8. Alternative futures and what is to be done.

Abstract

In this final chapter, we introduce alternative scenarios concerning tech giants, the US and Chinese states, data governance and innovation under the current governance regime. On this basis, we advance policy recommendations and calls for activism aiming at a less polarized future where technology is guided toward collectively solving societal, ecological and health challenges. We elaborate on why there is a need for new forms of governance that take into account the growing importance of global digital public goods as well as the need for new forms of public access to science and technology. We end by applying a global perspective pointing to major dilemmas between what can be done under existing governance regimes and what should be done in the long term.

Keywords: Antitrust; Digital acts; Policy recommendations; Global public goods; Activism.

8.1 Introduction

In this book, we have studied crucial aspects of the innovation race in artificial intelligence (AI) between the hegemon -the United States (US)- and its challenger China (Chapter 7), and we have seen how globally oriented tech giants from these countries play key roles in developing, applying and profiting from this general-purpose technology (Chapters 4 and 5).

The intense and conflictual character of the US-China relationship reflects that AI has the potential to change the world's pecking order. At the corporate level, the efforts to win the race are equally intense, since the use and development of AI is a crucial factor driving the concentration of intangible capital by tech giants. We have conceptualized these companies as data-driven intellectual monopolies (see Chapter 2) and explained how they respectively lead and organize corporate innovation systems (Chapter 3). These systems integrate subordinate organizations, including universities and start-ups. The overall R&D orientations are set by the intellectual monopoly, which therefore garners most of the intellectual rents resulting from transforming data and research into assets.

As we have shown in Chapter 6, the co-evolution of national and corporate innovation systems is complex and full of contradictions. China and the US make efforts to support their own intellectual monopolies while the tech giants try to safeguard a certain degree of autonomy in relation to the state. At the same time, the extreme concentration of financial resources and economic power in tech giants creates social imbalances and challenges the power of the state and this provokes efforts to regulate their activities in the US as well as in China.

The global innovation race affects all regions and countries and shapes the AI technological trajectory in terms of both speed and direction. While the engagement of powerful states and enterprises in technological competition accelerates the rate of technological change in certain dimensions and directions, it does so in an uneven and lop-sided fashion, increasing global inequalities and aggravating global problems. Furthermore, tech giants' intellectual monopolies curtail public access to knowledge thereby reducing the overall global rate of innovation, as reflected in recent discourses on secular stagnation.

The current pattern of development, where the AI-trajectory is subsumed under the national interests of two major countries and exploited in the interests of a handful of intellectual monopolies, opens up a huge and growing gap between what could be achieved with this technology and what is actually achieved.

These developments raise a series of new political issues in respectively the US, China, other core regions like Europe and the rest of the world. In this chapter, we explain why current political instruments at the disposal of the single (national or regional) state are insufficient when it comes to responding to these new challenges. AI has the potential to create enormous wealth and could contribute to tackling global challenges such as ecological disasters and pandemics. However, this would require new and more ambitious forms of international cooperation and new forms of governance at the national level.

So far, the focus of state intervention and policy debates has been either on tech giants' market power and tax avoidance or on (data) privacy issues. In this book, we have focused on a third dimension: who has the power to shape the technologies of the future, and who will benefit from them? We see the aggravation of the US-China conflict as rooted in this dimension and it is, of course, a major issue for the rest of the world.

A classical policy response at the national level would be to engage in the innovation race through active science, technology and innovation (STI) policy. It could take the form of increased efforts to promote AI through public and private research, education and establishing links between users and producers of AI. While massive efforts to stimulate innovation in AI through standard STI policies in the US and China contribute to their techno-nationalist agendas, such policies will have limited positive effects on the rest of the world. They are necessary but not sufficient to counter the extreme concentration of AI innovation and associated profits.

In the rest of the world, STI policies aiming at building AI competence will help to spread the use of the technology in different sectors. But, at the same time, they will strengthen tech giants' cloud computing business (see Chapter 4) and fail in establishing domestic corporations as major AI developers and producers. The major reason is the character of AI, which results in tech giants' unique capacity to harvest the fruits of knowledge where others have sown (see Chapters 3 to 5).

The world is at a pivotal stage where the major alternatives are a return in the direction of a more open exchange of data and technologies and a balkanization of the global knowledge landscape. As far as we can judge, the latter alternative is the more likely. This is worrying in a situation where the pandemic, ecological crises and (income, wealth, gender and racial) inequalities require a new kind of collaboration and common efforts to develop and share scientific results and technological know-how.[95] In a world where the two lead countries engage in techno-nationalist strategies, the rest of the world is forced to reconsider its openness in important respects, including data, foreign acquisitions, access to foreign technology programs and scientific collaboration.

In a period characterized by the combination of technological revolution and growing geopolitical conflict, the future outcome of the global innovation race remains uncertain.

[95] Neither would it be sufficient to move back to the old form of globalisation since it fosters and reproduces economic inequality and ecological problems both domestically and internationally. In the final part of this chapter, we point to the need for new forms of international cooperation and national governance.

Therefore, this chapter explores alternative futures focused on who will dominate the shaping of AI trajectory under the current governance regime. We also overview existing policy responses to the emergence of data-driven intellectual monopolies, elaborate on their limitations and explore alternative or complementary policies. Yet, government action is not a sufficient response. At least as important are people's agency and awareness. Citizen actions based upon a deeper understanding of how AI works and how it is being used by tech giants and the most powerful states are required to develop the kind of new institutions and forms of governance that can counterbalance their power.

8.2 Predominant policy responses to tech giants: antitrust and digital acts

As we mentioned above, most of the policy debate in relation to tech giants and digital capitalism has focused on antitrust and data governance. The US Congress (2020) recently investigated (and subsequently sued) tech giants' excessive market power. And just before Ant Group's IPO in Shanghai, the Chinese government announced antitrust regulations for digital companies forcing to cancel the IPO.[96] Yet, the earliest concerns on these topics came from the European Union (EU).

8.2.1. The European Union

The EU was among the first to raise awareness of US tech giants' abusive market power. Since 2010, it has run three antitrust investigations against Google related to Google Shopping (2010), Google's Android (2015) and Google AdSense (2016). In 2017, the EU competition agency solved the first claim. It found Google guilty of systematically ranking its websites and services first, thus favouring its own businesses vis-à-vis competitors. Google was fined €2.42 billion (European Commission, 2017). Concerning Google's Android case, in 2018 the agency "fined Google €4.34 billion for illegal practices regarding Android mobile devices to strengthen dominance of Google's search engine".[97] The European Commission also ruled against Apple and Ireland in 2016 finding that the latter granted illegal state aid to the former through selective tax breaks. Yet, the EU General Court annulled this decision in 2020. The dispute is still unsettled.

Since the Covid-19 pandemic, European countries' antitrust concerns regarding US tech giants have increased. For instance, antitrust regulators in the UK, Germany and Australia are jointly investigating the domination of internet giants.[98] Germany had already blocked Facebook from merging data from its own services in 2019.[99]

Europe's active stand reflects that -this time- it risks ending on the subordinate side, where the peripheries have historically been and generally remain. This is reflected in aggregate data on the location of the world's biggest companies. With a drop of 8 companies between March 2009 and December 2019, Europe's share of global top 100 corporations in market capitalization fell from 27% to 15%. This drop was corresponded by a growing share for the

[96] https://www.ft.com/content/1a4a5001-6411-45fa-967c-0fd71ba9300b
[97] https://ec.europa.eu/commission/presscorner/detail/en/IP_18_4581
[98] https://www.ft.com/content/f24c844d-18dc-4c8b-a6bf-61526f084f4f?segmentId=b0d7e653-3467-12ab-c0f0-77e4424cdb4c
[99] https://www.ft.com/content/a169921d-4744-4c16-8ae8-028d52bb655c

US (PWC, 2020). Regulating the digital economy could thus be seen as Europe's geopolitical rebalancing move.[100]

Antitrust regulations have been complemented with Europe's general data protection regulation (GDPR) and, recently, with a proposed Artificial Intelligence Act. More broadly, the European Commission has made it explicit in recent reports that it is aware of and concerned about its laggard position in the digital era, especially concerning AI. There are references to threats related to the extraction of European data by big tech companies (European Commission, 2020b, 2020a). However, none of these documents analyse in-depth the more active involvement of the states in the US and China and the crucial role of their tech giants.

In a white paper on AI called "A European approach to excellence and trust" the European Commission proposes a set of STI-policy initiatives to strengthen Europe's position. It recommends encouraging venture capital and increased research efforts and skill formation with the ultimate goal "to achieve an 'ecosystem of excellence' along the entire value chain, starting in research and innovation, and to create the right incentives to accelerate the adoption of solutions based on AI, including by small and medium-sized enterprises (SMEs)" (European Commission, 2020b, p. 3). The proposal overlooks the global dominance of US and Chinese tech giants, including their capacity to acquire promising start-ups and to garner intellectual rents from European research institutions and innovating firms. As we showed in Chapter 3, tech giants are in a privileged position to integrate and exploit any newly created European expertise into their Corporate Innovation Systems. This implies that the EU may end up using taxpayers' money to create knowledge and skills absorbed by or subordinated to tech giants.

The proposed AI act is focused on regulating the use of data in connection with AI. It makes a distinction between prohibited, high-risk and normal applications. Examples of prohibited AI are remote biometric identification excepting for searching for potential victims of a crime, terrorist threats or prosecution of perpetrators or suspects of certain crimes. AI-systems used to evaluate the credit score or creditworthiness of natural persons and for migration, asylum and border control management are given as examples of high-risk. Within this regulatory frame, the declared objective is to promote AI innovation and a single market for AI applications in Europe. Since there are no explicit limits on access to this market, the formation of the single market will offer opportunities for further expansion primarily for the US tech giants.

It has been argued that the very size of a unified market offers the EU the opportunity to set standards that might then spill over and shape applications worldwide. Another argument for euro-optimism is that new technological developments and especially edge-computing will offer less massive scale advantages and open up for European competitors to the tech giants. The current strategy is rooted in an EU history where free mobility of capital, labour and commodities were established as basic principles and where industrial policy has been defined as competition distortion. The Airbus state support, the single example of ambitious and successful industrial policy at the European level, was triggered by the threat of Boeing establishing a world monopoly. A similar assessment of the position of tech giants would open up for more ambitious industrial policy aiming at creating high-tech public corporations (Archibugi & Mariella, 2021).

[100] By 2019, Europe had 3.6 of the market capitalization value of the world's 70 largest digital platforms (UNCTAD, 2019).

8.2.2. The United States

In 2019 there was a break with the permissive antitrust policies that became the rule in the US since the 70s and 80s (Glick, 2019). The US Congress opened an antitrust investigation against Google, Amazon, Facebook and Apple. They were found guilty in 2020 and several prosecutions are on their way. Since then, tech giants have been increasingly put into question, denounced by their use and abuse of private data[101], anti-competitive practices[102], and tax avoidance. Among other recent claims, California general attorneys joined the Federal Trade Commission to investigate Amazon for potential abuse of its market power.

It is still to be seen if these attempts will end up altering tech giants' market power. Yet, they represent a turning point from the past and signal that their lobbying may not be as effective as it has been so far. With Google leading the ranking of global lobbying expenditures,[103] tech giants have so far been successful. For instance, in 2015, the US Federal Trade Commission (FTC) mistakenly released portions of a report by its Bureau of Competition staff regarding the Google investigation. The legal staff recommended prosecuting Google. The FTC instead opted to close its investigation after Google committed to change some of its data-driven business practices[104], something it has not done so far as the US Congress investigation showed (US Congress. Subcommittee on antitrust, commercial and administrative law, 2020).

8.2.3. China

The last country to regulate its tech giants' excessive market power was China. Just before Ant Group's IPO in Shanghai, the Chinese government announced antitrust regulations for digital companies forcing Alibaba to cancel the IPO.[105] Claims against Alibaba were only the first step. As we explained in Chapter 6, the Chinese state ordered to terminate Ant Group's financial activities keeping only its e-payments business. Alibaba was also fined USD 2.75 billion by the State Administration of Market Regulation. Further anti-monopoly investigations are on their way against the online food courier Meituan[106] and, as this book is being finished, Tencent is about to receive about USD 1.5 billion fine. Tencent is accused of not properly reporting past acquisitions and for anticompetitive practices in some of its businesses, in particular music streaming. [107]

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[101] See for instance https://www.ft.com/content/4ade8884-1b40-11ea-97df-cc63de1d73f4?segmentId=b0d7e653-3467-12ab-c0f0-77e4424cdb4c

[102] See for instance https://www.ft.com/content/e56d2820-4cef-11ea-95a0-43d18ec715f5

[103] https://www.washingtonpost.com/technology/2020/01/22/amazon-facebook-google-lobbying-2019/

[104] http://graphics.wsj.com/google-ftc-report/

[105] https://www.ft.com/content/1a4a5001-6411-45fa-967c-0fd71ba9300b

[106] https://www.bloomberg.com/news/articles/2021-04-26/china-investigates-meituan-for-suspected-monopolistic-practices?cmpid=BBD043021_CN&utm_medium=email&utm_source=newsletter&utm_term=210430&utm_campaign=china

[107] https://www.reuters.com/world/china/exclusive-china-readies-tencent-penalty-antitrust-crackdown-sources-2021-04-29/

8.3. Alternative futures

8.3.1 Antitrust and natural monopolies

Capitalism is at a crossroad, even considering that the above-mentioned attempts to regulate tech giants succeed. The latter is still to be seen given -among others- the ongoing battle between Facebook, who recently won an antitrust reprieve[108], and the US Federal Trade Commission, who responded filing a new suit[109]. Several variables are at stake in the near future in relation to corporate and political powers and involving antitrust, data governance and innovation.

Open questions include whether the US, China and the EU -as well as other countries- advance in a more stringent antitrust that even reverses already approved mergers and acquisitions. Or will competition agencies' attempts to regulate big tech be lost in legal procedures, administrative burden and relatively small fines considering tech giants' enormous revenues? Tech giants will argue against antitrust law-making that they are big because they are more efficient. And they may be right since most of the digital services engender natural monopolies and there are serious doubts on whether federated solutions that promote a less asymmetric digital economy will be able to overcome network effects and the quasi-infinite content available on platforms like Google's YouTube or Facebook (O'Neil et al., 2021). Seen from this perspective, there is a need for imagination and boldness when looking for alternatives to governance through either private (but heavily regulated) or public monopolies. Another open question refers to whether these solutions could take place at a global level or whether states' limited power and geopolitical conflicts will, at most, lead to national solutions.

Concerning antitrust policies and tech giants' market dominance, breaking them up remains an option. Still, it would require a clear stand of the US state against ambassadors of its hegemony. Furthermore, considering the tight technological cooperation among data-driven intellectual monopolies (see Chapters 3 to 5), even if antitrust policies force them to break up, they may still work together, sharing databases and research results to maximize extracted rents. Unlike US tech giants, their Chinese counterparts were compelled to have separate businesses from the start. For instance, Alibaba is formally separated from Ant Group and Alibaba Health. However, since they are all controlled by the same holding company, it remains easy to share datasets to boost each business.

Anyway, the main problem with breaking them up or fostering competition is that tech giants operate in markets where -as far as they are properly regulated- natural monopolies are the best alternative. Think of search engines and how inefficient it would be to have ten places to search instead of one, therefore ten different AI models processing fewer data each than a single one that constantly learns and improves from processing billions of searchers. Since the more searches a deep learning AI model processes the better it gets, clearly centralizing all web searches in one engine would be preferred. Yet, they cannot be at the expense of public access to data and knowledge, including the AI models that result from processing society's data.

[108] Retrieved from https://www.ft.com/content/75b74e7a-02d8-430d-b9fa-70a9235b875a?segmentId=b0d7e653-3467-12ab-c0f0-77e4424cdb4c last access July 9, 2021.

[109] Retrieved from https://www.ftc.gov/news-events/press-releases/2021/08/ftc-alleges-facebook-resorted-illegal-buy-or-bury-scheme-crush last access August 20, 2021.

This points to fundamental dilemmas. It may be argued that specific fields of digital services, such as search engines and social networking, constitute global natural monopolies. Nonetheless, there are strong arguments for antitrust action because tech giants use their dominant market position to monopolize strategic technologies. One obvious alternative, to 'nationalize' the activities and leave it to national or (non-existent) global governments to manage the activities, would raise other types of problems in a world with imperfect democracy and political surveillance. It is a major challenge for progressive political forces to come up with new kinds of solutions to these dilemmas.

8.3.2 The role of tech giants and industrial digitalization

Another dimension to be considered when thinking of possible futures concerns what Margrethe Vestager -the EU's Executive vice-president of the European Commission for 'A Europe Fit for the Digital Age'- sees as the second phase of digitalization: industrial digitalization, a phase that -she argues- could give the EU some leverage considering its position in major industries.[110] However, this second wave also presents new openings for a further expansion of tech giants beyond their current platforms. Among others, we are already seeing this in the automobile and healthcare industries.

Autonomous vehicles will expand the time people spend in front of a screen and they offer new markets for digital services. This explains the priority that tech giants give to this field. Alphabet has Waymo, a company dedicated to autonomous driving technology development, and Amazon acquired the self-driving start-up Zoox for over $1.2bn in 2020 and invested in the self-driving start-up Aurora in 2019.[111] In China, Alibaba, Tencent and Baidu cooperate with Audi and with FAW Group Corporation and Volkswagen's joint venture in data analysis, internet-vehicle platform building, and intelligent urban transport.[112] Even Foxconn is getting ready to serve tech giants in this industrial shift, expanding its manufacturing capabilities from smartphones and other devices, to vehicles.[113]

In healthcare digitalization, Alphabet (Google's parent), Apple and Amazon, and to a lesser extent Facebook and Microsoft, are active investors and they engage in major development efforts. Alphabet's approach to healthcare includes Verily Life Sciences, the originally UK start-up DeepMind specialized in AI that includes healthcare projects and Calico that focuses on aging and age-related diseases. Apple also has its wearable, the Apple Watch, and uses its data in multiple associated healthcare initiatives with universities (Rikap, 2018). Amazon acquired the online pharmacy PillPack in 2018 and Health Navigator in 2019. Amazon Web Services provides specific AI solutions for healthcare and works with universities and hospitals in applying AI to diagnosis, precision medicine, voice-enabled technologies, and medical

[110] Retrieved from https://www.project-syndicate.org/onpoint/eu-regulations-for-the-digital-economy-by-margrethe-vestager-and-anu-bradford-2021-05 last access May 25, 2021.

[111] Retrieved from https://www.ft.com/content/37ae69d9-f160-48c3-b3c5-736730c110ce and https://www.wired.com/story/amazon-aurora-self-driving-investment-funding-series-b/ last access June 4, 2021.

[112] https://www.audi-mediacenter.com/en/press-releases/audi-strengthens-partnerships-with-chinese-tech-giants-6711

[113] https://www.ft.com/content/b229250d-5d9e-4bb1-bb91-e57888233a98

imaging.[114] As we mentioned in Chapter 5, its wellness tracker Halo can even monitor our mood.[115] And Microsoft has just acquired Nuance, a cloud-based system for hospitals and doctors. When the purchase was announced Microsoft's CEO, Satya Nadella, tweeted "AI is technology's most important priority, and healthcare is its most urgent application".

It is still unclear to what extent the digitalization of new industries will result in tech giants conquering these industries and subordinating old leaders. One alternative scenario could be the emergence of a new type of *combined intellectual monopolies* reflecting cooperation between tech giants and intellectual monopolies from other sectors, such as big pharma and leading automotive corporations.

Concerning technological cooperation, Google's Verily Life Sciences partnered with GlaxoSmithKline for a project called Galvani Bioelectronics, and Onduo is a joint venture between Verily and Sanofi (CBInsights, 2018). Yet, big tech companies have the data, the required analytics skills and idle funds to lead other industries' digitalization. Overall, how and who will set the R&D orientation and harvest associated profits in these industries remains an open question. The future of tech giants' data monopolies and data harvesting will depend on data governance regimes.

8.3.3. Data privacy acts or socializing data?

Data privacy acts seek to protect the privacy of the individual citizen and limit tech giants' power. Seen in a different perspective they contribute to further knowledge privatization by fostering individual property over data. Concerning data privacy, Hoeyer (2020) opened a discussion on the concept of patient data. He explains that so-called "patient data" are actually data of relations and processes, not exclusive of the patient. Data include information on the treating physician, the hospital or clinic, the laboratory delivering test results, etc. The same could be said of a Facebook post that receives likes and is shared by friends or a purchase that by definition involves two sides (supply and demand). Digital privacy acts are ill-equipped when data points reflect social relations.

An additional question is if those data privacy acts effectively limit data-driven intellectual monopolies from profiting from harvesting data. Aho and Duffield (2020) analysed the GDPR and conceptualized it as a policy aimed at protecting individual freedoms. They explain that the GDPR legislation does limit cases like the Cambridge Analytica scandal but does not impede tech giants' data harvesting. Furthermore, there are many loopholes in the regulation. Most US tech giants have their European base in Ireland, whose Data Protection Commission is not complying with Europe's GDPR.[116] Also, concerning data privacy acts, we explained in Chapter 4 that tech giants are developing new approaches to become less reliant on new sources of big data.

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[114] https://www.beckershospitalreview.com/healthcare-information-technology/pittsburgh-health-data-alliance-partners-with-amazon-web-services-5-things-to-know.html
https://www.beckershospitalreview.com/artificial-intelligence/amazon-to-beth-israel-deaconess-tell-us-how-ai-can-make-your-hospital-more-efficient.html

[115] https://www.theverge.com/2020/8/27/21402493/amazon-halo-band-health-fitness-body-scan-tone-emotion-activity-sleep

[116] https://www.politico.com/story/2019/04/24/ireland-data-privacy-1270123

Another aspect to consider is that tech giants keep their big datasets secret. Hence, an alternative to fostering data privacy acts could be to follow the advice of several NGOs and advocacy groups that call for socializing data, such as IT for Change (Korjan & Narayan, 2021). Socializing data could intensify technological competition between tech giants. The latter is already happening, as we showed in particular in Chapter 5 for Amazon and Microsoft. Besides, given that tech giants concentrate the most advanced algorithms and digital infrastructure, socializing data would probably favour them more than any other organization since they are better prepared to process and learn from socialized data. In this respect, socializing data value not only among tech giants but for society at large will require granting access to data and also to the algorithms that have been trained with free harvested data. It will also require the development of public digital infrastructure.

8.3.4. On the future of techno-nationalism

Finally, in this exercise of exploring alternative futures, concerning socializing access to data and knowledge (such as algorithms), there is yet another dimension to be considered. Will techno-nationalisms fostered by the pandemic and the US-China conflict be reinforced in the near future? China's commitment to becoming the global AI leader by 2030 and the US AI policy guided by the concern of the US state and its tech giants about China and its own giants point in that direction. However, we have seen a rise in global cooperation in 2021 driven by the OECD and the G20. Although initially mostly focused on advancing toward a global corporate tax structure for large multinationals, this points to possible commitments to reach global agreements. Among them, the G20 is focused on a recovery from the pandemic driven by intangibles, in particular digital goods. Could these instances of negotiation and expressions of will ultimately contribute to tackling major challenges by tilting the scale in favour of common and public access to knowledge and data -including digital infrastructure- or will they end up favouring the privileged position of data-driven intellectual monopolies and their home states?

In this context, exclusively promoting the use and uptake of AI in peripheral countries will expand the market for cloud services and, if not combined with other types of policies, will further reinforce tech giants' current dominance. At the international level, it will reinforce the tendency of knowledge extraction by lead countries from laggards through different mechanisms:

1. National investments in research excellence can, if successful, be extracted through uneven collaboration between research organizations and tech giants.
2. Tech giants and local concentrations of AI-competence in the US are attractive employers for elite scholars.
3. National efforts to foster high-tech entrepreneurs could be usurped by tech giants' acquisition strategies.
4. National efforts to establish collaborative innovation may be dominated by foreign tech giants operating in the host country.
5. Speeding up diffusion and broadening fields of application will expand the market of tech giants' services, including cloud services.

Summing up, although the future remains uncertain, most alternative scenarios point to tech giants and their home countries as remaining in dominant positions and as main beneficiaries at the expense of the rest of the world. On this background, we introduce next some policy

recommendations aimed at contributing to create a less polarized future, where collectively solving major societal, ecological and health challenges drive production and policymaking.

8.4 Policy recommendations

In a world characterised by a high degree of uncertainty, there are no magic bullets. We think of policy recommendations in the context of broader social and political transformations, fostered by public agency and the acknowledgment that the future, if left alone, would be worse. We agree with Prainsack (2020) who criticizes that data policies have been excessively concentrated on data protection and ownership leaving questions on the distribution of power aside. She suggests considering who benefits, at what cost and for what purposes. Our policy recommendations move along those directions.

We add to this a concern about the impact of tech giants' intellectual monopoly status on innovation both in terms of its rate and direction. Since AI has great potential to transform many aspects of life as well as all kinds of economic activities, who remains in charge of shaping it is of crucial importance. Current AI applications reflect the priorities of tech giants, mostly about entertainment in private consumption and surveillance solutions for the military and police departments, which can be more easily monetized, and little about the environment and helping the marginalized regions and people. Hence, the detrimental effects of the dominant influence of tech giants on technological trajectories go beyond limiting access to -and therefore curtailing the development of- knowledge and innovation. As far as they remain as agenda setters, the rate and direction of AI innovation will not be put at the service of societies' major challenges.

This book has focused on the monopolization of data and knowledge, which engenders a specific type of monopoly power whose effects go beyond textbook monopolies (higher price, restricted supply and misallocation). Broader perspectives on economic power should be considered to fully tackle the effects of (data-driven) intellectual monopolies. Intellectual monopolies can limit knowledge spillovers beyond the markets where they operate. Furthermore, in the case of data-driven intellectual monopolies, there are long-term consequences of stifling innovation at the (global) system level. These companies can offer free products or low prices to consumers for the sake of harvesting more data that will result in a further concentration of digital intelligence.

A step towards an effective regulation is to take seriously that we are dealing with digital global public goods. Digital platforms are globally produced by society at large and since digital services -in particular those in the hands of big tech companies- tend to be natural monopolies, they should be envisioned as global public goods. While the feasibility of developing innovative forms of governance that correspond to this perspective depends, among others, on public pressure, other redistributive measures could be taken into consideration in the meantime.

G20 has recently suggested the taxation of profits based on the location of customers. The OECD and the G20 have also been advocating for a global minimum corporate tax rate to tackle base erosion and profit shifting (OECD/G20 Inclusive Framework on BEPS, 2020). However, the so far agreed minimum tax rate seems insufficient to tackle the effects of tech giants. This minimum tax rate will only be imposed if companies earn more than a 10% profit rate, which leaves Amazon outside. This company has developed an internal transfer system

where losses from outside the US and Europe are concentrated in Luxemburg together with the company's EU profits. As a result, it ends up receiving tax credit in Europe, globally paying little or no tax at all (Phillips et al., 2021).

Moreover, the way profits are calculated, considering R&D as an expense and not as an investment, contributes to providing artificially reduced profit figures for intangible-intensive firms. This is all the more true for tech giants; they use intangible assets deferrals -often dubiously calculated- to inflate their costs, thus reducing declared profits. Overall, tech giants and other leading corporations take advantage of accounting rules and use financial instruments to alter their accounting data to pay lower taxes.

Therefore, reforms should aim at taxing digital companies' *revenues* rather than profits. Amazon is an extreme case illustrating the limits of taxing profit. It is a company that barely declares profits but whose market capitalization has risen about 1,789 % in the last decade. This points to yet another option: to tax shareholders in line with the rise of corporations' market capitalization. Limiting buybacks and other mechanisms that artificially increase shares' prices should also be put in place. Apple has been particularly active in terms of buybacks.

Moreover, data-driven intellectual monopolies earn rents through mechanisms that may be paralleled to land rents usurped by landowners where their source of rents is access to data. This parallel points to a progressive tax on owners of digital databases created from centralizing third-party -individuals or organizations- data. Tech giants should then pay according to the size of their databases. A relatively simple way to proxy size (if required information is not provided) is to consider datacentres' square metres.

Unlike land, these taxes should not be charged according to where the data centres are located. This would benefit core countries, in particular the US, home to 40% of the world's hyperscale data centres (Synergy Research Group, 2019). The tax collection could take place at the global level considering the global scale of these corporations, but also to assure that no country sets a zero tax on data centres, therefore favouring their relocation at the expense of the rest of the world. Tax revenues could be shared according to countries' share of Internet penetration, or -even better for development- through a progressive scheme favouring less developed countries.

Besides addressing the effects of data concentration and reaping back the rents appropriated by tech giants, another necessary reform refers to the global intellectual property regime. The current regime favours knowledge owners but seldom benefit actual inventors (Dreyfuss & Frankel, 2014; Pistor, 2019). It also limits global learning and stifles innovation since knowledge is a cumulative process where society builds new knowledge based on previous knowledge. If the latter is only accessible by paying an intellectual rent, promising knowledge avenues may be discarded to avoid such costs. Alternative and less harmful methods to foster innovation need to be promoted, including prizes financed with public money.

8.4.1. Focusing on underdeveloped countries

While all these policies certainly require global enforcement to effectively tilt the scale against data-driven intellectual monopolies, non-core countries should not wait for the US, the EU and China to regulate big tech. Peripheral countries are net providers of raw data that are freely harvested and monetized by a handful of data-driven intellectual monopolies mostly from the US and China. This form of data or digital colonialism reinforces underdevelopment (Couldry

& Mejias, 2019a, 2019b; Kwet, 2019). Data privacy laws, inspired by the law passed in Europe, are being implemented in countries like Brazil, Thailand, South Korea, South Africa and India.[117] Nonetheless, as we argued above, these regulations are tricky because as much as they try to limit tech giants' access to data, they still fall short and further promote a culture that celebrates intangibles as private property.

Instead, these countries could require data-driven intellectual monopolies to transfer the technology necessary to build data centres using state-owned infrastructure. A step further could be to charge them for privately appropriating data and also force them to store them in local data centres. Some peripheral regions host local data-driven intellectual monopolies, like MercadoLibre in Latin America. Given the importance of some digital services, like e-commerce and e-payments, states should regulate these giants with the same regulations applied to banks because, besides e-payments, e-commerce is intertwined with new forms of private credit and asset management (Frost et al., 2019).

Some peripheral economies are also advancing regulations to reap back part of the profits made by tech giants in their territories. In Indonesia, the state has threatened foreign internet firms to block their services in the country if they do not obtain "permanent establishment" status and, thus, pay Indonesian taxes.[118] Singapore and Malaysia established digital tax regimes for overseas companies in 2020, and Thailand introduced a 7% value-added tax on sales for digital platforms that lack a local subsidiary company and make more than $57,000 a year. A bill was introduced in May 2020 in the Philippines to raise funds to face pandemic-associated expenses. It taxes big providers such as Facebook, Google, Netflix and Spotify.[119]

In countries where tech giants' operations are not yet widely developed, there is a chance for national and even local authorities to develop state-owned or cooperative platforms while limiting US and Chinese tech giants' access. Tech giants are now expanding cloud servicing to the peripheries. This is the case of cloud computing in Southeast Asia.[120] There is, therefore, a small window of opportunity for states to coordinate and offer state-owned or cooperative public clouds before data-driven intellectual monopolies capture this market.

In Indonesia, a state-owned enterprise already manages the digital payment service LinkAja.[121] Brazil has seen the emergence of several public platforms since the pandemic, like the delivery platform FiqueNoLar that operates in the northern part of the country, where the most popular private delivery apps did not have a service.

In fact, although their chances to succeed in triggering network effects will be smaller, state-owned or cooperative platforms should also be created in countries where local or global tech giants have an established business. For instance, in October 2020 Argentina announced the creation of an online marketplace called "Correo Compras" to be run by a state-owned company, Correo Argentino, which is also the country's official postal service. And, amid the Covid-19 pandemic, some advocated that the US government should nationalize Amazon and

[117] https://www.endpointprotector.com/blog/data-protection-legislation-around-the-world-in-2020/

[118] https://www.reuters.com/article/us-indonesia-tax-internet-idUSKCN0W20QM

[119] https://asia.nikkei.com/Economy/From-Thailand-to-Indonesia-taxes-tighten-for-digital-businesses

[120] Retrieved from: https://www.ft.com/content/1e2b9cd9-f82e-4d3b-a2d8-f20c08bdc3aa?segmentId=b0d7e653-3467-12ab-c0f0-77e4424cdb4c

[121] https://www.linkaja.id/

use its logistics network to assure the delivery of essential goods to all US citizens.[122] For these initiatives to succeed and overcome part of the shortfalls of private companies, digital security must be guaranteed and surveillance capitalism overcome, which certainly requires civil society bodies that oversee how data are used and stored.

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Overall, both at the global level and for peripheral countries, a comprehensive plan should be put in place to tackle intellectual monopolies and their effects. It should address the effects of knowledge privatization and assetization, opening space for a new global knowledge regime based on common and public knowledge. Yet, this type of initiative will require significant public pressure, such as what we are currently witnessing for the case of Covid-19 vaccine waiver.

8.5 We need more activism

The rise of US and Chinese big tech as the world's most powerful corporations has deepened inequalities at multiple levels: among firms, among workers, among countries and between capitalists and workers. In this context, social disrupts have been an unsurprising recurring outcome, and we have seen them everywhere in the 21st century. Even during the pandemic, revolts surged against different forms of inequality in, among others, Chile, Colombia, India and the US.

Demonstrations are increasingly being organized online. The same technology that underlies tech giants' power, used for -corporate and state- surveillance, for broadcasting extreme right and even fascist ideas and that fuels the US-China conflict, is also being used as a counterbalancing weapon. Internet, particularly social networks, is a powerful tool for the organization of grassroots movements. Workers' unions can also learn from each other's experiences and get in contact online. During the pandemic, digital technologies have also been used to organize assemblies, academic conferences, political meetings and so on.

Unions are adapting and workers organizing themselves, and this should be fostered at every possible level. In 2018, Google employees managed to stop the company from renewing an AI contract with the Pentagon and to cancel its plans for a censored search engine for China. And, in 2020, 2,000 employees urged the company to cease selling technology to the US police after George Floyd's killing. Google's employees created their union and Amazon warehouse workers in different parts of the world are also organizing and trying to become unionized workers. Even if they fail several times before succeeding, the threat of unionization is already impacting Amazon's working conditions for the good.

These initiatives could inspire workers from other companies. Unions should be reconceived as political actors capable of exercising their influence beyond wage claims. Workers' organization is indispensable to counterbalance the power of intellectual monopolies, given both their global reach and states' internal contradictions and limitations.

[122] https://inthesetimes.com/article/supply-chain-crisis-nationalize-amazon-coronavirus-covid-19

8.5 Final remarks

In this book, we have focused on how countries and corporations compete to establish leadership in AI. It is obvious that those governing the US and China now see leadership in this technology as being of fundamental importance for leadership in world affairs. There is a growing understanding in the rest of the world that AI is key for economic growth and to tackle global challenges related to health, inequalities, climate change and other major ecological challenges. Hence, it is highly problematic that the capacity to lead AI development and enjoy associated profits has become concentrated in a handful of tech giants with roots in the US and China. In the first phase of the ICT revolution, there was a similar concentration of the semiconductor and computer industry in Silicon Valley. That did not hinder other developed regions to use microelectronics to develop new products and more efficient processes supporting their competitiveness.

Is this time different? We think that it is for a few interconnected reasons. Scale economies are crucial and they operate at different levels. As indicated, some digital services operate in what seems to be global natural monopolies and, at the same time, incumbents have the major dynamic advantage of digital learning where the technological lead increases with the scale of accessed data. While it may be argued that microelectronics was a general-purpose technology, manufacturing was its primary field of application, whereas AI can be applied in all sectors and not least in those crucial for human welfare, such as education and health. What's more, it may revolutionize the innovation process itself.

This is why the current geopolitical distribution of corporate capabilities in AI is unsustainable and undefendable. As indicated in the introduction of this chapter, there are two major alternatives to the current situation. The first is that the techno-nationalist strategies of the US and China are reproduced in other parts of the world. In the case of the EU, it would require both a stronger federation and a break with historical bias in favour of open markets. Since the size of the market determines the volume of data, it would require a movement toward regional integration in other parts of the world, such as in Africa and Latin America. In these cases, a pragmatic approach to the current conflict between the US and China may be useful, since the very conflict may offer access to critical elements of knowledge. However, this alternative points to new barriers to access to knowledge and information and an escalation of conflicts with a major risk of military confrontations.

The other alternative is that the rest of the world forces the US and China to re-establish a collaboration to develop and use AI focused on solving global problems including poverty and economic underdevelopment. It would require a new global regime where access to data from abroad is compensated by sharing crucial knowledge including algorithms. To move in this direction, we see the need for a new Enlightenment. This time, all humans around the world should be given insights into the fundamentals and contradictions of the emerging digital society.

Current stereotypes where the US is seen as a liberal market society and China as completely dominated and managed by the state and the Communist Party are misleading and dangerous. And they point to irrelevant alternative modes of governance. Recent developments have made it abundantly clear that even these two extremes are mixed societies. In both countries, the state is highly active in steering technologies and there are private interests that go against government regulations. Without a new discourse that goes beyond the duality between state and market and between private and public, it is difficult to see how to realize the second

alternative. New forms of citizen engagements in building global cooperative endeavours will be elements of a third alternative.

AI evokes both dystopian and utopian perspectives. Its breakthrough should engage citizens all around the world to use their imagination to think about how to construct a fair and sustainable society for all, where global governance plays a stronger role and where knowledge is widely shared within and across nation states.

8.6 References

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