



How Much Will the

Artificial Intelligence Act

Cost Europe?

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The European Commission published a draft of its proposed Artificial Intelligence Act (AIA) in April 2021. If adopted, the AIA will be the world's most restrictive regulation of artificial intelligence (AI) tools. It will not only limit AI development and use in Europe but also impose significant costs on EU businesses and consumers.

The AIA is a horizontal law that will apply to any product that contains artificial intelligence (AI). It attempts to sort AI into three categories (prohibited, high-risk, and limited risk). The AIA bans AI for subliminal psychological manipulation, and it prohibits public authorities from using real-time biometric surveillance and building AI-powered social scoring systems. The use of AI in ways that affect the fundamental rights or the safety of users is considered high-risk. This includes using AI in critical infrastructure, educational and vocational training, employment or worker management, essential public and private services (including access to financial services), law enforcement, border control and migration, and the administration of justice. AI in these many contexts generates a broad swathe of legal obligations for developers and users. The AIA requires high-risk AI to be:

- trained on datasets that are complete, representative, and free of errors;
- implemented on traceable and auditable systems in a transparent manner;
- subject to human oversight at all times; and
- robust, accurate, and secure.

Operators of high-risk AI systems have to abide by numerous technical and compliance features before and after they take their AI tool to market. They must:

- Build a quality management system.
- Maintain detailed technical documentation.
- Conduct an assessment to ensure the system conforms to the AIA.
- Register the system in an EU database.
- Monitor the system once it is on the market.
- Update the documentation and conformity assessment if substantial changes are made.
- Collaborate with market surveillance authorities.

The Commission has stated that it wants 75 percent of European businesses to use AI by the end of this decade—estimates of current AI adoption vary, but this could amount to as much as a tenfold increase from current levels.¹ Since the AIA's list of high-risk AI uses is long, and fines for non-compliance are high, it is to be expected that the AIA's lengthy set of requirements will come at a steep price. The point of the AIA is to ensure that “high risk” AI in Europe is covered by a detailed and broad set of legal requirements. These requirements come at a significant cost to developers and deployers of AI.

The European Commission has released an impact assessment of the AIA.² Using this study and further analyses, the Center for Data Innovation estimates the financial cost that the AIA will impose on Europe's economy.

This analysis excludes the additional unquantifiable costs that the AIA imposes—deterring investment into European AI startups, slowing down the digitization of the economy, and encouraging a brain drain of European entrepreneurs to countries where they can build AI companies with fewer bureaucratic hurdles than they face at home.

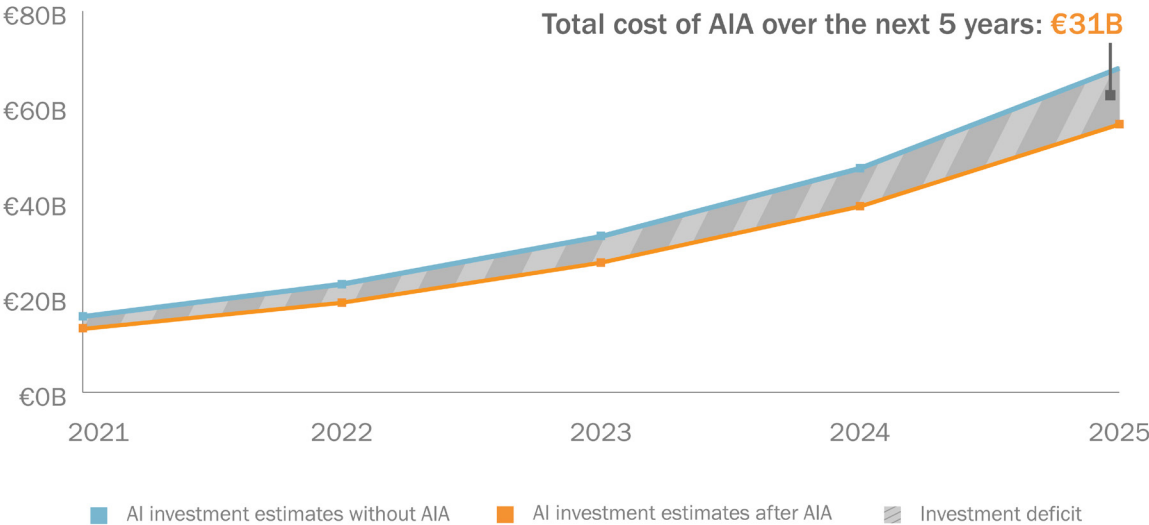
The AIA will cost the European economy €31 billion over the next five years and reduce AI investments by almost 20 percent. A European SME that deploys a high-risk AI system will incur compliance costs of up to €400,000 which would cause profits to decline by 40 percent.

Overview

The European Commission has repeatedly stressed, based largely on opinions and shibboleths rather than logic and data-driven arguments, that the draft AI legislation, far from creating an undue burden on the economy, will support growth and innovation in Europe’s digital economy.³ As our analysis shows, this argument is disingenuous at best.

We estimate that the Artificial Intelligence Act would cost European businesses €10.9 billion per year by 2025, having cost the economy €31 billion by then. This excludes the opportunity cost of foregone investment into AI. Our analysis, based on the European Commission’s own impact assessment of the AIA, indicates that the AIA will cause a 40 percent profit reduction for a European business with a €10 million turnover that deploys a high-risk AI system. The provisions of the AIA, however well-intended, will extract a heavy price from an increasingly uncompetitive European economy.

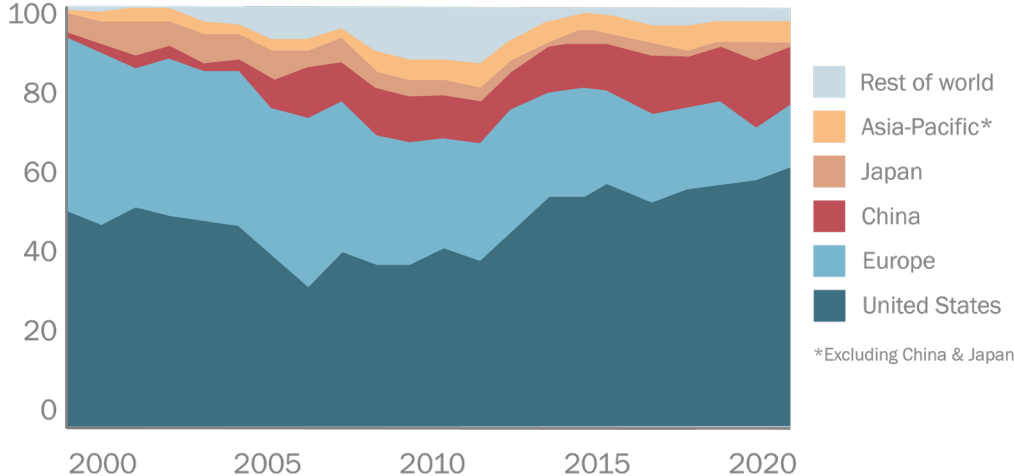
Figure 1: Projected AI investment shortfall caused by the AIA³⁴



Moreover, the European Commission has publicly committed to its ambitious “Digital Decade” target of 75 percent of European businesses using AI by 2030. This will require substantial investments. In 2020, European investment into AI was estimated to reach €19 billion.⁴ With 7 percent of European businesses currently using AI, this figure would need to increase to over €200 billion of annual investments to hit the target—meaning AIA compliance costs would rise to €34 billion a year by 2030.

Twenty years ago, European corporations made up 40 percent of the world’s largest 100 companies as measured by market capitalization. Today, that share has winnowed to 15 percent. Europe’s economy has largely failed to participate in the digital gold rush of the last two decades.⁵ The AIA is now set to add further costs on businesses that want to invest in AI or set up new AI ventures in the EU.

Figure 2: Location of world’s largest 100 companies by market capitalization, 2000 to 2021³⁵



The Macroeconomic Context

The EU's GDP is €13.3 trillion, 75 percent of which is made up of businesses and government expenditures.⁶ Of this, about 35 percent of sectors (by value) fall into the AIA's "high risk" category: education, finance/insurance, health, IT, technical/scientific activities, social work, and critical infrastructure.⁷ Approximately €3.4 trillion of economic activity is thus considered "high risk" by the AIA.

7 percent of European non-financial businesses currently use AI.⁸ Therefore, approximately €230 billion of economic activity lies within the scope of the AIA now. Of that, roughly 20 percent of spending, or €46 billion, is on IT R&D.⁹ If the Commission's Digital Decade target is reached—and 75 percent of European businesses use AI by 2030—€2.5 trillion of economic activity would be within the scope of the AIA, and €500 billion of IT R&D.

Figure 3: Portion of EU GDP that falls under the "high risk" provisions of the AIA

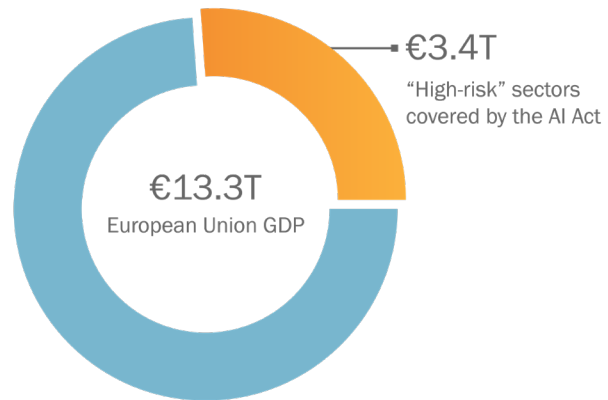
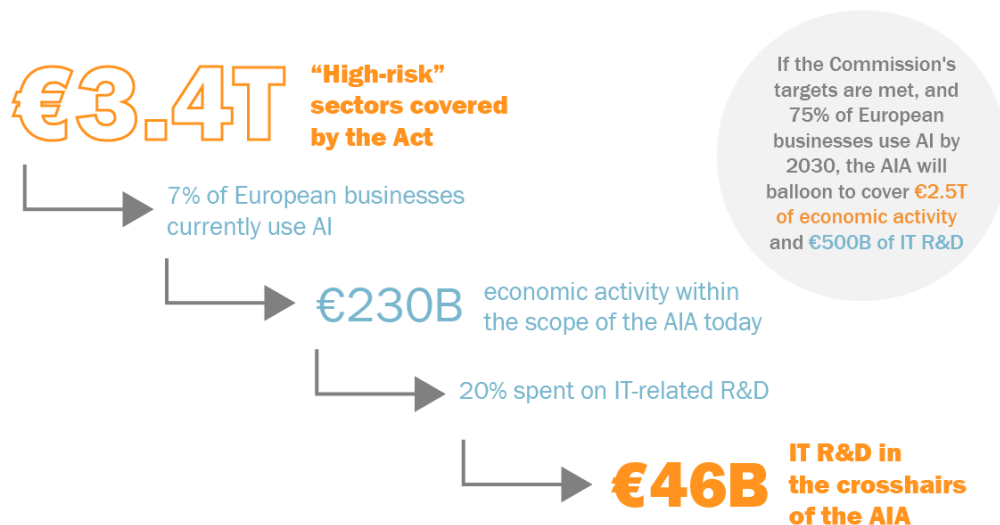


Figure 4: Amount of IT spending by European businesses covered by the AIA



Given the growing importance of AI, significant investments are expected in Europe in the coming years. The EU estimates that absent the AIA, investments into AI will grow from €16 billion in 2021 to almost €70 billion by 2025.¹⁰ The Commission's impact assessment concludes that the AIA will cause an additional 17 percent of overhead on all AI spending, in both fixed costs (e.g. setting up the quality management system, designing workflows and system architectures to comply with the Act's stipulations, conducting conformity assessment procedures) and variable costs (i.e. ongoing monitoring of the AI system to ensure it complies with the AIA).¹¹ Applying this to the investment projections, we find that by 2025, the compliance cost caused by the AIA will rise to more than €10 billion per year. By that point, the AIA will have cost the European economy more than €30 billion.

This is a static analysis that assumes the AIA will not influence the trajectory of AI investments in Europe other than to impose a haircut on planned investments. In fact, there will be three further downstream effects that this analysis does not capture:

1. Like any other product, there is a price elasticity to software: when prices increase, demand falls. As companies developing and adopting AI face higher prices, this will reduce consumption of AI in Europe, leading to lower productivity growth.
2. In addition, the imposition of a new regulatory framework will likely divert investments away from Europe to countries where investors are not faced with this extra overhead, and thus increase the cost of capital in Europe for AI investments.
3. Lastly, a brain drain of European entrepreneurs with business ideas for AI is likely. Startup innovators will find it easier to set up shop outside Europe where they do not face high fixed compliance costs from the outset. This is particularly likely because the AIA contains only token concessions to startups, such as a "sandbox" in which all the Act's rules apply and entrepreneurs cannot experiment whatsoever outside the regulatory framework.

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Firm-level Impact

The AIA's technical and documentation requirements will need to be translated into concrete system architecture and business decisions. Firms need to take appropriate steps to ensure they comply with the Act, and this will create firm-level costs. The specific provisions of the AIA for “high risk” AI include:

- building a quality management system,
- drawing up and maintaining technical documentation,
- undertaking a conformity assessment (and repeat assessments if the AI system undergoes substantial changes),
- ensuring human oversight of the system and monitoring it for potential risks, and
- ascertaining that the AI system complies with other relevant legislation (such as GDPR).

Our analysis looks at implementation costs for small and medium-sized enterprises and large corporations.

SME costs

Based on the EU's own impact assessment, a small business (up to 50 employees/€10 million turnover) can expect total compliance costs of up to €400,000 for one high-risk AI product requiring a quality management system.¹² The average SME profit margin is about 10 percent.¹³ Therefore, the AIA will cause a 40 percent reduction in profit for a European business with €10 million turnover wanting to deploy a high-risk AI (excluding the cost of the AI system). The cost of obtaining an external conformity assessment can be up to €1 million.¹⁴ This is in line with the implementation costs SMEs experienced in the wake of GDPR.¹⁵

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A business with €10 million turnover would see its profits fall by 40%.

Enterprise costs

The GDPR provides a benchmark against which the costs of implementing the AIA can be estimated. Thirty-four percent of large enterprises spent more than €1 million to implement GDPR requirements, and similar costs can be expected to be caused by the AIA.¹⁶ The cost distribution is “fat-tailed” in that larger businesses face higher costs: members of the Fortune 500 spent \$8 billion on GDPR compliance.¹⁷ U.S. companies with more than 500 employees spent up to \$10 million each on GDPR compliance and were estimated to have spent up to \$150 billion in total.¹⁸ Microsoft alone employed more than 1,500 software engineers to make its products GDPR compliant. Like the AIA, GDPR is a horizontal framework (regulating the use of personal data). However, the AIA is more expansive in scope and places a more detailed set of requirements on businesses. Thus, it is likely the GDPR implementation costs constitute a lower floor estimate of the AIA’s enterprise implementation costs.

20,000 US firms with 500+ employees

These firms spent up to \$10 million each on GDPR compliance

Total cost of GDPR compliance for large US firms was as high as **\$150 billion**

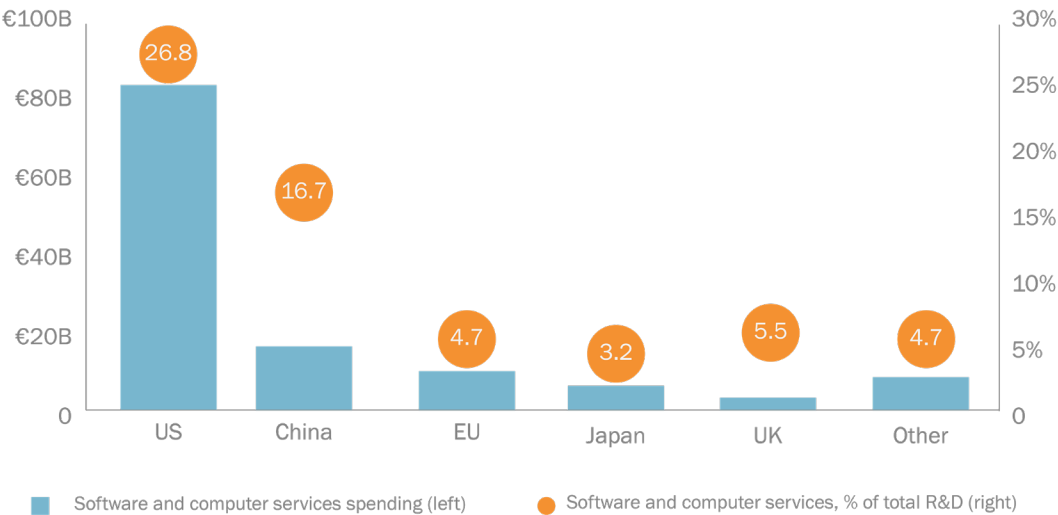


The AIA’s cost for US businesses will likely exceed those of GDPR, as the law is more far-reaching in scope

Discussion

Despite substantial efforts by the EU since it launched the Lisbon Strategy in 2000, Europe has failed to reach its stated goal: to make Europe “the most competitive and dynamic knowledge-based economy in the world.”¹⁹ The facts are unambiguous: of the 60 most valuable digital companies, two-thirds are American, one-third are Asian, and a meager 3 percent are from Europe.²⁰ There are a number of reasons for this.²¹ A major contributor has been the belief held by policymakers that the EU can not only impose significant regulatory obligations on companies using digital technologies without any cost to growth, but that these regulations actually spur digital innovation.²² This is a comforting notion, but not one that is borne out by logic, data, or analysis. There is no reason to believe that Europe’s experience with AI will be any different, despite confident claims to the contrary.

Figure 5: Europe lags far behind the US and China on information technology R&D spending³⁶



In fact, Europe seems to be doubling down on this path, perhaps under the notion that they have not regulated enough. A recent Politico Europe headline touted, “France will ‘try to deliver a maximum of regulation and progress’ during its EU presidency, Emmanuel Macron said today. He also wants to foster 10 European tech giants worth 100 billion euros by 2030.”²³ The idea that regulation will deliver growth is a policy shibboleth in Europe, a sacred and contradictory one that few dare to question publicly. At a minimum, the Commission owes it to European citizens to engage in a robust public debate on this idea.

Europe lags behind China and the United States in AI development and adoption.²⁴ For instance, of the \$30 billion of private venture capital invested in AI companies in 2019, under 10 percent went to Europe.²⁵ The AIA will increase this disparity. AI is not a separate industry or narrow niche of the economy—it is a general-purpose technology that affects all sectors of the economy and in particular powers the fast-growing digital economy. The AIA will further exacerbate Europe’s underspending on AI and thus will exacerbate slow productivity growth and lagging digital competitiveness over the coming decades. A joint report by the European Commission and the European Investment Bank notes, “global GDP could increase by up to 14 percent (the equivalent of €13.3 trillion) by 2030 as a result of the accelerating development and take-up of AI.”²⁶ Tragically, because of the AIA, the EU will capture a smaller share of these gains than it would otherwise. Given how far behind Europe is already in its digitization efforts, any additional restraints on investments are unwelcome.

Conclusion

The AIA is likely to spark a chilling effect on investments into AI in Europe, due to the Act's legal complexity and the compliance costs it engenders.²⁷ This will damage Europe's digital transformation before it is even properly underway. The EU's Digital Decade target foresees 75 percent of European businesses using AI by 2030—a ten-fold increase from current adoption levels. It is hard to see how this is achievable given the costs of the AIA for European businesses that want to invest in AI in a “high risk” sector. Thus, the AIA will in all likelihood generate an enormous opportunity cost for Europe in terms of the development of AI, and the deployment of AI in ways that can make European businesses more productive and competitive. It will also cause a brain drain of European innovators who plan to develop new AI technologies in “high risk” sectors.

This is doubly tragic, given that European SMEs already lack innovative capacity. Only 14 percent of European SMEs are in industries with “high” or “very high” innovation intensity—yet they generate 27 percent of the economic value-add provided by SMEs.²⁸ The EU's own impact assessment notes, “SMEs may lack significant funds [to invest in AI] and thus choose to stay away from the regulated market.”²⁹ For European businesses and SMEs who are planning to develop or deploy “high risk” AI, the cost of capital to invest in such initiatives is going to rise due to the increased regulatory expense associated with doing business in AI in Europe. This reduction in the availability of private venture funding for “high risk” AI startups in Europe is a non-quantifiable opportunity cost that will further reduce the EU's growth potential. The resulting increase in the cost of AI adoption for European businesses, combined with skills shortages and a lack of resources to comply with the AIA, will further dampen the vitality of Europe's digital ecosystem.³⁰ Like GDPR, the AIA will cause increased market concentration and more favorable conditions for large incumbents.

The EU's regulatory environment continues to let down European entrepreneurs who want to undertake risky and innovative investments. It is no surprise that the venture capital market in Europe is significantly smaller than in the United States or Asia.³¹ The last word belongs to the European Investment Bank, which pithily summarizes the core of a problem that the AIA is about to exacerbate significantly: “The European Union does not appear to be generating many new innovation leaders, especially in fast-growing sectors such as software and computer services. This may jeopardize Europe's long-term competitiveness.”³²

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Appendix

AI investment projections in the EU without the AIA, per the impact assessment

2021	2022	2023	2024	2025
€15.9B	€22.7B	€32.7B	€47.0B	€68.0B

The impact assessment suggests that “total compliance cost of the proposed regulation on AI systems is roughly 17% of total AI investment cost.”³³

AIA annual cost

2021	2022	2023	2024	2025
€2.7B	€3.9B	€5.5B	€8.0B	€10.9B

AI investment projections in the EU with the AIA, per the impact assessment

2021	2022	2023	2024	2025
€13.3B	€18.8B	€27.2B	€39.0B	€56.2B

About the Author

Benjamin Mueller is a senior policy analyst at the Center for Data Innovation, focusing on AI and technology governance. Prior to joining the Center he was chief of staff at a financial technology company in London. Dr. Mueller studied Politics, Philosophy and Economics at the University of Oxford, and completed his PhD in International Relations at the London School of Economics.

About the Center for Data Innovation

The Center for Data Innovation is the leading global think tank studying the intersection of data, technology, and public policy. With staff in Washington, D.C., and Brussels, the Center formulates and promotes pragmatic public policies designed to maximize the benefits of data-driven innovation in the public and private sectors. It educates policymakers and the public about the opportunities and challenges associated with data, as well as technology trends such as open data, artificial intelligence, and the Internet of Things. The Center is part of the nonprofit, nonpartisan Information Technology and Innovation Foundation (ITIF).

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Endnotes

- 1 European Commission, “Europe’s Digital Decade: Digital Targets for 2030” (Brussels: European Commission, 2021), <https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A52021DC0118>; Eurostat, “Artificial Intelligence in EU Enterprises,” news release, April 13, 2021, <https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20210413-1>.
- 2 European Commission Directorate-General for Communications Networks, Content and Technology, Study To Support An Impact Assessment Of Regulatory Requirements For Artificial Intelligence In Europe (Brussels: European Commission, April 2021), 138, <http://dx.doi.org/10.2759/523404>.
- 3 “Event summary: What’s Next on the EU’s Proposed AI Law?” accessed June 23, 2021, <https://datainnovation.org/2021/06/recap-whats-next-on-the-eus-proposed-ai-law/>; “Politico AI Summit: Will the EU’s planned AI regulation safeguard fundamental rights?” accessed June 24, 2021, <https://blogs.microsoft.com/eupolicy/2021/06/04/will-the-eus-planned-ai-regulation-safeguard-fundamental-rights-and-encourage-innovation/>; European Commission, “Europe Fit for the Digital Age,” news release, April 21, 2021, https://ec.europa.eu/commission/presscorner/detail/en/ip_21_1682.
- 4 Ibid, 202.
- 5 Benjamin Mueller, “Is the EU Doing Enough to Address Europe’s Digital Investment Shortfall?” April 20, 2021, <https://datainnovation.org/2021/04/is-the-eu-doing-enough-to-address-europes-digital-investment-shortfall>.
- 6 European Commission Directorate-General for the Internal Market, Industry, Entrepreneurship and SMEs, Annual Report on European SMEs 2020/2021—Digitalization of SMEs (Brussels: European Commission, 2021), 17, <https://ec.europa.eu/docsroom/documents/46062>. Eurostat, “Artificial Intelligence in EU Enterprises.” The biggest share of GDP (or gross value added) originates in non-financial corporations (around 60%). The government accounts for around 15% and financial corporations for a small fraction of GDP. The remaining 25% is mostly household production activities. Eurostat, “Overview Of The Relative Economic Importance Of The Institutional Sectors,” website accessed July 15, 2021, <https://ec.europa.eu/eurostat/web/sector-accounts/de-tailed-charts/importance-sectors>.
- 7 European Commission, AIA Impact Assessment, 138.
- 8 Eurostat, “Artificial Intelligence in EU Enterprises.”
- 9 The world’s top 2,500 R&D companies account for ~90% of business R&D, a total of €823B in 2018 (\$1T in 2021). The EU accounts for 20% of this R&D in software, computer services and hardware. European Investment Bank, Investment Report 2020/2021: Building A Smart And Green Europe In The Covid-19 Era. (Luxembourg: European Investment Bank, 2021), 237-239, https://eib.org/attachments/efs/economic_investment_report_2020_2021_en.pdf. Roughly 3% of EU GDP consists of Business ICT spending, which tallies to the \$45B of IT R&D spend assumed in this analysis. See also: Robert D. Atkinson, “How ICT Can Restore Lagging EU Productivity Growth”, (ITIF, October 2018), 17, <https://itif.org/2018-ict-eu-productivity-growth.pdf>.
- 10 European Commission, AIA Impact Assessment, 134.
- 11 Ibid, 134.
- 12 European Commission, AIA Impact Assessment, 152.
- 13 Centre for Interfirm Comparison, Benchmarking Report: Industry Overview 2016, (London: Association for Consultancy and Engineering, 2016), 44, <https://acenet.co.uk/media/3321/benchmarking-report-2016.pdf>; European Commission Directorate-General for the Internal Market, Industry, Entrepreneurship and SMEs, Annual Report on European SMEs 2016/2017—Focus On Self-Employment, (Brussels: European Commission, 2017), 39, <https://op.europa.eu/en/publication-detail/-/publication/0b7b64b6-ca80-11e7-8e69-01aa75ed71a1>; David Summers, “Profitability of UK Companies: October to December 2019”, (London: Office of National Statistics April 2020), <https://ons.gov.uk/economy/nationalaccounts/uksectoraccounts/bulletins/profitabilityofukcompanies/octobertodecember2019>; European Commission, Survey On Access To Finance For Cultural And Creative Sectors, (Brussels, 2013), 45, https://ec.europa.eu/assets/eac/culture/library/studies/access-finance_en.pdf.
- 14 European Commission, AIA Impact Assessment,

- 148.
- 15 Average SME GDPR implementation costs were €870,000. See International Association of Privacy Professionals, Annual Governance Report 2018, October 2018, <https://iapp.org/resources/article/iapp-ey-annual-governance-report-2018>.
 - 16 European Commission, AIA Impact Assessment, 161.
 - 17 Mehreen Khan, “Companies Face High Cost to Meet New EU Data Protection Rules.” *Financial Times*, November 10, 2017, <https://ft.com/content/Od47ffe4-ccb6-11e7-b781-794ce08b24dc>.
 - 18 Daniel Castro and Michael McLaughlin, “Why the GDPR Will Make Your Online Experience Worse.” *Fortune*, May 23, 2018, <https://fortune.com/2018/05/23/gdpr-compliant-privacy-face-book-google-analytics-policy-deadline>.
 - 19 European Committee of the Regions, “The Lisbon Strategy in short,” website accessed July 15, 2021, <https://portal.cor.europa.eu/europe2020/Profiles/Pages/TheLisbonStrategyinshort.aspx>.
 - 20 Institute for Competitiveness discussion panel, “Towards A New European Digital Environment.” Presentation by Dr Christian Rusche, June 16, 2021, <https://youtube.com/watch?v=AuXrWmFP-KY4&t=7844s>
 - 21 <https://www2.itif.org/2019-europe-digital-age.pdf>.
 - 22 “European Commission representative Kim Jørgensen reassured the public that regulation and innovation are not contradictory.” In Leopoldo Biffi, “The Governance Of AI: The ‘Brussels Effect’ of a Pan-European Framework.” *AI Business*, May 20, 2021, https://aibusiness.com/author.asp?section_id=796&doc_id=769670.
 - 23 Though it sounds like material for a Monty Python skit, it is not an absurdist sketch but reality. See this headline by Politico Europe, “France will “try to deliver a maximum of regulation and progress” during its EU presidency, Emmanuel Macron said today. He also wants to foster 10 European tech giants worth 100 billion euros by 2030.” *Politico Europe*, June 20, 2021, <https://twitter.com/POLITICOEurope/status/1406637748069584899>.
 - 24 Daniel Castro and Michael McLaughlin, “Who Is Winning the AI Race: China, the EU, or the United States?” *Center for Data Innovation*, January 2021, <https://datainnovation.org/2021/01/who-is-winning-the-ai-race-china-the-eu-or-the-united-states-2021-update/>.
 - 25 Arnold Verbeek and Maria Lundqvist, *Artificial Intelligence, Blockchain And The Future Of Europe*, European Commission Directorate-General for Communications Networks, Content and Technology and European Investment Bank, July 2021, 49, https://www.eib.org/attachments/thematic/artificial_intelligence_blockchain_and_the_future_of_europe_report_en.pdf.
 - 26 *Ibid*, 17.
 - 27 On the complexity of the law, for instance, the AIA Impact Assessment notes, “A point to be clarified is the flexibility and responsibility of certifications between AI developers and deployers,” 163. The relative assignment of responsibilities between developers and users of AI is going to be a major driver of SME uptake of AI, and the law leaves unclear exactly who is responsible for compliance with different sections of this law (which is almost 200 pages long).
 - 28 European Commission Directorate-General for the Internal Market, Industry, Entrepreneurship and SMEs, *Annual Report on European SMEs 2018/2019—Research & Development and Innovation by SMEs*, (Brussels: European Commission, 2020), 22, <https://op.europa.eu/en/publication-detail/-/publication/b6a34664-335d-11ea-ba6e-01aa75ed71a1/language-en>.
 - 29 AIA Impact Assessment, 155.
 - 30 “That one-off [compliance] spend may deter new entrants from developing high-risk AI systems, but have less impact on existing companies that have already made their investment decision.” AIA Impact Assessment, 160
 - 31 Benjamin Mueller, “Is the EU Doing Enough to Address Europe’s Digital Investment Shortfall?” *Center for Data Innovation*, April 20, 2021, <https://datainnovation.org/2021/04/is-the-eu-doing-enough-to-address-europes-digital-investment-shortfall/>.
 - 32 European Investment Bank, *Investment Report 2020/2021*, 240.
 - 33 AIA Impact Assessment, 166.
 - 34 European Commission, AIA Impact Assessment, 138.
 - 35 “The Land That Ambition Forgot—Europe is Now a Corporate Also-Ran. Can It Recover its Footing?” *The Economist*, June 5, 2021, <https://economist.com/briefing/2021/06/05/once-a-corporate-heavy-weight-europe-is-now-an-also-ran-can-it-recover-its-footing>.
 - 36 Hernández, H., Grassano, N., et al.: *The 2019 EU Industrial R&D Investment Scoreboard*, Publications Office of the European Union, Luxembourg, 2020, <https://iri.jrc.ec.europa.eu/sites/default/files/2020-04/EU%20RD%20Scoreboard%202019%20FINAL%20online.pdf>.