

## NOTAT

30. november 2021

# EU's digital sovereignty and the quest to double the EU's microchip production

**Senior Rådgiver,  
Jan Høst Schmidt  
+45 53 76 27 08  
jhs@thinkeuropa.dk**

The lack of microchips is about to ruin the economic recovery after the corona crisis, announced the Danish daily Berlingske Tidende on 14. October 2021. It referred to the German automobile production being 58 pct. smaller in August 2021 than in the beginning of 2019 and to the US, the UK and the Japanese productions being 30 pct. smaller. Given the importance of the automobile production for especially the German economy and thus for the EU economy, the insufficient delivery of microchips can have serious consequences for Europe's economic upswing.<sup>1</sup>

The lack of chips was a key reason for Ursula von der Leyen to announce a new European Chips Act in her State of the European Union speech on 15. September 2021, because "There is no digital without chips."<sup>2</sup> She wants to include an EU-based production of microchips as a key element in her strategy of digital transformation and sovereignty for the EU.<sup>3</sup>

The Chips Act will link together EU-based research, design and testing capacities and coordinate EU and national investment along the value chain with the aim to jointly create a state-of-the-art European chip ecosystem, including production. This shall ensure security of supply and develop new markets for ground-breaking

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<sup>1</sup> [https://www.berlingske.dk/oekonomi/den-er-lillebitte-men-er-ved-at-smadre-coronaopsvinget-i-en-lang-raekke?&utm\\_source=newsletter&utm\\_medium=email&utm\\_content=red\\_nb-537560705&utm\\_campaign=berlingske\\_business\\_eftermiddag\\_og\\_Økonomisk\\_etterårs\\_forecast\\_2021](https://www.berlingske.dk/oekonomi/den-er-lillebitte-men-er-ved-at-smadre-coronaopsvinget-i-en-lang-raekke?&utm_source=newsletter&utm_medium=email&utm_content=red_nb-537560705&utm_campaign=berlingske_business_eftermiddag_og_Økonomisk_etterårs_forecast_2021), Kommissionen, november 2021, [https://ec.europa.eu/info/publications/european-economic-forecast-autumn-2021\\_da](https://ec.europa.eu/info/publications/european-economic-forecast-autumn-2021_da)

<sup>2</sup> [https://ec.europa.eu/commission/presscorner/detail/en/SPEECH\\_21\\_4701](https://ec.europa.eu/commission/presscorner/detail/en/SPEECH_21_4701)

<sup>3</sup> [https://ec.europa.eu/commission/presscorner/detail/en/SPEECH\\_20\\_1655](https://ec.europa.eu/commission/presscorner/detail/en/SPEECH_20_1655)

European tech.<sup>4</sup> The Commission's ambitions both for the EU digital transformation and sovereignty and for the cutting-edge European production of microchips are backed by the EU member states in the European Council-meeting conclusions from October 2021.<sup>5</sup>

### **Despite progress in digitalization the EU is not in the lead, and especially not for microchip production**

Since the Juncker Commission in 2015 launched its program for the Digital Single Market, the EU has made important efforts to speed up the digitalization of the EU's societies and economies. The von der Leyen Commission has continued the efforts with proposals for a Digital Service Act and a Digital Market Act in 2020, followed by initiatives to make the EU leading in the development and production of Artificial Intelligence and Quantum Computing.<sup>6</sup>

The EU is still not at the level of its main global competitors with respect to digitalization and microchip production. According to the EU's index for digitalization, I-DESI, the EU has middle-position in the ranking despite the lead of the smaller Nordic countries cf. figure 1. The differences between the EU members are of great significance here.<sup>7</sup>

Equally no EU-enterprises are among the World's 20 biggest tech-companies – such as platforms, producers of smartphones, microchip producers – in 2021.<sup>8</sup>

<sup>4</sup> [https://ec.europa.eu/commission/presscorner/detail/en/SPEECH\\_21\\_4701](https://ec.europa.eu/commission/presscorner/detail/en/SPEECH_21_4701)

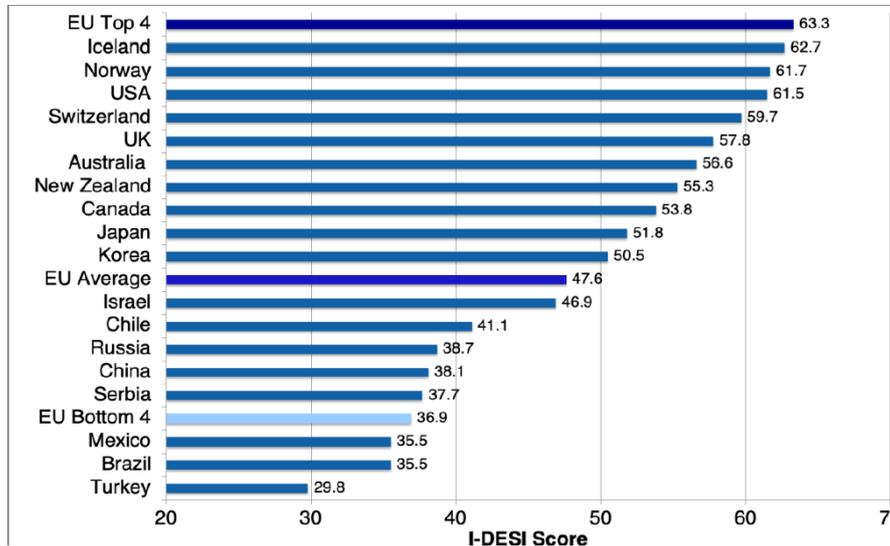
<sup>5</sup> <https://www.consilium.europa.eu/media/52622/20211022-euco-conclusions-en.pdf>

<sup>6</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52015DC0192&from=EN>; <http://bruegel.org/2019/02/contribution-to-growth-the-european-digital-single-market/>; <https://digital-strategy.ec.europa.eu/en/policies/digital-services-act-package> and Reports on Artificial Intelligence – critical industrial applications. Report on current policy measures and policy opportunities, Kommissionen, April 2020.

<sup>7</sup> <https://digital-strategy.ec.europa.eu/en/library/i-desi-2020-how-digital-europe-compared-other-major-world-economies>

<sup>8</sup> <https://www.thetealmango.com/featured/biggest-tech-companies-in-the-world/>

**Figure 1. EU degree of digitalization compared to major global competitors. I-DESI, avrg 2015-18.**



Source: <https://digital-strategy.ec.europa.eu/en/library/i-desi-2020-how-digital-europe-compared-other-major-world-economies>

From 2012 to 2020 global production of microchips has increased by around 55 pct. with variations on a yearly basis, including an important reduction in 2019 compared to 2018.<sup>9</sup> Part of this reduction was the effect of American sanctions against high-tech Chinese producers of smartphones and chips introduced in 2018 and 2019. In 2020, production of chips has been increased to meet additional demand due to the effect of the pandemic on the use of smartphones and computers on a global level. At the same time, the demand for chips from car makers was cancelled in 2020 due to the pandemic. With the economic upswing in 2021, the demand for chips was further increased. Taking into consideration that the establishment of a fully functioning microchip plant costs around 20 bn. euro and takes around two years, the chip industry therefore had difficulties meeting both the change in demand in 2020 and the overall increase in demand in 2021. And supply is first expected to meet the demand in 2022/23.<sup>10</sup>

The EU's share of global microchip production is around 9 pct. Microchip production is spread around the World, but heavily concentrated in a few big industries especially in the USA, South-Korea, Taiwan and Japan. No EU-based producer of microchips is part of the 10 biggest microchip companies in the World.<sup>11</sup>

Since 2000 the share of EU-based chip producers in global investments has decreased from 11 pct. to 4 pct. cf. figure 2.

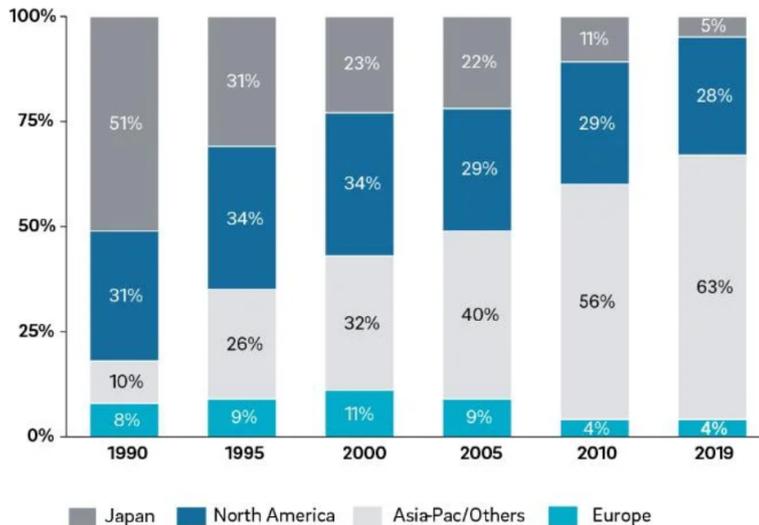
<sup>9</sup> Statista - Statista - <https://www.statista.com/statistics/272872/global-semiconductor-industry-revenue-forecast/>

<sup>10</sup> Commission Autumn Economic Forecast 2021 - [https://ec.europa.eu/info/publications/european-economic-forecast-autumn-2021\\_da](https://ec.europa.eu/info/publications/european-economic-forecast-autumn-2021_da)

<sup>11</sup> <https://blog.bizvibe.com/blog/top-semiconductor-companies>

**Figure 2. EU microchip production has reached a small part of global industry investments.**

*Percentage of total global industry investments.*



Source: IC insights, Press research, Roland Berger

## Which options does the EU have to increase microchip production?

In a globalized, digital world, ownership and nationality should not be a big issue as long as economic specialization ensures production and delivery of products at the lowest cost to anywhere in the World from where demand might come. The EU's Single Market should be a guarantee for that. However, the pandemic and the intensified competition about global leadership between the USA and China, have reinforced tendencies to re-shore important, especially high-tech production lines in the USA, EU and Asia and have led to increased perceptions in the EU that Europe must "stand on its own feet". The EU's call for strategic autonomy in industrial policy and for digital and tech sovereignty bear witness to this tendency.

If the EU was to reestablish a fully-fledged high-tech micro-chip production, the Commission estimates the investment needed to amount to 240-330 bn. euro,<sup>12</sup> which is probably one important reason that the Commission President proposes an investment plan to double the EU microchip production for 2030, including production of cutting-edge microchips.<sup>13</sup>

The EU intends to build so-called Important Projects of Common European Interest (IPCEI) which are formalized cooperations between Member States and enterprises ready to contribute resources to research, innovation and industrial

<sup>12</sup> [https://ec.europa.eu/commission/commissioners/2019-2024/vestager/announcements/speech-evp-margrethe-vestager-ku-leuven-ambassadors-lecture-series-transatlantic-relations-post\\_en](https://ec.europa.eu/commission/commissioners/2019-2024/vestager/announcements/speech-evp-margrethe-vestager-ku-leuven-ambassadors-lecture-series-transatlantic-relations-post_en)

<sup>13</sup> <https://www.teletrader.com/von-der-leyen-eu-to-increase-chip-production-to-20-by-2030/news/details/56745273?ts=1637067222978>

investments in projects. The IPCEIs are approved by the Commission, including with respect to state aids from participating Member States and possible co-financing from EU-funds. 22 Member States signed a declaration of cooperation on investments in EU microchip production in December 2020 and one IPCEI is approved by the Commission while another is in the pipeline.<sup>14</sup>

Doubling and upgrading the EU's microchip production will no doubt require important, both public and private investments. As for the public investments both, EU money and national public money will be needed. In the declaration from December 2020, it is noted that the EU Recovery and Resilience Facility (RRF) would be the relevant fund to tap for the project. By June 2021 22 plans had been delivered to the Commission with 132 bn euro aimed for digital projects.<sup>15</sup>

However, Member States have envisaged this amount for a wide range of digital projects, including a minor part for development of microchip production in the EU. The net media Politico has made a rough and preliminary estimate of public money, both EU and national, of around 35 bn. USD pledged so far for the establishment of microchip production in the EU, including funds from the RRF. This compares to around 52 bn. in the US plans, 170 bn. USD for China and South-Korea is providing tax incentives to attract private capital in the order of magnitude of 450 bn. USD.<sup>16</sup>

Finding the necessary public money to double an EU-based cutting-edge microchip production until 2030 will thus not be simple. The Commission has prolonged the temporary state aid regime to facilitate more national funds for green and digital transition, including funds to upgrade and re-shore microchip production in the EU. It also intends to make the rules for the IPCEI more transparent and accessible for SME's.<sup>17</sup>

In addition, Executive Vice-President Vestager in a speech at Leuven University, Belgium, advanced ideas to establish trade and industrial agreements with like-

<sup>14</sup> [https://eur-lex.europa.eu/legal-content/DA/TXT/PDF/?uri=CELEX:52014XC0620\(01\)&from=EN;](https://eur-lex.europa.eu/legal-content/DA/TXT/PDF/?uri=CELEX:52014XC0620(01)&from=EN;) [https://ec.europa.eu/commission/presscorner/detail/en/IP\\_18\\_6862;](https://ec.europa.eu/commission/presscorner/detail/en/IP_18_6862) <https://digital-strategy.ec.europa.eu/en/library/joint-declaration-processors-and-semiconductor-technologies> and [https://ec.europa.eu/commission/commissioners/2019-2024/vestager/announcements/speech-evp-margrethe-vestager-ku-leuven-ambassadors-lecture-series-transatlantic-relations-post\\_en](https://ec.europa.eu/commission/commissioners/2019-2024/vestager/announcements/speech-evp-margrethe-vestager-ku-leuven-ambassadors-lecture-series-transatlantic-relations-post_en)

<sup>15</sup> Thinktank Europa on the basis of national RRF plans by June 2021 -

<sup>16</sup> Europe's microchips plan doesn't add up, Politico, 21. oktober, 2021

<sup>17</sup> A competition policy fit for new challenges, Kommunikation fra Kommissionen, 18. november 2021

mind regions like the USA to help secure value-chains and make these more transparent.<sup>18</sup>

Finally, some experts have suggested to try to attract investments from one or several of the big foreign companies like Intel (USA), TSMC (Taiwan) and Samsung (South-Korea).<sup>19</sup> Samsung has for example agreed to establish a microchip plant for 17 bn. USD in Texas.<sup>20</sup>

Given the time lag for doubling and upgrading microchip production in the EU, the short-term lack of sufficient supply of microchips for the car industry and other parts of the EU industry will not be fixed until 2022/23. In the longer term, the strategy, including the options outlined here, may contribute to improve the EU's high-tech industrial base and thus contribute to improve long-term digitalization and industrial competitiveness.

Finding the necessary public funds to secure a doubling and upgrade of EU microchip production will not be simple. Neither will discussions amongst Member States about the placement of the production be. But on top of the economic challenges to reestablish an important EU high-tech microchip production come security policy concerns. EU's Foreign Policy chief, Josep Borrell, warns that China's threat against Taiwan is a security risk to the EU, amongst other things due to the role of Taiwan as a microchip producer.<sup>21</sup> The Sino-American "cold tech-war" has already worsened problems of shortage of microchips and other products such as rare metals.<sup>22</sup>

Establishing digital sovereignty together with a cutting-edge microchip production in the EU between now and 2030 will be complicated because it will involve difficult decisions vis-à-vis China on relations with Taiwan, with long-time partners like the US, for example with respect to regulation of the large American tech-giants, and internally amongst Member States with diverging industrial and security policy priorities.

<sup>18</sup> [https://ec.europa.eu/commission/commissioners/2019-2024/vestager/announcements/speech-evp-margrethe-vestager-ku-leuven-ambassadors-lecture-series-transatlantic-relations-post\\_en](https://ec.europa.eu/commission/commissioners/2019-2024/vestager/announcements/speech-evp-margrethe-vestager-ku-leuven-ambassadors-lecture-series-transatlantic-relations-post_en)

<sup>19</sup> Europe is still set on chip sovereignty despite the many challenges it presents, TechMonitor, 20. september 2021 - <https://techmonitor.ai/silicon/european-chips-act-eu-infineon> [og](#) A path to success for the EU semiconductor industry, M. Alexander og T. Kirschstein, Roland Berger, 12. februar 2021 <https://www.rolandberger.com/en/Insights/Publications/A-path-to-success-for-the-EU-semiconductor-industry.html>

<sup>20</sup> Samsung to build \$17 bn. Chip plant in Texas, Financial Times 24. november 2021 - <https://www.ft.com/content/1bdb3163-59ab-4cb4-b3b5-8970a7290b85?segmentId=114a04fe-353d-37db-f705-204c9a0a157b>

<sup>21</sup> Borrell: China's threats to Taiwan pose risk to EU, Politico, 20. oktober 2021

<sup>22</sup> <https://www.bruegel.org/wp-content/uploads/2021/07/PC-2021-17-semiconductors-.pdf>

