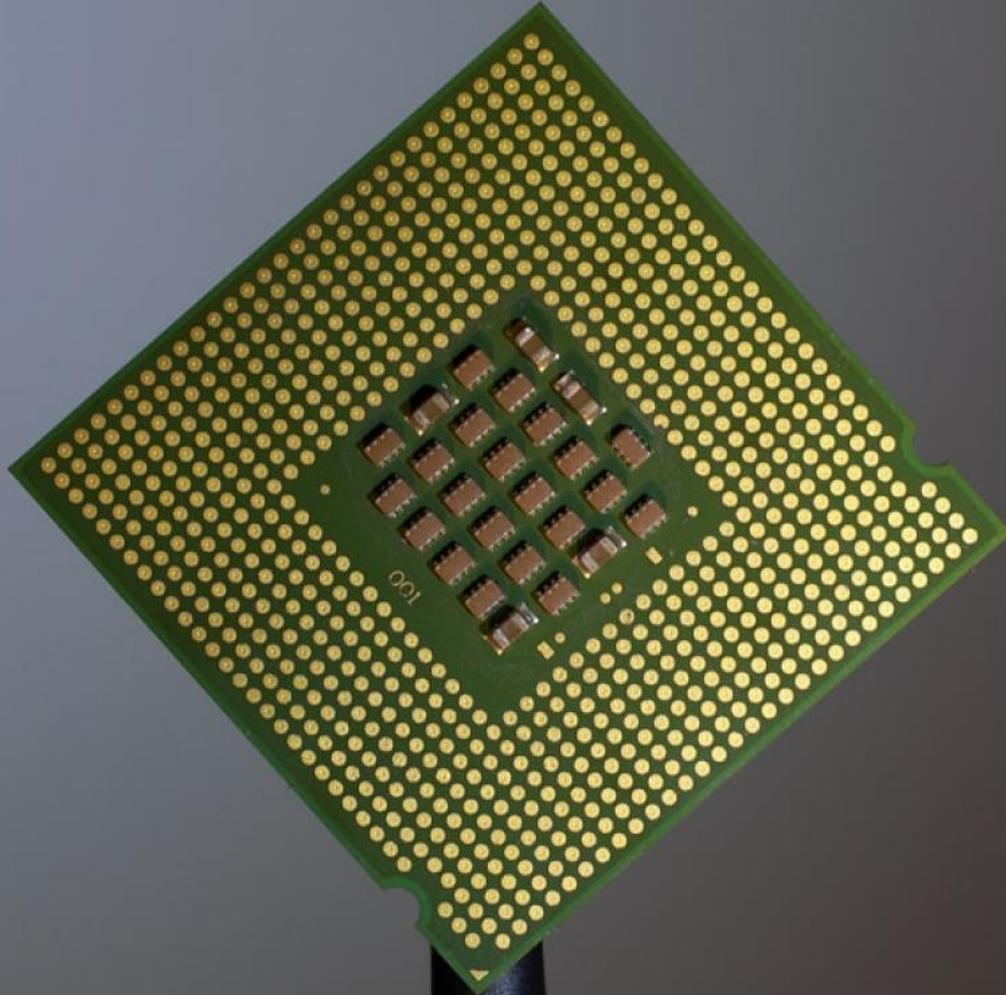# JEDI

TECH & POLICY BRIEFINGS

EU CHIPS ACT:

LET US NOT FIGHT, AGAIN, YESTERDAY'S WAR

MARCH 2022

THE JOINT EUROPEAN DISRUPTIVE INITIATIVE

The Joint European Disruptive Initiative (JEDI) is the European advanced research projects agency (ARPA) with a mission to bring Europe in a leadership position in emerging and breakthrough technologies.

To achieve this goal, JEDI is launching GrandChallenges to push the frontiers of science & innovation, with a radical new method based on purpose-driven research, maximum speed, full focus on excellence, deep interdisciplinarity, and bold 'moonshot' risk-taking.

JEDI aims to provide Europeans and free societies with the means of technological and scientific power, for prosperity and societal resilience. Driven by humanistic values, JEDI is focused on solving major societal challenges of our time (environment, healthcare, digital, education, oceans, space) through innovation.

To be always ahead of the curve, JEDI has developed cutting-edge technology foresight and is actively engaged in high-level tech & policy recommendations.

JEDI is working for the common good, powered by more than 4.600 technology and scientific leaders from academia, industry and deeptech startups in 29 countries in Europe and globally. It is fully independent and financed by engaged foundations, companies, individuals, and public institutions.

THE EUROPEAN ARPA

eurojedi

THE EU CHIPS ACT

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BUILDING EUROPE INTO A SEMICONDUCTOR POWERHOUSE

A LOSING PROPOSITION ?

For Europe, fighting US, China, Korea and Taiwan on advancements in the semiconductor processes and manufacturing is a losing proposition. All these countries have favorable starting positions, a lot of capital and superb operational models that took years to craft (TSMC). Playing their game will cost a lot of money and is unlikely to result in success.

Being a leader in the semiconductor field cannot be improvised, not even by a top-down snap of the fingers of Europe. Europe should rather look at the next disruptions to leapfrog and not playing a catch-up game on the latest node development and a competition on who will pull the biggest paycheck. Europe should also avoid another top-down policy or techno-push, but rather focus on future use case and major societal impact, by looking at semiconductor technology as an enabler of the industries where European companies have intrinsic advantages like automotive, industry or energy. And in

the current geopolitical context, it won't be the US, Taiwan (it's their life insurance), or China that will provide us with the latest technology...

WE ARE OPTIMISTIC, IF...

We are optimistic: Europe has an advantage of being able to create a unified industrial policy that minimizes fighting over standards and maximizes collaboration. It has great technological foundations with world leading entities like ASML, Zeiss, CEA-Leti or Imec. And Europe has another advantage: systems engineering is embedded into European engineering education structures and is practiced pervasively. The American approach of trying and failing quickly does not have a good match with the emerging systems-centric world.

BEYOND THE FAB

We should also not be entirely focused on the Fab –the giant semiconductor fabrication plant, also called foundry- despite the fact that it is the most politically visible: photolithography or

etching is only part of the challenge, we also need the whole ecosystem: design tools (all US today), raw materials, wafer manufacturing, dicing, chip partitioning, heterogenous integration, testing and packaging. A comprehensive strategy is necessary. We should also be pragmatic: the smallest technology node (currently down to 5 nanometers) are only useful/accessible for high-volume products (Qualcomm, Nvidia, Samsung, Intel) and products of a certain complexity. This is where the advanced process gives advantages in terms of consumption or performance – like iPhones - and there is currently no European player that need these chips. Semiconductor manufacturers in Europe such as ST/Infineon/NXP are rather in well mastered technologies for "small" circuits like microcontrollers (or circuits dedicated to radiofrequency or power) and specialize in ASICS (Application Specific Integrated Circuits) that do not require the latest technology node. Good players like Kalray are at best in a niche, and only SiPearl or Graphcore could need advanced technologies for European chips in high performance computing. But a Fab just for these two startups won't be profitable. A Fab that does not run at full volume is extremely expensive while fully loaded foundries can be hugely profitable, as TSMC has shown. Intel has shown it: it is basically a foundry, and all its activity (and its genius), was to organize itself to load its Fab; it was at the beginning memories, then processors and chipsets that go with them.

WISE USE OF TAXPAYERS MONEY

So beyond a long term and ecosystem policy, we also need to be pragmatic:

✍ first ensure that European taxpayer's money is not wasted on current technologies that will be outdated soon just to attract a Fab – we could see how Tesla played that game between different EU countries very well with its Gigafactory that ended up in Berlin: let us not repeat this by entirely subsidizing Intel to build a 5 or 10 nm Fab. We need to make European Fabs profitable, usable by our different industries, while allowing them to differentiate from each other so that they have profitable business models : Europe has done reasonably well so far by having its own, smaller, factories and focusing on niches. Clearly this opens the discussion whether we have too many "smaller" companies in Europe like ST or Infineon – the two together would be in the Top 10 - the US has gone through a consolidation phase, Motorola and many others are no players anymore, and others (IBM) have withdrawn.

✍ We secondly need to invest heavily in research, not through the traditional bureaucratic calls for proposals but through focused, agile and bold programs aiming at achieving real breakthroughs on emerging technologies that could radically disrupt the industry like quantum, photonics, spintronics and neuromorphic computing. By putting the bar very high, focusing entirely on excellence and not on European geographical redistribution, and attracting the best talents globally to run these programs.

✍ Finally let us pay attention to new players like Google (with their TPUs), Amazon or Facebook that are requiring advanced processes: these companies may not build their own foundry, but are able to load a Fab due to their volume.

A GRAND DEAL ?

This could be an opportunity for a truly strategic, grand Deal: we build the Fab in Europe, but with the latest technologies, a deep technology transfer, concrete support of the European ecosystem (suppliers, talents and products): Big Tech platforms, currently under scrutiny in Brussels for their monopolistic behavior, could then demonstrate their goodwill by contributing to increase the number of cutting-edge semiconductor manufacturers based in Europe. Bringing together the energy of Commissioner Breton for industry and Commissioner Vestager for Competition would demonstrate that Europe is not fragmented, is not just pulling the checkbook and talking, but really acting as a true strategic titan.

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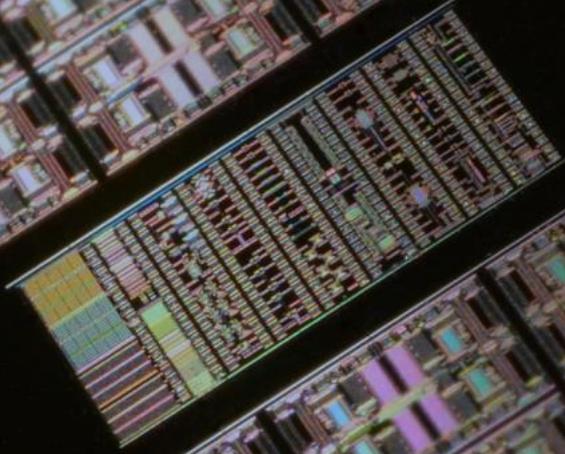
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