

NVIDIA to acquire global leader in technology licensing Arm Ltd. for \$40 billion

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“NVIDIA has a great strategy ahead. We don’t have to buy Arm. I want to buy Arm. The combination is going to be great for the ecosystem.”

- Jen-Hsun Huang, CEO of NVIDIA

Deal Overview

- **Acquirer:** NVIDIA (NVDA)
- **Target:** Arm Ltd.
- **Industry:** Semiconductor Design
- **Transaction Amount:** \$40 billion
- **Date:** September 13, 2020
- **Target Advisor:** Zaoui & Co. (advised SoftBank)
- **Acquirer Advisor:** Morgan Stanley

NVIDIA is the 16th biggest company in the world and is publicly listed on the NASDAQ exchange, with a market cap of around \$550 billion in

September 2021. The company is the world’s biggest developer of GPUs (general processing units) with about 83% of the share in the discrete PC GPU market.

It announced the Acquisition of SoftBank’s ex portfolio company Arm, one of the three biggest CPU-Architecture R&D companies. The deal is a vertical integration acquisition and provides complementation to NVIDIA’s competencies. Under the terms of the transaction, NVIDIA will pay to SoftBank a total of \$21.5 billion in NVIDIA common stock and \$12 billion in cash, with \$2 billion paid at the signing. Additionally, SoftBank may receive up to \$5 billion in cash or common stock under an earn-out construct, subject to satisfaction of specific financial performance targets by Arm. NVIDIA will also issue \$1.5 billion in equity to Arm employees. NVIDIA intends to finance the cash portion of the transaction with balance sheet cash. The transaction does not include Arm’s IoT Services Group. The proposed transaction is subject to customary closing conditions, including the receipt of regulatory approvals for the U.K., China, the European Union, and the United States, which are expected to take approximately 18 months, until March 2022.

Companies Overview – NVIDIA

Co-founded in 1993 by Jen-Hsun Huang, the current president and CEO, NVIDIA originally started in the graphics chip sector. From their original focus on PC graphics, which to this day deliver a fluid experience to millions of gamers, NVIDIA has expanded into other large and important computationally intensive fields.

NVIDIA’s 2021 annual EPS was \$1.73, which is a 52.65% increase from 2020. Their 2021 Revenue was \$16’675 million compared with \$10’981 million

in 2020 and \$11’716 million in 2019. This is also reflected in the rise in the company’s stock price up to \$326.76 per share as of December first 2021. NVIDIA’s research and development expenses for the twelve months ending July 31, 2021, were \$4.590 billion, a 44.2% increase year-over-year. Additionally, NVIDIA is the leader in R&D intensity among the 10 biggest tech companies by market cap with trailing twelve months R&D expenses being 15% of Revenue.

Trailing 12-month R&D expenses as % of Revenue

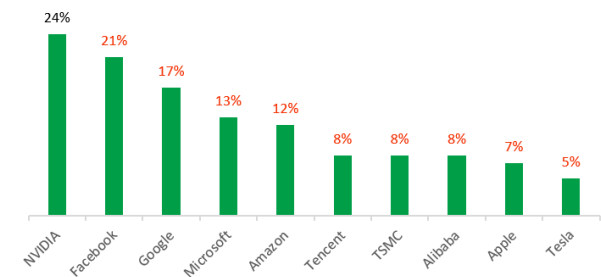


Figure 1: Source: NVIDIA, deal announcement presentation (Own Illustration)

For decades, the CPU was considered the basic unit of computing. The rise of cloud computing and AI services is driving fundamental changes in computer architecture. NVIDIA, therefore, pioneered GPU computing beyond computer graphics and has leveraged its GPU architecture to run deep learning algorithms and to create platforms for artificial intelligence, robotics and augmented virtual reality. The GPUs built on NVIDIA’s CUDA (Compute Unified Device Architecture) model, enables parallel processing capabilities through thousands of computing cores. Building on the acquisition of Mellanox’s world-class networking chip in 2020, NVIDIA is now

additionally pioneering the “BlueField” DPU (Data processing unit), which is designed to increase performance and security in data centers as well as in high-performance computing (HPC) fields such as scientific computing, research, simulations, as well as crypto mining.

The Arm deal is expanding NVIDIA’s capabilities and products. The main goal of the deal is to help build Arm a better and more complex silicon IP, which is demanded by customers and which Arm self-admittingly can’t reach on their own. NVIDIA wants to bring its competencies and infuse its technology into Arm’s headquarters in Cambridge UK. NVIDIA’s current competitors include chip suppliers, such as AMD, Intel, and companies with in-house chip design teams, such as Tesla Motors, Alphabet, and Amazon.

Companies Overview – Arm Ltd.

Arm’s primary business is the development of intellectual property (IP) blocks that are licensed to semiconductor companies. Those clients then combine Arm IP with their IP to create complete chip designs. Arm receives, in turn, an upfront license fee as well as a royalty on every chip that contains its technology.

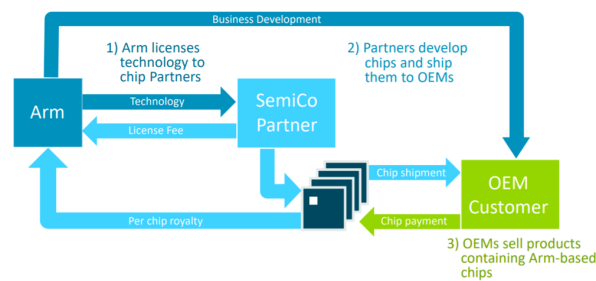


Figure 2: Source: Arm Ltd., Roadshow slides

On 18 July 2016 Japanese telecommunications company SoftBank Group made an agreed offer for Arm, valuing the company at £24.3 billion. The transaction was completed on 5 September 2016. Under SoftBank Arm entered new markets such as 5G networks, cloud computing as well as building new technologies that expanded their reach into data centers, the automotive and networking industries, all while retaining the leadership in mobile. Arm’s main CPU competitors in servers include IBM, Intel, and AMD. Intel competed with Arm-based chips in mobile, but nowadays Arm no longer has any competition in that space. Arm’s main GPU competitors include mobile GPUs from American and Japanese technology companies Imagination Technologies, Qualcomm, and increasingly NVIDIA and Intel. The deal will therefore further consolidate the mobile GPU market.

The number of Arm-based chips shipped continues to accelerate, with more than 100 billion devices shipped over the last five years. Arm’s licensees reported shipments of 25 billion Arm-based chips shipped in 2020, representing the highest-ever number of chips shipped in a year. Arm’s unit shipments increased 12.7% year on year, while shipments by the Arm-relevant part of the semiconductor industry increased 6.7% during the same period. Arm’s Sales increased from \$1719.65 million in fiscal year 2019 to \$1840.53 million in fiscal year 2020. In fiscal year 2020 Net sales increased 6.5% yoy Technology royalty revenue increased 16.7% yoy largely due to the strong ramp in 5G smartphones and networking equipment as well as increased shipments into servers. Technology non-royalty revenue decreased 1.7% yoy. In addition, as Arm continues to enhance its R&D capabilities by hiring more em-

ployees, mainly technology-related personnel. The number of Arm employees at the fiscal year-end increased 7.9% from 5,906 in 2019 to 6,370 in 2020.

State of the Industry – Silicon Design

While the semiconductor industry has achieved great successes in 2021, it also faces significant challenges. Chief among them is a widespread global semiconductor shortage. Unanticipated rising demand for semiconductors needed during the pandemic response, coupled with significant fluctuations in chip demand for other products such as cars, triggered a rippling supply-demand imbalance felt across the world.

Design activity is chiefly knowledge- and skill-intensive, accounting for 65% of the total industry R&D and 53% of the value-added. By far, these represent the highest shares of R&D and value-added of any stage of semiconductor fabrication.

As demand from both consumer and business customers soared in 2020, shareholders in semiconductor companies saw high double-digit returns, despite supply-chain issues and growing divergence in global trade. The global semiconductor market is projected to grow from \$452.25 billion in 2021 to \$803.15 billion in 2028 at a CAGR of 8.6% in this forecast period.

The semiconductor industry is trending toward smaller M&A deals. This trend is mostly caused by the environment being hostile toward bigger deals. For instance, from 2016 to 2018, government intervention and regulatory restrictions led to a 5X increase in transactions that were blocked or lapsed, while global geopolitical tensions in 2018 also contributed to a significant reduction in global M&A transaction value.

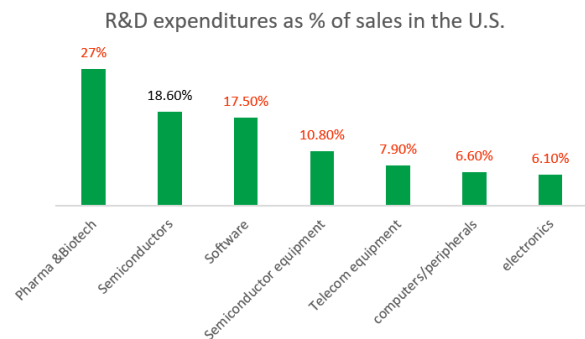


Figure 3: Source: Semiconductor Industry Association[SIA], 2021 report (Own Illustration)

Qualcomm’s recent acquisition of Nuvia for \$1.4 billion is an example of how a smaller player may “develop leading performance as on-demand computing increases in the 5G era.” Furthermore, in highly specialized areas, such as Field programmable Gate Arrays (FPGA) for example, acquiring a company was simply be less costly for AMD than developing the capabilities in-house, despite Xilinx being valued at \$35 billion.

In addition to investing long-term in transformational technologies, semiconductor companies are improving the way they work in a short-term way using M&A to acquire technology capabilities or physical assets that can help them optimize their operations to become more competitive. This includes both internal processes such as performance management and salesperson incentives, as well as structural operations such as real estate footprint and digital marketplaces. For example, like many other high-tech firms, semiconductor companies are moving away from selling chips to selling software-as-a-service and that requires new sales capabilities and tools.

Deal Structure

To get a frame of reference for the acquisition price, we ran a comparable company analysis based on the EV/Sales multiple with financial data from 2020. All the companies included in the analysis are publicly listed and are based in the US. AMD and Intel are not perfectly suited for comparison, because their designs are made for internal use and therefore make up only a part of their businesses. However, they are key competitors in other segments than mobile, which is why we included them. The other peers have been selected because of their reasonable comparable size in terms of EV and Market cap, as well as being increasingly active in the silicon IP market.

Company Name	Market Data		Financial Data				Valuation	
	Price (\$share)	Market Cap (\$B)	EV (\$M)	Sales (\$M)	EBITDA (\$M)	EBIT (\$M)	Earnings (\$M)	EV/Sales
Synopsys	213.86	32	31348	3685	846	632	663	8.5x
Intel	49.82	204	216568	77867	36115	23802	20899	2.8x
Cadence	136.43	38	37473	2583	800	655	591	14.0x
AMD	91.71	110	108340	9763	1681	1369	2485	11.1x
Average same size and stable								
Median								9.8x
Arm Ltd.		40	40365	1207	222	42	-78	33.5x

Figure 4: Source: FactSet, Own Illustration: “Comparable Company Analysis”

The result of our analysis is a significantly higher multiple for Arm compared to the peer average. The price paid, therefore doesn’t reflect the revenue generation. Only looking at the analysis however fails to consider that NVIDIA in this case is not interested in acquiring revenues and customers, but rather its technology and growth and synergy potential, especially in building a platform for developers and locking them into their combined ecosystem.

In the advanced stages of talks before the acquisition, one analyst put the Arm price tag at around \$55 billion. There have been also been rumors at that time that SoftBank might re-IPO Arm with a

\$44 billion valuation before the deal announcement with NVIDIA, which would still be a viable option if the deal won’t get approved by the regulators. Altogether, we consider the high price paid to be relatively fair since the Deal gives NVIDIA another edge solidifying its position as a heavyweight in the semiconductor market with great ecosystem development opportunities.

Potential Risks & Potential Upsides

AI will be fundamentally different. The level of investment that will be needed to lead in AI will be unprecedented and the ubiquity and range of AI workloads demand more diverse and specialized solutions. When training ML-Algo’s you just have two choices: Google or NVIDIA. The problematic thing with Google is that they are themselves a software company that prohibits using their Platforms to build products that compete with Google itself. The NVIDIA NGC catalog, in turn, provides pre-trained models, training scripts, optimized framework containers, and inference engines for popular deep learning models. NVIDIA AI Toolkit includes libraries for transfer learning, fine-tuning, optimizing, and deploying pre-trained models across a broad set of industries and AI workloads. NVIDIA has hundreds of Github repositories covering products, demos, samples, and tutorials to get started, which shows that NVIDIA sees the attraction of developers into their ecosystem as a key opportunity. Furthermore, NVIDIA also tries to push progress in research by partnering up with 5 AI genomics companies and public research institutions and providing them with the fastest custom-built supercomputer in the world, the “Cambridge-1”, which could bring NVIDIA enormous benefits if it accelerates science and generates more demand for HPC. NVIDIA’s

CEO has committed to maintaining Arm's open licensing model. But critics of the deal fear that regulators won't be able to force NVIDIA to remain neutral indefinitely. According to the EU's press release, NVIDIA submitted commitments to try to address some of these concerns, but they were "insufficient to dismiss its serious doubts as to the effect of the transaction", according to the EU. NVIDIA's purchase of Arm sure is taking a while, and the company announced it being unlikely to meet the 18-month regulatory window. Part of the delay with Chinese regulators is NVIDIA's fault. The deal with SoftBank will be void if NVIDIA can't close by the end of 2022. Regulators in Arm's home country, the UK, have national security concerns and are "currently inclined to reject the takeover". Of course, NVIDIA could make some concessions to push the deal through, but according to Bloomberg investors have "low expectations" that the deal will go through.