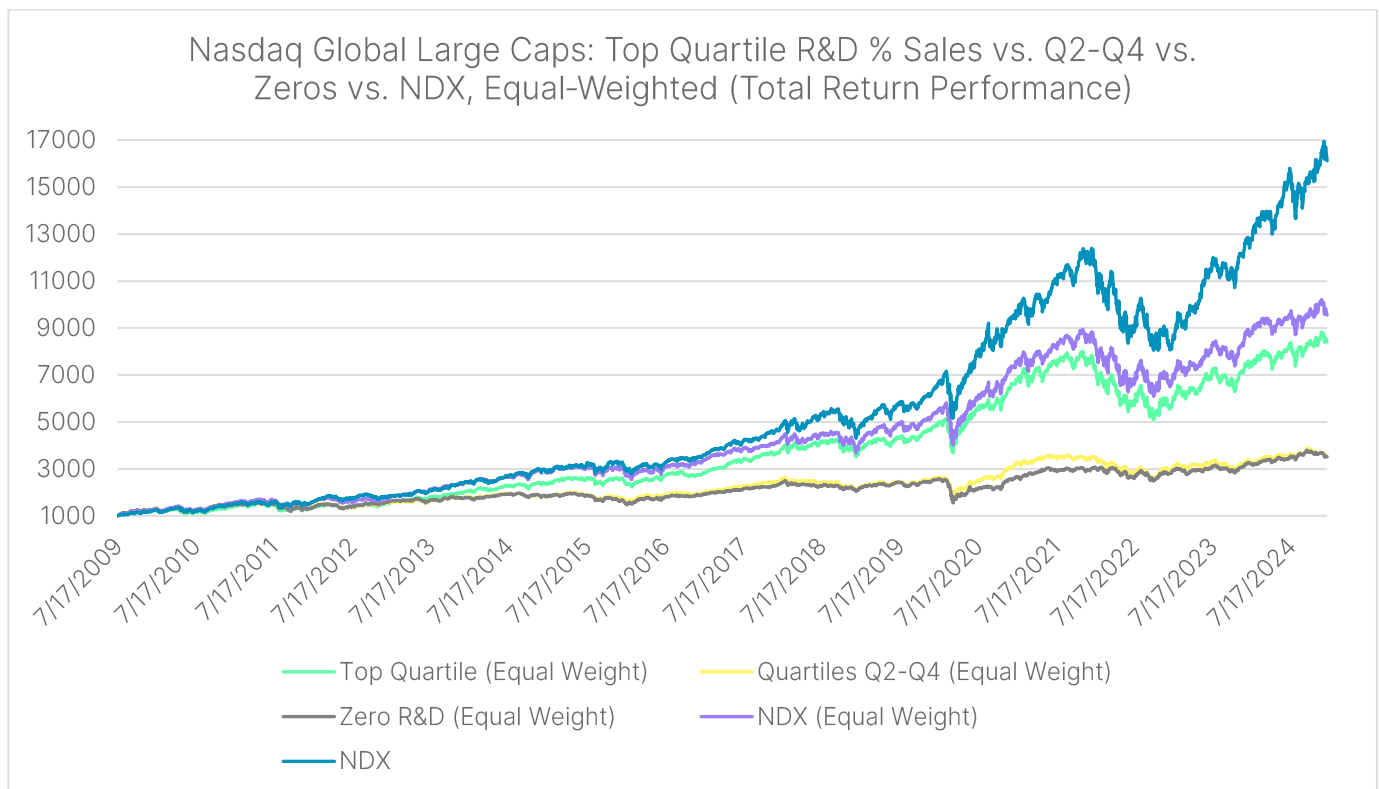


40 Years of Leadership: Nasdaq-100® at the Forefront of Exponential Innovation Age

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The Nasdaq Index Research team attended CES 2025 for a number of reasons, first and foremost to participate in a [research panel with Invesco QQQ](#) and engage with senior leaders from three Nasdaq-100 companies (Arm, Autodesk, Synopsys) on the question of how they approach R&D from a practical and philosophical perspective, and to discuss how they each fit within the emerging AI ecosystem. The discussion was enlightening, and a rare opportunity to hear directly on a recurring topic for investors tracking the Nasdaq-100 (NDX®): what is enabling the index to generate such an impressive track record of outperformance over an extended time horizon? Is it eventually due for a multiyear period of underperformance? Are the past 15-20 years an anomalous market cycle, in terms of technology companies' ability to grow faster than other segments of the market?

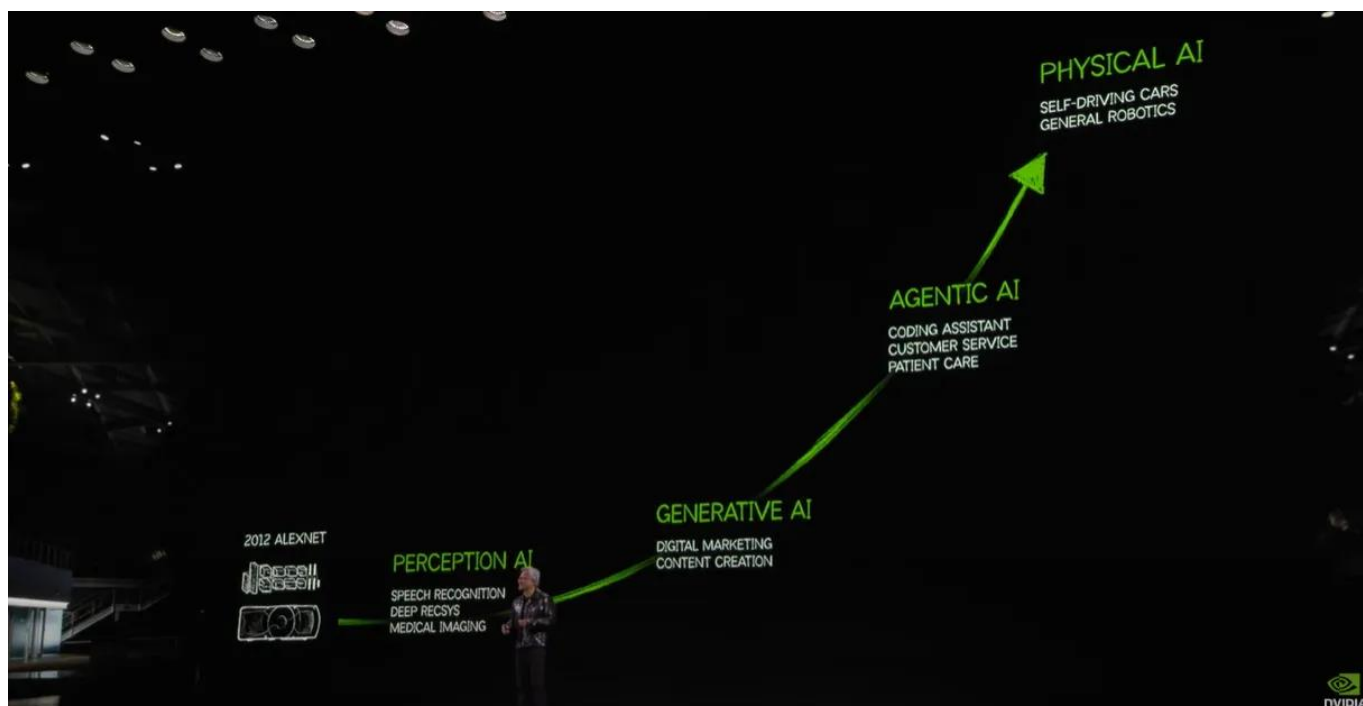
The answers are unlikely to be 100% ironclad, but by working to quantify the level of innovation in the index, one is tempted to arrive at a simple conclusion: in the 21st century, innovation – proxied by R&D spending and patent filings – is what disproportionately drives growth at both the individual company and economy-wide level; sustainable, innovation-driven growth is creating better fundamental outcomes for the companies leading in this race; and better fundamentals ultimately lead to superior performance in the equity market.



Source: Nasdaq, Factset, Nasdaq AI Team, IPR Strategies as of 12/31/2024. Index data as of each year-end from 12/31/2008 to 12/31/2023. Companies are ranked on prior full-year R&D expense as % of Sales on a 6-month lag (June 30) to allow for disclosure of reported financials. Baskets rebalanced annually 3rd Friday of July, beginning July 17, 2009. Values rebased to 1,000.

The underlying story for the rise in the Nasdaq-100 is that economic growth has shifted from capital-intensive, traditional industries to the “new-economy” sectors (Technology, Consumer Discretionary, & Healthcare) that are increasingly driven by R&D spending. By creating equally-weighted portfolios of global large caps – splitting up the top quartile of R&D spenders (as a % of revenue) vs. the bottom three quartiles vs. non-spenders – we can see above that since the Financial Crisis, the top R&D spenders have accelerated away from the rest, producing a total return of 741% from July 2009 – December 2024. Incredibly, there is no statistically significant performance differential between the bottom three quartiles of R&D spenders vs. the non-spenders, which produced total returns of 256% and 252%, respectively. The top quartile of R&D spenders reinvest ~5-6x more as % of Sales vs. Quartiles 2/3/4, illustrating how only the most intensely committed innovators accrue the most value in the new global economy. The Nasdaq-100 is home to many of these R&D champions, and its equal-weighted version produced an even better return vs. the top quartile, up 855%. The Nasdaq-100 Index® itself, which uses modified market cap weighting, has been accelerating away from the equal-weighted version over the past five years, up 1,512% for the full period studied.

With a market cap now exceeding \$3.0 trillion, Nvidia has earned its reputation as one of the undisputed leaders in innovation driving AI-related technologies forward with its cutting-edge GPUs (graphic processing units), as well as its proprietary parallel computing platform and application programming interface, CUDA. CEO Jensen Huang’s [keynote address at CES 2025](#) outlined just how quickly things are moving and how much further they will likely go in the coming decade. He highlighted the recent progress of AI from Generative (ChatGPT, Google’s Gemini, Meta’s Llama) to Agentic, and then on to Physical. The world is now entering the Agentic stage, during which AI will be able to deliver knowledge-based services via AI “Agents” to complement, or in some cases completely supplant, human-based knowledge work. Physical AI is not far behind, which will usher in the era of fully self-driving cars and AI-enabled robots, automating much of humanity’s physical labor needs. The fact that the Nasdaq-100 includes all eight of the largest tech/tech-adjacent companies listed in the US – all of whom are leading, in some way, the massive new secular growth theme of AI – positions the index for a continuation of its success throughout most of this decade and into the next. Not to mention, outside of those eight NDX megacaps exist a plethora of other innovation champions in areas as varied as enterprise software, semiconductor design, entertainment (streaming/gaming/media), fintech, biotech, cybersecurity, clean energy, and future mobility, many of whom are continually disrupting older incumbents residing in other large cap equity indexes.

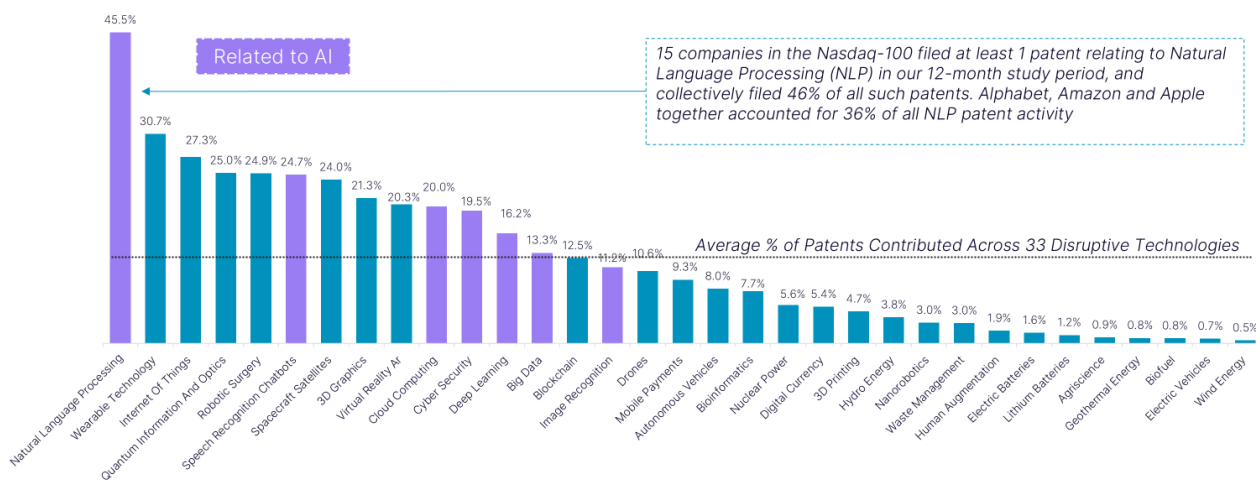


Source: Medium.com

If we look at another form of quantifying innovation through the analysis of patent filings, we see a similar story reinforcing the dominance of NDX companies in the AI race. Among more than 18,000 public companies globally for which we have data coverage, nearly 50% of all patents relating to Natural Language Processing (NLP), a foundational AI technology, were filed by Nasdaq-100 companies in the last 12 months. One out of every four patents relating to Speech Recognition, one of five relating to Cloud Computing or Cybersecurity, one of six relating to Deep Learning, and one of nine relating to Image Recognition came from the Nasdaq-100. That is a tremendous level of *innovation concentration* taking place within an index that tracks only about 0.5% of publicly traded companies around the world. Over the past nearly two decades, NDX companies have been growing the value of their patent portfolios at nearly three times the rate of other US companies, as well as any other companies based outside the US. They've achieved that patent dominance by consistently investing an order of magnitude more into R&D spending (>10x in total dollar amounts, 7x when normalized as a % of sales) year after year compared to their large cap peers in the US.

Disruptive Technology and R&D: Nasdaq-100

- 63 companies in the Nasdaq-100 (representing 79% of index weight) filed patents across one or more of 35 key areas of Disruptive Technology such as Artificial Intelligence, over the last 12 months



Source: Nasdaq, Patent data as of 11/29/2024. Index data as of 12/31/2024.

To be clear, while the NDX megacaps have certainly been leading the charge in terms of *total R&D spending* in recent years, the *R&D reinvestment rate* across the entire index is impressive, too. Qualcomm is a great example, taking 17-19% of its revenues in 2023/2024 and reinvesting back into R&D efforts. With its leading position in designing semiconductors for smartphones and other devices, it was no surprise to see multiple exhibitors at CES 2025 running their AI products on Qualcomm chips like the Snapdragon 8 Elite.



Qualcomm's "Patent Wall" at Global Headquarters

2nd Most Valuable Patent Portfolio (>18,000 public companies) based on data from IPR Strategies

Patent filings in 20 of 35 Disruptive Tech sub-themes

Filed approximately one out every six patents in Spacecraft/Satellites, as well as Internet of Things, in last 12 months

20th largest company by weight in NDX as of 12/31/24

The shift in economic value tied to intangible assets (i.e. intellectual property) vs. tangible assets (physical property) has been profound over the last several decades. In the mid-1970s, perhaps 15-20% of the value of large cap US companies was tied to intangibles; nowadays it's as much as 90% of their value.¹ The reversal has been led by Nasdaq-100 megacaps like Apple, Alphabet, Amazon, Broadcom, Meta Platforms, Microsoft, Nvidia, and Tesla. Consider how profoundly disruptive Alphabet (Google) has been to the media & advertising industries, given its relatively short history as a public company since 2004; it generated \$238 billion in ad revenue in 2023, and its share of the global market is in the range of 30-40%. Consider Amazon's disruption of brick & mortar retail, first in the US and now expanding globally; or Amazon Web Services' (AWS) disruption of the legacy IT industry that was fully run on-premises for decades and is now shifting to the cloud. Consider Apple's ability to accrue more than 80% of global smartphone profits, or Nvidia's estimated 90% share of the global GPU market. These are but a few highlights tied to the disruptive wave of innovation that arose from first-generation computing and internet technology, which in turn found incremental growth drivers with the rise of smartphones and social media platforms. Then, consider how relatively *undisruptive* the internet has been, at least from the perspective of displacing jobs; indeed, it has been a net *job creator* to the tune of 17 million jobs in the US alone, as of 2021².

The power and promise of AI is that, while it may be profoundly disruptive to industries as diverse as [transportation](#) – a traditionally blue-collar industry which employs 3.6 million truckers alone in the US, and [Wall Street](#), along with other white-collar industries that are knowledge work-intensive – it has the potential to [create millions more jobs than it displaces](#), and along with it, new economic surpluses that will grow aggregate global wealth. While many companies who adopt AI will benefit in the form of higher productivity, faster revenue growth, and/or increased profitability from declining cost structures, those who stand to benefit the most *should be* the ones delivering the core AI “stacks” such as the major semiconductor players (Nvidia & runner-up AMD for GPUs, Intel/Arm for CPUs, Micron for high-bandwidth memory, Synopsys for electronic design architecture); the “hyperscalers” i.e. leading cloud computing platforms (Microsoft Azure, Amazon Web Services, Google Cloud); the AI model developers (Meta's open-source Llama, Google's Gemini, Microsoft by way of its stake in OpenAI, Amazon by way of its stake in Anthropic); and the AI-native application builders (all of the above, plus early leaders like Adobe & ServiceNow). These are all NDX companies, and each reinforces the thesis that the index is one of the premier, diversified large cap benchmarks to track the leading AI ecosystem players in the US (and a few outside the US, like Europe's Arm, ASML, & NXP).

The age of exponential innovation is upon us. For 40 years since its launch in 1985, the Nasdaq-100 has proven to be one of the preeminent indexes to track the pioneers of technological innovation, through first-generation computing, the rise of the Internet, mobile phones & broadband, social media, smartphones, cloud computing, and finally AI. Over its four decades-long existence, NDX has generated annualized returns in excess of 14% – an incredible feat that compounds to a cumulative 20,000% as of year-end 2024. Whereas the champions of the 20th century economy were often tied to physical assets – and rode the economic growth coattails of globalization, accelerated population growth, and financialization – the champions of the 21st century are, almost without exception, fueled by achievements in the realm of intellectual property. And in the face of the recent trends of de-globalization, slowing population growth (or outright contraction), and redirected investment flows, the global economic pie would likely shrink if not for the ability of technological innovation to generate economic value-add through its unique advantages in producing exponential growth with declining cost curves (e.g. Moore's Law, Kryder's Law), as well as its inherent scalability (e.g. network effects, Metcalfe's Law).

One of the burning questions among investors in recent years has been: can the Nasdaq-100 megacaps continue to outperform, and for how much longer? [An advantage in scalability](#) seems to suggest that they can. And with a combined R&D budget estimated at nearly \$300 billion in 2025, the eight NDX megacaps are signaling that they think they can, too. But it is worth remembering that names like Nvidia, Broadcom, and Tesla were not considered megacaps until fairly recently. Which other companies may join the ranks in the coming years? If history is a guide, the odds are strong that most, if not all of them, will emerge from the remainder of the Nasdaq-100.

Sources: Nasdaq Global Indexes, FactSet, Bloomberg, Nasdaq AI Team, IPR Strategies.

¹ <https://anderson-review.ucla.edu/boom-of-intangible-assets-felt-across-industries-and-economy/#:~:text=Back%20in%201975%2C%20intangible%20assets,S&P%20500%20by%20market%20capitalization.>

² <https://www.iab.com/news/study-finds-internet-economy-grew-seven-times-faster/>

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