⁸⁹ South Africa's "Intsimbi Future Production Technologies Initiative" launched in 2018 with the aim of advancing South Africa's manufacturing sector also considers AI.²⁹⁰

There are various ways to define AI; one is proposed by Stuart Russell and Peter Norvig as "the designing and building of intelligent agents that receive precepts from the environment and take actions that affect that environment."²⁹¹ AI dates back more than half a century (see Figure 1.14.), and its history saw both peaks of interest and almost full disappearance thereof. The rather recent increase in interest in AI is due to the developments in machine learning, advances in computing power, and data availability, which ensure the effective work of artificial neural networks on a large scale. Thanks to that, it is often possible to ensure attaining results without developing specialized software to solve a particular problem, including carrying out certain tasks to which there is no algorithmic solution, or which are hard to accomplish otherwise.

²⁸³ Sizing the Pize: What's the real value of Al for your business and how can you capitalise? PricewaterhouseCoopers, https://www.pwc.com/gx/en/issues/analytics/assets/pwc-ai-analysis-sizing-the-prize-report.pdf.

See e.g. Max Craglia (Ed.) Artificial Intelligence: A European Perspective, European Commission, Joint Research Centre,
 Publications Office of the European Union, 2018.

²⁸⁵ For an overview see e.g. Tim Dutton, "An Overview of National Al Strategies" Medium (28 June 2018), https://medium. com/politics-ai/an-overview-of-national-ai-strategies-2a70ec6edfd.

^{286 &}lt;u>http://www.gov.cn/zhengce/content/2017-07/20/content_5211996.htm</u>. Although China has a strong advantage in data availability for these purposes, there are multiple challenges. See e.g. Jeffrey Ding, "Deciphering China's Al Dream: The context, components, capabilities, and consequences of China's strategy to lead the world in Al", Future of Humanity Institute, University of Oxford, 2018, available at https://www.fhi.ox.ac.uk/deciphering-chinas-ai-dream/

 $^{287 \}quad https://www.niti.gov.in/writereaddata/files/document_publication/NationalStrategy-for-AI-Discussion-Paper.pdf$

²⁸⁸ https://digital.ac.gov.ru/news/1073

²⁸⁹ http://www.mctic.gov.br/mctic/export/sites/institucional/inovacao/paginas/politicasDigitais/arquivos/estrategia_ digital/180629-E-Digital-English.pdf

²⁹⁰ https://www.thedti.gov.za/editmedia.jsp?id=5480

²⁹¹ S. Russel & P.Norvig. Artificial Intelligence: A Modern Approach, (3d edition) Prentice Hall 2009.



Source: https://www.innovationobservatory.com/node/243.

The development of AI strives to transfer high-level processing of data from human beings to computers. AI can be used in order to find unobvious or hardly cognizable dependencies and patterns where it is difficult or unfeasible for humans to perform, as well as to run routine intellectual operations or labor-intensive transformation of information. At the same time, AI-based systems cannot currently provide substantial responses on the essence or cause-and-effect relationships of phenomena.

Al is commonly divided into two groups: artificial general intelligence,²⁹² or "strong Al",²⁹³ and applied or "weak Al". The former is a hypothetical artificial intelligence capable of performing any intellectual task and set its goals independently. It is therefore either comparable to human-level intellect or surpasses it. There is no technology close to it currently available, but there are no conclusive theoretical limitations for it to appear in the future. Availability of strong Al will have an unlimited scope of application. Weak Al, on the other hand, are applied systems designed to address specific tasks. Broadly speaking, these are all Al solutions available today. They are sometimes subject to the so called "Al effect" problem: as soon as a certain inconceivable result is achieved using Al, such a task in no longer considered an Al task. John McCarty stated that "[a]s soon as it works, no one calls it Al anymore."²⁹⁴

²⁹² N. Bostrom, Superintelligence: Paths, Dangers, Strategies (Oxford University Press, 2014), 22.

N. J. Nilsson, The Quest for Artificial Intelligence: A History of Ideas and Achievements(Cambridge University Press, 2009)
 319.

Attributed in M. Y. Vardi, "Artificial Intelligence: Past and Future" (2012) 55(1) Communications of the ACM 5.

1.5.2. Machine Learning

Machine learning is one of the AI methods and deep learning is correspondingly a subset of machine learning (Figure 1.15.). Machine learning has become the major technological approach that defines the current state of AI. The essence of the technology is the creation of a database of study examples that a computer aligns to (self-learns), produces the rules, and therefore can correctly recognize and classify new incoming data. Thus, it is an ensemble of algorithms and approaches that allow computers to make conclusions on the basis of available data. Adding more study examples improves recognition results. The major technology behind it are artificial neural networks, which are statistical modelling techniques capable of learning sophisticated relationships, i.e. they modify their own code to find and optimise links between inputs and outputs.²⁹⁵



Figure 1.15. AI Mind Map

Source: Samrat Kar, Al Mind Map, available at: https://medium.com/ml-ai-study-group/ai-mind-map-a70dafcf5a48

An example of considerable breakthrough in machine learning is Google Deep-Mind's AlphaGo, which was won by the South Korean Go champion Lee Sedol.²⁹⁶ Go is considered to be the most complex game in the world. Achieving this result was possible by using *deep learning* and *reinforcement learning*. Deep learning is applied to the learning methods of neural networks that use more than one buried layer, and therefore formally the word "deep" also indicates the multi-layer architecture of the neural network. Algorithms of this kind appeared long ago, but the computing power was low and could simulate only several hundreds of artificial neurons with one buried layer between input and output layers. Currently, for instance, voice recognition systems use up to 12 internal layers of neurons.

OECD (2019), Artificial Intelligence in Society, OECD Publishing, Paris, <u>https://doi.org/10.1787/eedfee77-en</u>, p. 28.

296 The Google DeepMind Challenge Match, AlphaGo, March 2016, available at: https://deepmind.com/research/alphago/ alphago-korea/. The uniqueness of deep learning is that the machine finds features on its own (key traits, which allow it to distinguish different classes of objects more easily) and structures such features hierarchically: simpler features make up more complex ones. There is no formal definition of deep learning as it combines a whole range of different technologies. Its feature is that it can cope with noisier data by increasing significantly the number of neural layers and neurons and the amount of data.²⁹⁷ In other words, deep learning is an analysis of previous and current data for the purposes of forecasting the future. Reinforcement learning, on the other hand, focuses on experience-driven sequential decision-making, meaning that agents take action to maximise a cumulative reward.²⁹⁸

Therefore, a computer learns on the examples and its own experience. For instance, AlphaGo first analysed 29.4 million moves and 160 thousand games of professional players and two copies of the programme started playing between each other adding more games to the study sample. Having played millions of games, the programme learned to assess the most beneficial placing of stones on the board to ensure victory.

Deep learning can be supervised and unsupervised. Supervised deep learning envisages compulsory learning using examples or learning samples. Unsupervised learning means that an AI-based system searches on its own. Initially, the former has been giving better results. Nevertheless, the prospects of the latter are higher as developers do not need to prepare the data and learning is not limited to available datasets. Thus, AlphaGo Zero using reinforcement learning and not using datasets derived from humans trained itself faster and was able to beat the original AlphaGo by 100 games to 0.²⁹⁹

Deep learning is currently part and parcel of research in voice recognition, image recognition, self-driving, medical state diagnostics and performing other complex tasks. Nevertheless, AI technologies using machine learning have distinctive features and limits. One of those is the inability of a machine to reconstruct the logic of adopting this or that decision. It limits substantially the application of AI in socially sensitive and strategic fields. Apart from that the success often depends on access to sufficient Big Data for learning (see the following section). A separate group of risks is related to the way the initial learning data is formed, which can include trends provoking displacement of the focus of decisions. There are some other technical problems inherent in machine learning which must be taken into account in the practical implementation of AI.

²⁹⁷ Max Craglia (Ed.) Artificial Intelligence: A European Perspective, European Commission, Joint Research Centre, Publications Office of the European Union, 2018, p. 21.

²⁹⁸ Ibid. See also OECD (2019), Artificial Intelligence in Society, OECD Publishing, Paris, <u>https://doi.org/10.1787/eedfee77-</u> en, p. 29.

D. Silver, J. Schrittwieser, K. Simonyan, I.s Antonoglou, A. Huang, A. Guez et al. "Mastering the game of Go without human knowledge." Nature 550, 354-359 (19 October 2017). This has been further developed into a generalized version – AlphaZero. See D. Silver, T. Hubert, J. Schrittwieser, I. Antonoglou, M. Lai, A. Guez, M. Lanctot et al. "Mastering chess and shogi by self-play with a general reinforcement learning algorithm." arXiv preprint arXiv:1712.01815 (2017).

1.5.3. Big Data

Big Data represents a new scale of datasets so voluminous that they exceed classical tools of analysis. The amount of data added to the global dataset every day is quantifiable at around 2.5 quintillion bytes per day³⁰⁰ on average and this number continues to grow. Consequently, it is extremely difficult to precisely define Big Data, as the relativity and changing aspect of this new scale of dataset make any order of magnitude or characteristic quickly obsolete. If the term "Big Data" dates from 1997 according to the Association for Computing Machinery,³⁰¹ the definition recognized by most scholars and business today is Gartner's (2001): Big Data is "high-volume, high-speed and/or high-variety information assets that demand cost-effective, innovative forms of information processing that enable enhanced insight, decision making, and process automation."³⁰² Gartner's definition is based on the enunciation of three broad dimensions of data processing, also called the 3 Vs, that help to understand the outlines of Big Data:

- 1. *High Volume*: It is the increase and significant size of the data volume that differentiates Big Data from conventional data analysis. This volume dimension is often considered to be the most relative. For instance, worldwide digital data have grown from 1.2 zettabyte³⁰³ per year in 2010 to 1,8 zettabyte in 2011, then 2,8 zettabytes in 2012 and will rise to 40 zettabytes in 2020.³⁰⁴
- 2. *High-Variety*: In addition to a quantity of information that surpasses conventional data analysis tools, the format of these data is also very different. These are not traditional relational data. These data are raw, semi-structured or even unstructured. These are complex data from web mining, text mining and image mining. Thus, these new and extremely varied forms of data cannot be treated with traditional tools directly.
- 3. *High-Velocity*: These growing data streams are in perpetual development and require real-time processing to avoid the obsolescence of the statistics obtained. This dimension can have a major importance in the treatment of Big Data by the stock market for example. In fact, computers that send purchase orders automatically must benefit from the information collected in real time to minimize the risk.

³⁰⁰ B. Marr"How Much Data Do We Create Every Day?", Forbes.com, 21 May 2018, <u>https://www.forbes.com/sites/bernard-marr/2018/05/21/how-much-data-do-we-create-every-day-the-mind-blowing-stats-everyone-should-read/</u>

³⁰¹ G. Press, "A Very Short History Of Big Data", Forbes, 9 may 2013, <u>https://www.forbes.com/sites/gilpress/2013/05/09/a-very-short-history-of-big-data/#69c1ed6465a1</u>

³⁰² D. Lanney, "Application Delivery Strategies", <u>https://blogs.gartner.com/doug-laney/files/2012/01/ad949-3D-Data-Man-agement-Controlling-Data-Volume-Velocity-and-Variety.pdf</u>, Meta Group, 6 February 2001

^{303 1} Zettabyte equals 1,000,000,000,000,000,000 bytes.

 ³⁰⁴ J, Gantz. and E. Reinsel. 2011. "Extracting Value from Chaos", IDC's Digital Universe Study sponsored by EMC, 2011

 https://www.emc.com/collateral/analyst-reports/idc-extracting-value-from-chaos-ar.pdf
Nevertheless, depending on their use of Big Data, companies, communities or researchers who use them accentuate the importance of one dimension or leave others on the side, and can even highlight the importance of new ones. That is the case with the growing importance of veracity³⁰⁵ and value³⁰⁶ that are new axes of definition and stakes of Big Data with the rise of fake profiles and fake information on the Internet.

Thus, all these dimensions are constitutive of Big Data's specificities. But these specificities are also the main issues in order to stock and use these complex data for the actors who wish to take advantage of the situation. Given the extent of the Big Data components, the benefits are multiple and form various activities.

Research is at the origin of Big Data analysis, and science benefits from it particularly. In medicine, for example, Big Data now makes it possible to decode the human genome in less than a day while it took 10 years to achieve it up to 2003.³⁰⁷ More recently, a Korean Project developed by the Korea University Medical centre started to be tested in hospitals in order to create a cloud based system to turn dispersed medical information into Big Data. This project is expected to cut the operation cost to one fifth and to help hospitals treat patients more efficiently. It shows how Big Data can both contribute to research at the very beginning of the scientific process but also at the very end, the individual scale.³⁰⁸ Other fields such as astronomy, aeronautics or meteorology also benefit heavily from the recurring patterns enlightened by the huge dataset that Big Data provides.

Big Data proves to be a formidable political weapon to understand voters' wishes during campaigns but also to highlight social media trends, target action plans more efficiently or even as part of monitoring and security procedures.³⁰⁹ For instance, in India, Big Data was used for the Bharatiya Janata Party for the 2004 elections campaign. Later on, Narendra Modi, the Indian Prime Minister even quoted Facebook as an inspiration. His move toward the mastery of Big Data is blatant with Aadhar: an ID system for India's 1.3bn residents that is required for almost every government service and which allows the state to use efficiently the citizen's profile with information at high rate of veracity.³¹⁰ However, the impact of data on modern elections is an issue everywhere on the planet, which has been underlined by firms like Cambridge Analytica Ltd and the scandals linked to it. Even if

³⁰⁵ Ali M. Al-Salim, Taisir E. H. El-Gorashi, Ahmed Q. Lawey, and Jaafar M. H. Elmirghani, "Greening Big Data Networks: The Impact of Veracity", 6 Dec 2018, <u>https://arxiv.org/ftp/arxiv/papers/1812/1812.10307.pdf</u>

³⁰⁶ Roger H.L. Chiang, Varun Grover, Ting-Peng Liang & Dongsong Zhang Guest Editors "Special Issue: Strategic Value of Big Data and Business Analytics", Journal of Management Information Systems, 2018, 383-387

³⁰⁷ P. Delort, "Harnessing data as a new source of growth: Big data analytics and policies", OECD, ICCP Technology Foresight Forum, 8 October 2017 <u>http://www.oecd.org/sti/ieconomy/Session_3_Delort.pdf#page=6</u>

^{308&}quot;Cloud-based system to turn dispersed medical information into big data", Korea Biomedical Review, http://www.korea-biomed.com/news/articleView.html?idxno=6317, Consulted the 26th of August 2019 at 19:30 GMT

^{309 &}quot;Utah data Center", Nsa.gov1, https://nsa.gov1.info/utah-data-center/, Consulted the 3rd July 2019 at 19:30 GMT

^{310 &}quot;The world's most valuable resource is no longer oil, but data", The Economist, 6th May 2017, <u>https://www.economist.</u> com/leaders/2017/05/06/the-worlds-most-valuable-resource-is-no-longer-oil-but-data

the direct impact of Cambridge Analytica on elections is still unclear, the fact that it has been involved in elections in Kenya, United Kingdom, Malta, Mexico, India, Australia, and the US, it shows how important data management and analysis has become in politics.³¹¹

Big Data is of paramount importance in the analysis of actions and behaviors and generates a boost of progress and production which gives the information a value in constant increase. According to the International Data Corporation, the weight of Big Data in the global market in 2020 is estimated at \$203 billion.³¹² Moreover, it is no coincidence that seven of the ten largest companies in the world in terms of market capitalization are technology companies and five of them (Amazon, Alphabet, Facebook, Alibaba, Tencent) rely massively on data treatment, mining and selling.³¹³ Big Data also enabled the elimination of intermediaries with the example of NATUs (Netflix, Airbnb, Tesla, Uber) and even Spotify that use Big Data to understand and adapt to customers behavior and thus reduce price by replacing human intermediaries.³¹⁴ Big Data affects many areas of the private sector, such as sports,³¹⁵ insurance³¹⁶ or the energy sector³¹⁷ where collecting data could improve performance and yield.

Nevertheless, the problems associated with Big Data are as numerous as its fields of application. It is therefore important to mention some of them briefly. The first and most well-known is data mining and the threat to privacy that it generates. Indeed, regulation of data protection is still developing and knowing that data is easily duplicable and usable by more than one person, it is difficult to assess who owns it and how. Snowden's revelations have generated an awareness at this level that has triggered a reaction by the public and the law.³¹⁸ Moreover, if the data are exploited more and more precisely, they become all the more valuable. Cyber security is therefore involved in all aspects related to Big Data. The last breaches of giants like Facebook in 2019 are highly publicized and quickly corrected, but the

³¹¹ Vito Laterza, "Cambridge Analytica, independent research and the national interest", Anthropology today, 1st of June 2018, pp1-2

^{312 &}quot;Double Digit Growth Forecast Worldwide Big-Data Business", BusinessWire, 3rd October 2016 <u>https://www.business-</u> wire.com/news/home/20161003005030/en/Double-Digit-Growth-Forecast-Worldwide-Big-Data-Business

^{313 &}quot;How to think about data in 2019", The Economist, 22nd December 2018, <u>https://www.economist.com/lead-ers/2018/12/22/how-to-think-about-data-in-2019</u>

³¹⁴ Alina Sorescu, "Data-Driven Business Model Innovation." Journal of Product Innovation Management 34, no. 5, September 2017: 691–96; Bruno Teboul, « L'Uberisation, l'automatisation... Le travail, les emplois de la seconde vague du numérique. », Séminaire GE 90 « Big data et emploi : Principaux enjeux et conséquences en matière d'emploi », 2016.

³¹⁵ B, Hutchins, "Tales of the digital sublime: Tracing the relationship between big data and professional sport", Convergence, 22(5), 2016, 494–509.

³¹⁶ F, Corea, "Big Data and Insurance: Advantageous Selection in European Markets". Data Science Journal, 16, p.33 2017

³¹⁷ Jacobus Herman "Using big data for insights into sustainable energy consumption in industrial and mining sectors", Journal of Cleaner Production, 197, pp.1352–1364. 2018

³¹⁸ David Lyon, "Surveillance, Snowden, and Big Data: Capacities, consequences, critique", 9th July 2014 <u>https://journals.</u> sagepub.com/doi/full/10.1177/2053951714541861

data of hospitals, universities or small companies are much more vulnerable.³¹⁹ Entropy and the growing volume of data is also an issue as the Big Data collected lacks density. It means that only a minor part of Big Data is actually relevant and usable to draw trends and that the rest is not exploitable. All the inaccurate and unusable data contribute to "information overload" and "infobesity" and reduce the yield of Big Data analysis.³²⁰ Moreover, stocking a growing volume of potentially useless data has an important cost and environmental impact for no real return on investment. Finally, the situation of GAFAs (Google, Apple, Facebook, Amazon) raises questions as the data they collect allows them to set up economic, social and environmental actions but gives them a status close to monopoly that is hard to control with traditional antitrust procedures.³²¹ Thus, transparency, security and control seem to be the major challenges for big data now and in the near future.

1.5.4. Smart Data

It is important to understand that Big Data and Smart Data are not really two opposite concepts, but rather complementary. Smart Data is a way to explore and engage with the wideness of Big Data with a more strategic and restrictive approach. Indeed, the collection of Big Data makes it possible to benefit from a non-negligible sample of information but does not guarantee density and exploitability. Thus, the advantage provided by the volume dimension of Big Data disappears very quickly when information cannot be exploited because of data of little interest. For instance, according to the Electronic Business Group, Micropole and Qlick, 54% of French companies cite the scarcity of profile as a brake on the development of Big Data.³²² Thus, the policy of massive storage of unprocessed data can still be seen as an investment for multinationals such as GAFAs. Indeed, these companies have the computing power to make sense of low-density data and have the means to keep unnecessary data in the short term.³²³

Nevertheless, for smaller companies or for communities with fewer resources, storage represents a significant cost that must be offset by direct data exploitation.³²⁴ Thus, these companies, for their marketing campaigns for example or for their business development prefer to set objectives prior to the collection of data.

- 321 "Big tech faces competition and privacy concerns in Brussels", The Economist, 23rd March 2019 <u>https://www.economist.</u> com/briefing/2019/03/23/big-tech-faces-competition-and-privacy-concerns-in-brussels
- 322 Qlik, EBG, Micopole, "Baromètre Big Data 5 ans après", 2018 https://www.micropole.com/file.cfm?contentid=5459
- 323 Thulara N. Hewage, Malka N. Halgamuge, Ali Syed, and Gullu Ekici, "Review: Big Data Techniques of Google, Amazon, Facebook and Twitter", Journal of Communications Vol. 13, No. 2, February 2018
- 324 Bernard Marr, "Why most companies can deal with the data explosion?", Forbes.com, 28th April 2016 <u>https://</u> www.forbes.com/sites/bernardmarr/2016/04/28/big-data-overload-most-companies-cant-deal-with-the-dataexplosion/#3be9ff3e6b0d

³¹⁹ Ibid 23.

³²⁰ Saxena, Deepak, and Markus Lamest. "Information Overload and Coping Strategies in the Big Data Context: Evidence from the Hospitality Sector." Journal of Information Science 44, no. 3, June 2018, 287–97.

As a consequence, we are witnessing a return to a more conventional analytics operating model where the data collected match the 3Vs of Big Data but also have a high rate of value and veracity because of the strategic research done to collect them. The strategic research to target the need of the companies before the research is the move from Big to Smart Data. The point of Smart Data is that companies or researchers no longer collect information to draw conclusions from the mass collected but pinpoint their strategic needs of information beforehand to reduce the field of collection. ³²⁵

To metaphorize it, when collecting rainwater, Big Data collects all the drops where Smart Data only collects where it rains the most. This approach of Smart Data coupled with the expansion of Big Data has profoundly changed the customer relationship with the implementation of customer feedback loops. The orientation of the business model tends to change as companies tend to move progressively from a "product" business model to a "service" business model. Rolls Royce no longer sells its engines but rents them which allows the collection of various data by sensors placed in strategic spots where issues are frequent. This action allows the customer to be supported in the event of an issue in exchange for real-time information collection in order to improve quality in the long run.³²⁶ It creates a symbiosis between customers and products where both benefit from the data transfer.

Smart Data also helps to improve entire cities where people's activities are tracked in order to improve communication or to solve their problems more efficiently. Rio de Janeiro is one of the leading figures as a "smart city"³²⁷. One of their main innovative features has been to associate with the Waze app in order to decongest the city lanes by using live data instead of urban prevision for the road network modification.³²⁸

Thus, even if Big Data makes it possible to determine major trends on a certain amount of exploitable data, the challenge of Smart Data is to perform an intermediate filtering before the exploitation of the analytics by targeting the most useful data before the research. In order to do this, smart data analysis strategies are set up in advance by managers, but this treatment and intelligent analysis of Big Data cannot be done by humans. It is in this respect that developments in AI are particularly useful and intrinsically linked to Big Data and Smart Data. Machine learning uses Big Data to benefit from its volume and extend its learning capacity.³²⁹ But

- 327 Clara Schreiner, International Case Study of Smart Cities: Rio de Janeiro, June 2016, Published Online
- 328 "Improving the Road to Rio", Waze.com, <u>https://www.waze.com/fr/ccp/casestudies/improving_the_road_to_rio</u>, Consulted the 27th of August 2019
- Juuso Esko K, 2018. Smart Adaptive Big Data Analysis with Advanced Deep Learning. Open Engineering, 8(1), pp.403–416;
 M. Esmalifalak, L. Liu, N. Nguyen, R. Zheng and Z. Han, "Detecting Stealthy False Data Injection Using Machine Learning

A. L. Palacio and Ó. P. López, "From big data to smart data: A genomic information systems perspective," 2018
 12th International Conference on Research Challenges in Information Science (RCIS), Nantes, 2018, pp. 1-11.
 doi: 10.1109/RCIS.2018.8406658

^{326 &}quot;The Rolls Royce Intelligent Engine driven by Data", RollsRoyce.com <u>https://www.rolls-royce.com/media/press-</u> releases/2018/06-02-2018-rr-intelligentengine-driven-by-data.aspx, Consulted the 2nd July 2019 at 12:30 GMT

the long-term objective of the AI that is trained to do it is that they can extremely quickly sort the Big Data to deliver only the Smart Data which has a real potential of exploitation.³³⁰

Smart Data is therefore a form of continuity of Big Data but also reintroduces more traditional mechanics in the wheels. Indeed, it is a way to bring back conventional dense data analysis in an era where data is no longer directly exploitable. Smart Data is therefore the gateway through which Big Data becomes useful, intelligible and profitable for the greatest number of companies and people and not only to the internet giants.

1.5.5. Blockchain

According to a 2015 report from the World Economic Forum on breakthrough technologies and their societal implications, blockchain technology is expected to store an approximate 10% of global GDP by 2027.³³¹ It shows the potential impact such technology could have on the world economy. In Russia, the interest in blockchain and digital currencies dates back to 2016.³³² However, the legal framework still does not allow the technology to thrive. Overall, Blockchain was made widely recognizable with the 2009 creation of Bitcoin as the cryptocurrency needed a secure and decentralized system for its transactions.³³³ It was a way to move beyond the shortcomings of the existing banking system (delays for overseas transactions, commissions from the centralized institution etc.). However, the technology was available prior to cryptocurrencies as Stuart Haber and Scott Stornetta carried out a first work on a secured chain of blocks in 1991.³³⁴ Blockchain technology was defined, during the 2018 Crypto Valley Conference, as "an append-only database maintained by distributed nodes instead of central authorities."³³⁵ In other words, the technology constitutes a distributed ledger that is completely open to anyone. It is known for its application in the framework of cryptocurrencies but it has the potential to spread in various economic sectors and is expected to bring substantial changes in the field of contractual relationships.³³⁶

in Smart Grid," in IEEE Systems Journal, vol. 11, no. 3, pp. 1644-1652, Sept. 2017. doi: 10.1109/JSYST.2014.2341597.

Edwin, Vand Dijk. "Smart Data Collection Is Required for Continuously Improving Your Production Process." Quality, vol.
 57, no. 11, Nov. 2018, pp. 28–31. EBSCOhost, search.ebscohost.com/login.aspx?direct=true&db=buh&AN=132850729&
 site=ehost-live.

³³¹ World Economic Forum. "Deep Shift: Technology Tipping Points and Societal Impact", Global Agenda Council on the Future of Software & Society, September 2015

³³² Chudinovskikh, Marina, and Sevryugin, Victor. "Cryptocurrency regulation in the BRICS countries and the Eurasian Economic Union." BRICS LJ 6, 2019.

³³³ Crosby, Michael. Pradan, Pattanayak. Sankeev, Verma.Vignesh, Kalyanaraman. "Blockain technology, Beyond bitcoin." Applied Innovation 2, no. 6-10 (2016).

³³⁴ Ibid 44

^{335 &}quot;A Scale-out Blockchain for Value Transfer with Spontaneous Sharding." 2018 Crypto Valley Conference on Blockchain Technology, June 2018.

³³⁶ World Economic Forum. "Deep Shift: Technology Tipping Points and Societal Impact", Global Agenda Council on the

The functioning of blockchain relies on five main features.³³⁷ First, blockchain is a distributed ledger, meaning it grants each party complete access to the entire database and its history. Second, it relies on peer-to-peer transmission. Instead of using a central entity to manage the chain, blockchain uses a P2P network allowing everyone to join. When someone joins the network, he or she gets the full copy of the blockchain. The node can use it to verify that everything is in order. Third, blockchain ensures transparency through a system of pseudonyms. When users make a transaction, they do it through their blockchain address which is a unique 30-plus-character alphanumeric address. It is the users' decision to actually provide proof of their identity or remain anonymous. Fourth, blockchain is able to keep its records irreversible. This is one of the major innovations of the technology. The technique is as follows: each block is identified by a hash which is comparable to a fingerprint. Blocks also contain the hash of the previous block. If someone tampers with a block, it causes the hash to change as well. It therefore shows that there are inconsistencies in the chain. Blockchain combines it with its proof-of-work mechanism that slows down the creation of new blocks. Tampering with a block becomes hard since it requires recalculating the proof-of-work for all the following blocks. Fifth, Blockchain relies on computational logic, meaning it may be run through algorithms set up by users and generate automatic transactions.

Blockchain technology is expected to substantially modify the global economy. According to the European Commission, blockchain has already "numerous applications throughout the whole lawful economy".³³⁸ The technology is expected to reinvent contractual relationships throughout its system of smart contracts. Bernard Marr explains the functioning of blockchain adapted to contractual obligations, namely smart contracts.³³⁹ As blockchain allows the storage of digital information such as computer codes, they can be set to execute only once different parties enter their keys or any other circumstances happen that have been agreed upon. The consequence is that everyone must agree that the contract has been filled and the contract immediately executes when conditions are filled. The use of smart contract is already utilized by businesses in the way they validate delivery of service for example.³⁴⁰ It is also set to expand to new areas such as distribution of electricity through "smart" local power grids.³⁴¹

Future of Software & Society, September 2015

³³⁷ Christian Catalini. "How Blockchain Applications Will Move Beyond Finance", Harvard Business Review. March 2017 https://hbr.org/2017/03/how-blockchain-applications-will-move-beyond-finance

³³⁸ European Parliament. "Cryptocurrencies and blockchain: Legal context and implications for financial crime, money laundering and tax evasion.", July 2018

Zgeng, Zibin, Shaoan Xie, Hong-Ning Dai, Xiangping Chen and Huaimin Wang. "Blockchain challenges and opportunities:
 A survey." International Journal of Web and Grid Services, 2018.

³⁴⁰ Ibid 3

³⁴¹ European Commission. "Smart Electricity Grids". <u>https://setis.ec.europa.eu/system/files/Technology_Information_</u> <u>Sheet_Smart_Grids.pdf</u>

Blockchain may also lead to substantial changes in the real economy as it allows parties to eliminate the "middleman" in transactions.³⁴² In accounting and banking, Bank of America, Barclays and Morgan Stanley have already announced that they will commit to the R3 CEV initiative, an informal agreement between firms committing to collaborate in investigating blockchain's potential use in finance. Visa and MasterCard are currently exploring how distributed ledger could improve the process of cross-border payments and make it more affordable.³⁴³ Blockchain can also be used to store ID records, as it is already being envisaged by the European Commission,³⁴⁴ to include more fairness in online gaming and ensure more transparency in electoral process.

Blockchain technology is yet struggling to fulfil its potential making its future uncertain. Security of data and properties of assets raise legal issues as applications of blockchain technology in the real economy are still being experimented with and thus lack reliability. In the EU with advanced data protection rules,³⁴⁵ blockchain technology must deal with an increasingly constraining environment. BRICS countries are also seeking to build a legal environment that takes into account the implications of blockchain. Thus, the surge of investments related to blockchain in Brazil since 2015 has forced the government to adapt its national legislation.³⁴⁶ In May 2017, it established a commission to examine the existing regulation in an attempt to soften the legal framework. Overall, the technology could allow cutting costs, especially in the way information is verified. However, applying it to sensitive areas such as financial services or elections requires a centralized institution to prevent fraud which brings back the idea of an intermediary. Not to mention that unsuccessful attempts of using blockchain technology have occurred. For instance, Honduras property blockchain was announced in 2015 and finally abandoned due to official indifference.³⁴⁷ Sierra Leone used the Swiss start-up Agora to run its elections. It turned out that the company barely observed the election and provided wrong tallies. As a recent example, Stripe, a big digital-payments firm, abandoned its blockchain experiments after three years as it labelled it "slow and overhyped".348

³⁴² Bernard Marr. "How Blockchain technology could change the world.", Forbes. May 2016

³⁴³ De Filippi Primavera, "Chapitre III. Applications de la blockchain», Blockcbain et cryptomonnaies. Paris cedex 14, Presses Universitaires de France, 2018

³⁴⁴ EU Report Considers Blockchain-Based Digital Identities, Tokenized National currencies.

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

³⁴⁶ Chudinovskikh, Marina, and Sevryugin, Victor. "Cryptocurrency regulation in the BRICS countries and the Eurasian Economic Union." BRICS LJ 6, 2019.

^{347 &}quot;The promise of the blockchain technology"? The Economist. August 2018. <u>https://www.economist.com/technology-</u> quarterly/2018/08/30/the-promise-of-the-blockchain-technology

³⁴⁸ Jeff John Roberts. "Why Stripe gave up on Bitcoin and Blockchain Payments" Fortune (July 2018, Fortune) <u>https://fortune.</u> com/2018/07/17/stripe-blockchain/