

The Evolution of NYGBIG: A Deep Dive into the July 2026 Reconstitution and Methodology Enhancements

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At a Glance:

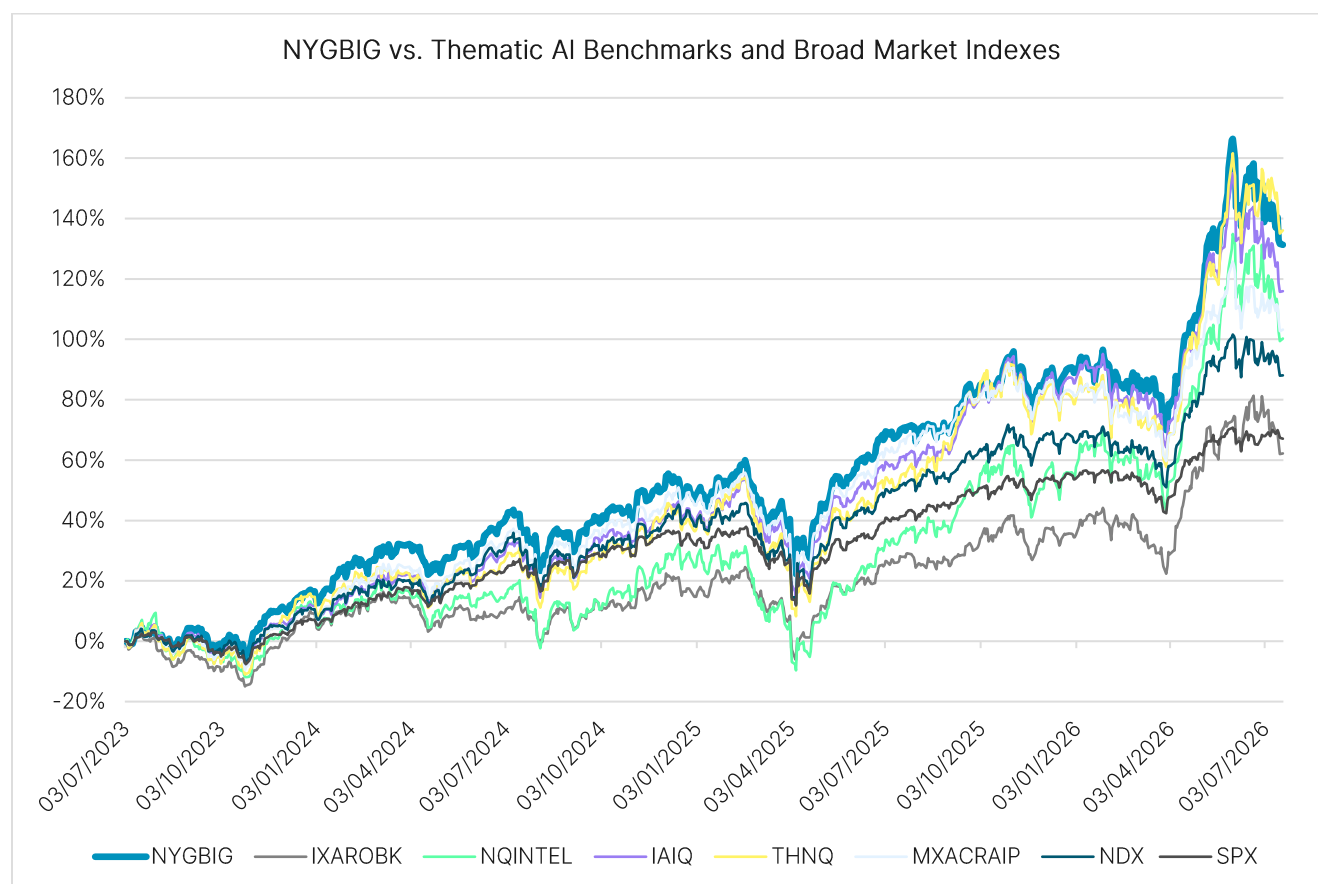
- The Nasdaq Global Artificial Intelligence and Big Data™ Index's (NYGBIG™) patent-driven approach has continued to identify companies at the forefront of AI innovation, contributing to strong long-term performance.
- Since launch, the index has returned approximately 384% (22.8% annualized), while generating 143.5% (33.9% annualized) since July 2023, outperforming several AI-focused benchmarks.
- The July 2026 methodology enhancements broadened the innovation opportunity set through a two-year patent assessment window, an expanded eligible universe (including eligible China A-Shares accessible through the Shanghai-Hong Kong and Shenzhen-Hong Kong Stock Connect programs), the introduction of Quantum Computing as a new sub-theme, and a more responsive IPO inclusion process.
- The July 2026 reconstitution resulted in 35 additions and 25 deletions, reflecting the broader opportunity set created by the methodology enhancements. New additions included established innovators such as Walmart and AMD, as well as pure-play quantum computing companies including IonQ and QuantumCTek.

Since its launch, the Nasdaq Global Artificial Intelligence and Big Data™ Index (NYGBIG™) has been designed to identify companies at the forefront of technological innovation through a patent-driven approach. As innovation cycles continue to accelerate and new technologies emerge, thematic index methodologies must evolve to ensure they remain aligned with the most relevant sources of future growth.

The effectiveness of this approach has been reflected not only in the index's ability to identify innovative companies, but also in its long-term performance. Since its launch on November 12, 2018, NYGBIG has delivered a total return of approximately 384% (22.8% on an annualized basis).¹

¹ Bloomberg. Data as of July 20, 2026

This pattern of outperformance has continued throughout the recent AI-driven investment cycle. Since July 2023, NYGBIG generated a total return of 139% (33% on an annualized basis), outperforming the Nasdaq-100®, broader U.S. equities, and several established AI benchmarks.²



Source: Bloomberg. Cumulative USD Price Performance. Data from July 3, 2023 to July 20, 2026

IXAROBK = Stoxx Global Automation and Robotics Index, NQINTEL™ = Nasdaq CTA Artificial Intelligence™ Index, IAIQ = Indxx Artificial Intelligence & Big Data Index, THNQ = ROBO Global Artificial Intelligence Index, MXACRAIP = MSCI ACWI IMI Robotics & AI Index, NDX® = Nasdaq-100®, SPX = S&P 500

While these results highlight the effectiveness of NYGBIG's patent-driven framework, the overarching goal of maintaining exposure to the most innovative companies within a rapidly evolving investment theme invites periodic opportunities for the methodology to evolve alongside the technology landscape. The July 2026 enhancements were therefore designed to strengthen the index's ability to identify companies demonstrating sustained innovation, broaden exposure to emerging technologies, and enhance the index's representation of the global innovation landscape. Collectively, these enhancements reinforce NYGBIG's objective of providing systematic exposure to companies driving innovation across artificial intelligence.

² The analysis period begins on July 3, 2023, to ensure consistent data availability across all indexes, including the Stoxx Global Automation and Robotics Index

Key Methodology Enhancements

The July 2026 reconstitution introduced a number of methodology enhancements. Key changes are summarized below. For more information, please refer to the [index methodology](#).

1. Strengthening the Measurement of Innovation: A Two-Year Patent Assessment Window

Effective with the July 2026 reconstitution, NYGBIG now evaluates companies using a rolling two-year patent dataset rather than a single year of patent activity. While patent activity can fluctuate from year to year due to filing schedules, research cycles, or the timing of patent approvals, innovation leadership is typically built over longer periods.

By extending the observation period, the methodology seeks to provide a more comprehensive view of a company's ability to consistently generate intellectual property and may help identify businesses contributing to long-term technological advancement.

2. Broadening Security Eligibility

Eligible securities are now required to be constituents of the Nasdaq Global Disruptive Technology Benchmark 2™ Index (NYDTB2™), replacing the previous reference universe.³

In addition to screening all securities in the Nasdaq Global™ Index and any others listed on major U.S. exchanges, the NYDTB2 universe may now also incorporate eligible China A-Shares accessible through the Shanghai-Hong Kong and Shenzhen-Hong Kong Stock Connect programs. As a result, the updated framework broadens the universe from which constituents may be selected and enhances the index's ability to capture innovative companies across global technology markets.

3. Expanding the Innovation Universe: Introducing Quantum Computing

As the technology landscape evolves, the July 2026 methodology update introduces Quantum Computing as a dedicated sub-theme within NYGBIG's innovation framework. The addition reflects growing research activity and investment across quantum technologies, as well as their increasing overlap with artificial intelligence, advanced analytics, and next-generation computing applications.

By incorporating Quantum Computing, the index expands its coverage of emerging technologies and further strengthens its focus on identifying companies operating at the forefront of innovation. The introduction of quantum computing is discussed in greater detail in [Expanding the Innovation Frontier: Introducing Quantum Computing as a New Sub-Theme](#).

4. Enhancing Index Responsiveness: New IPO Addition Policy

To improve the index's ability to reflect developments across the innovation landscape, the methodology now allows qualifying initial public offerings (IPOs) to be added between semi-annual reconstitutions and rebalancing.⁴ Under the updated methodology, qualifying IPOs can be

³ Nasdaq Global Disruptive Technology Benchmark™ Index (NYDTB™)

⁴ NYGBIG is reconstituted and rebalanced on a semi-annual basis in January and July. During each review, all eligible securities are reassessed against the index's selection criteria. The constituent selection process is applied using data as of the end of November for the January review and the end of May for the July review.

considered for inclusion through dedicated review windows in April and October, rather than waiting for the next scheduled semi-annual reconstitution.⁵

This enhancement reduces the lag between a company's public listing and potential index inclusion, helping ensure that emerging innovators can be reflected in the index more quickly following their entry into public markets.

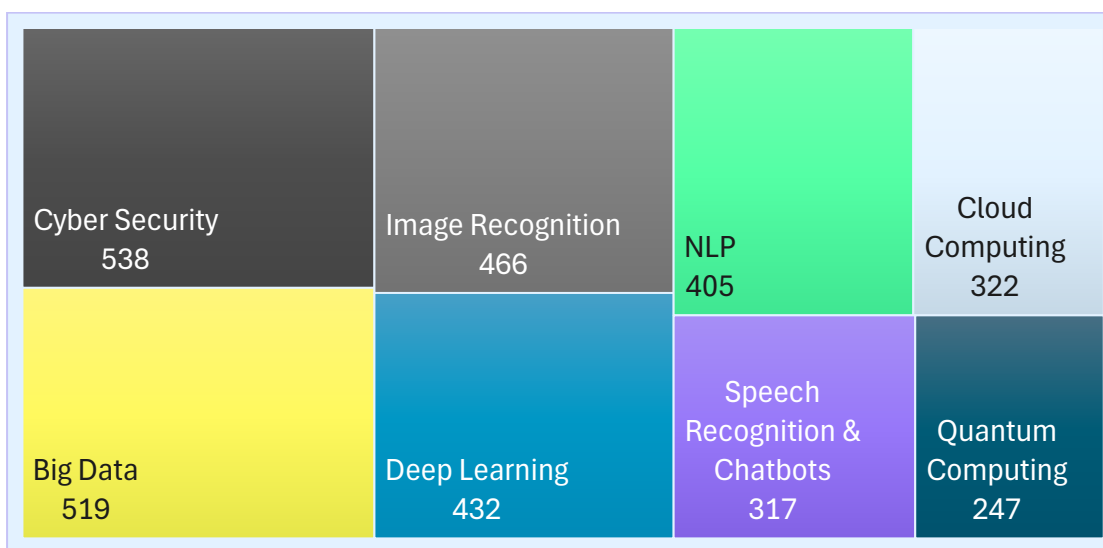
July 2026 Reconstitution Deep Dive

NYGBIG's patent-driven selection process begins with the Nasdaq Global Disruptive Technology Benchmark 2™ Index (NYDTB2™), a broad universe of companies with patent activity across 39 disruptive technology themes, including artificial intelligence, robotics, automotive innovation, healthcare innovation, new energy & environment, electrification, the Internet of Things, future mobility, and data computing & processing. As of the July 2026 reconstitution, this universe comprised 3,286 securities.

1. A Patent Lens on AI & Big Data Exposure

Within this broader universe, 1,181 companies held patents related to one or more NYGBIG sub-themes.

NYGBIG Eligible Constituents (1,181):



Source: Nasdaq. Patent data as of May 31, 2026. Note - the totals shown for each patent sub-theme are not mutually exclusive and therefore do not sum to the total number of patent-active companies. A company may exhibit patent activity across multiple sub-themes and can therefore be counted more than once.

⁵ To be eligible, a company must satisfy the index's security eligibility criteria as of the last trading day of February or August, be included in NYDTB2 effective at the market open on the first trading day following the third Friday of April or October, respectively, and have a float-adjusted market capitalization of at least \$25 billion. If selected, an IPO is added at the market open on the first trading day following the third Friday of April or October. Its initial weight is determined based on float-adjusted market capitalization, subject to a maximum weight of 4.5%, with existing constituent weights adjusted pro rata to accommodate the new addition.

Patent activity was distributed across a broad range of AI and data-driven technologies, highlighting the diversity of innovation within the eligible universe.

Cyber Security and Big Data represented the largest pools of patent-active companies, reflecting the growing importance of securing and managing increasingly complex data ecosystems. Deep Learning, Image Recognition and NLP also exhibited significant patent activity, underscoring their role as foundational technologies underpinning many AI applications.

By contrast, Quantum Computing was associated with 247 companies - smaller than more established AI sub-themes - but still representing a meaningful level of innovation activity. This suggests that while quantum technologies remain at an earlier stage of commercial adoption, a growing number of companies are investing in the area, supporting its inclusion as a dedicated sub-theme within the NYGBIG framework.

While innovation activity spans a broad range of technologies, it is considerably more concentrated from a geographic perspective. China, the U.S., and Japan collectively account for approximately 77% of all patent-active companies identified across NYGBIG's AI & Big Data sub-themes, highlighting their central role in the development of next-generation digital technologies.

China, which represents the largest country exposure within the patent universe with 399 companies, exhibits particularly strong activity in Big Data, Image Recognition and Cyber Security.

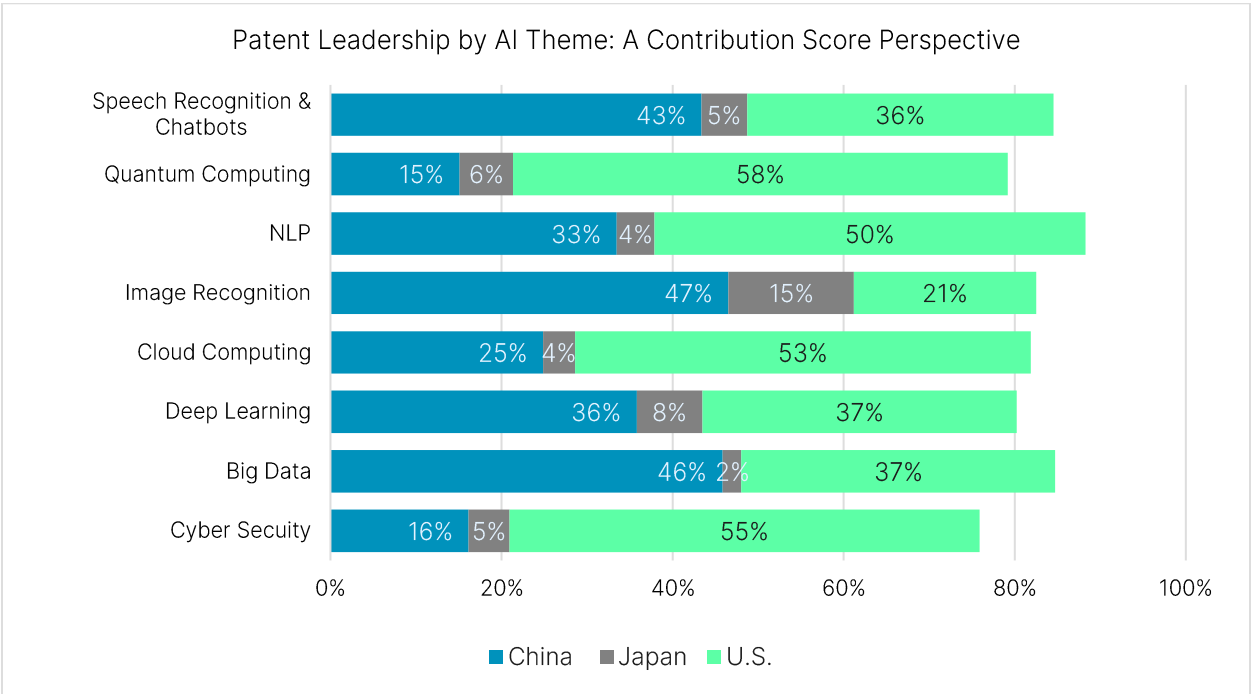
The U.S., with 369 patent-active companies, shows the greatest concentration in Cyber Security, Big Data, NLP and Deep Learning.

Japan, the third-largest market with 138 companies, demonstrates a more balanced distribution of patent activity, with Image Recognition, Cyber Security, Deep Learning and NLP representing the largest areas of innovation.

	# Patent-active companies	Deep Learning	Image Recognition	NLP	Speech Recognition & Chatbots	Big Data	Cloud Computing	Quantum Computing	Cyber Security
China	399	118	159	118	110	199	99	65	151
U.S.	369	144	127	150	95	181	135	82	203
Japan	138	52	72	52	42	41	29	36	55
Total # companies		432	466	405	317	519	322	247	538

Source: Nasdaq. Patent data as of May 31, 2026. Note - the totals shown for each patent sub-theme are not mutually exclusive and therefore do not sum to the total number of patent-active companies. A company may exhibit patent activity across multiple sub-themes and can therefore be counted more than once.

While the previous analysis highlights the geographic distribution of patent-active companies across the three largest innovation hubs, it does not indicate the relative level of innovation activity occurring within each market. To gain additional insight, we examine contribution ratios across China, the U.S., and Japan.



Source: Nasdaq. Patent data as of May 31, 2026

A company's contribution score measures its relative importance within a given technology area by assessing its share of recently filed approved patents compared with other companies active in the same sub-theme. Higher scores indicate a greater contribution to overall innovation activity within that field.

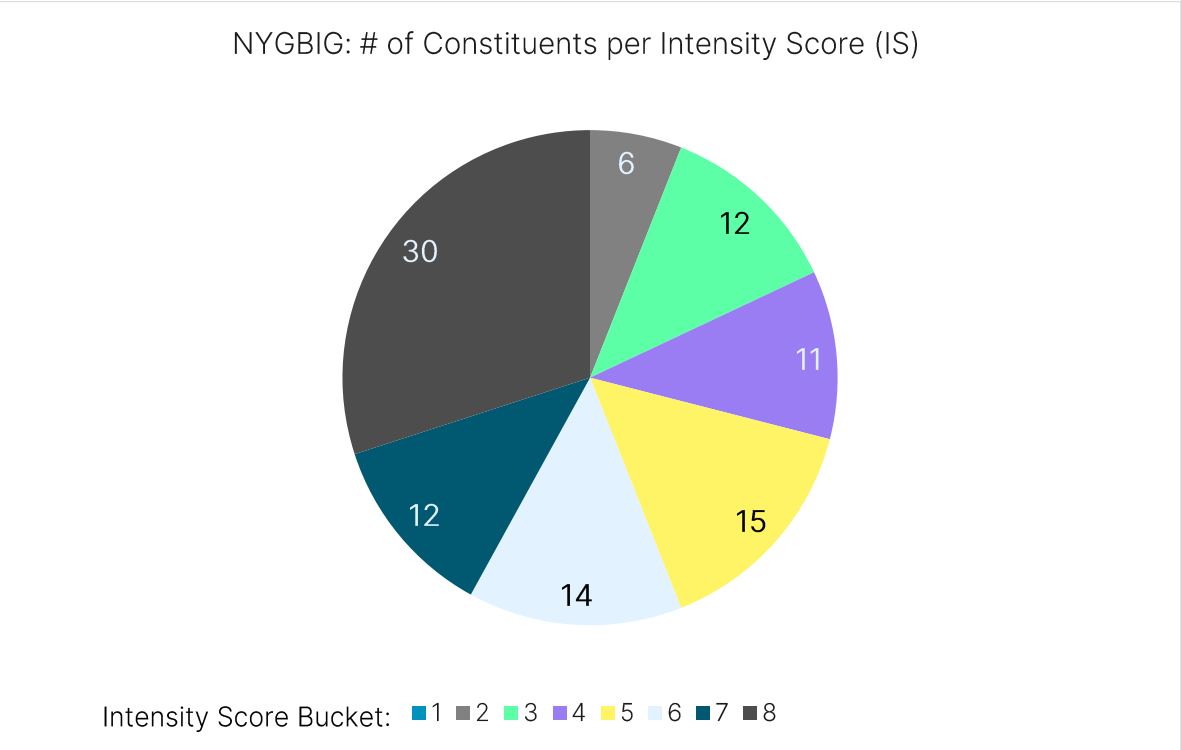
Aggregating these scores by country reveals that U.S. companies account for the largest share of contribution scores across most AI categories, including Cyber Security, Cloud Computing, Quantum Computing and NLP. China also represents a significant share of contribution scores, particularly in Big Data, Image Recognition, Speech Recognition & Chatbots and Deep Learning, while Japan maintains a smaller but broadly diversified presence across multiple AI themes.

These findings highlight the distinction between participation and contribution. China represents the largest pool of patent-active companies within the universe, while U.S. companies account for a larger share of contribution scores across several AI & Big Data sub-themes.

2. Measuring Breadth of Innovation: Intensity Score

A useful way to deepen the patent discussion is to introduce the Intensity Score, which provides a useful lens for assessing the breadth of patent activity across NYGBIG constituents. The Intensity

Score measures the number of sub-themes (i.e. relevant technologies with patent filings) with a level of involvement (max score = 8, min = 1).



Source: Nasdaq. Patent data as of May 31, 2026.

Note: The intensity score is based on the number of sub-themes in which a company demonstrates relevant patent activity across the initial universe. It does not reflect the number of sub-themes for which a company meets the minimum contribution and purity score thresholds used in the constituent selection process.

Under the July 2026 framework, the maximum score increased to 8, following the addition of Quantum Computing as a new sub-theme. Of the 100 index constituents, 94 have patent activity spanning at least three sub-themes, while 71 score five or higher. Notably, 30 constituents achieved the maximum score of 8, indicating patent activity across all AI & Big Data sub-themes. Examples of companies achieving the maximum score include Walmart, China Tower Corporation, Bank of America and Alibaba Group.

These results suggest that the index is not only capturing companies with exposure to individual technologies, but also businesses whose innovation activity spans multiple areas of artificial intelligence, data infrastructure and advanced computing.

Having examined the innovation universe that underpins NYGBIG's selection process, the next step is to evaluate how NYGBIG's patent-driven selection framework - including the July 2026 methodology enhancements - translated these insights into the final index portfolio.

3. Key Changes Following the July 2026 Reconstitution

The July 2026 reconstitution resulted in 35 additions and 25 deletions, reflecting the broader opportunity set introduced through the methodology enhancements and the updated NYDTB2 universe.

The additions were geographically diverse, with both China and the United States contributing 13 new constituents. However, the portfolio impact of these additions differed significantly. While the Chinese additions represented approximately 1.57% of aggregate index weight following the reconstitution, the U.S. additions accounted for roughly 10.75% of index weight, highlighting the influence of larger-cap U.S. companies within the final portfolio.

Among the most significant additions were Walmart and Advanced Micro Devices (AMD), both of which entered the index's top 10 holdings following the July 2026 reconstitution. Deep Learning was identified as Walmart's primary sub-theme, while Quantum Computing was identified as AMD's primary sub-theme.

The introduction of Quantum Computing as a dedicated sub-theme was reflected through the addition of pure-play quantum technology companies such as IonQ and QuantumCTek, alongside companies including Cambricon Technologies and Macronix International, which hold relevant patent activity within the quantum computing landscape.⁶

4. The Final Index Portfolio

The top 10 constituents comprise approximately 47% of the index weight and provide insight into the types of companies identified by NYGBIG's patent-driven framework. Apple, Meta Platforms, Microsoft, Amazon and Nvidia represent the five largest positions, while Walmart, Alphabet, Cisco Systems, Advanced Micro Devices (AMD) and Bank of America complete the top 10 holdings.

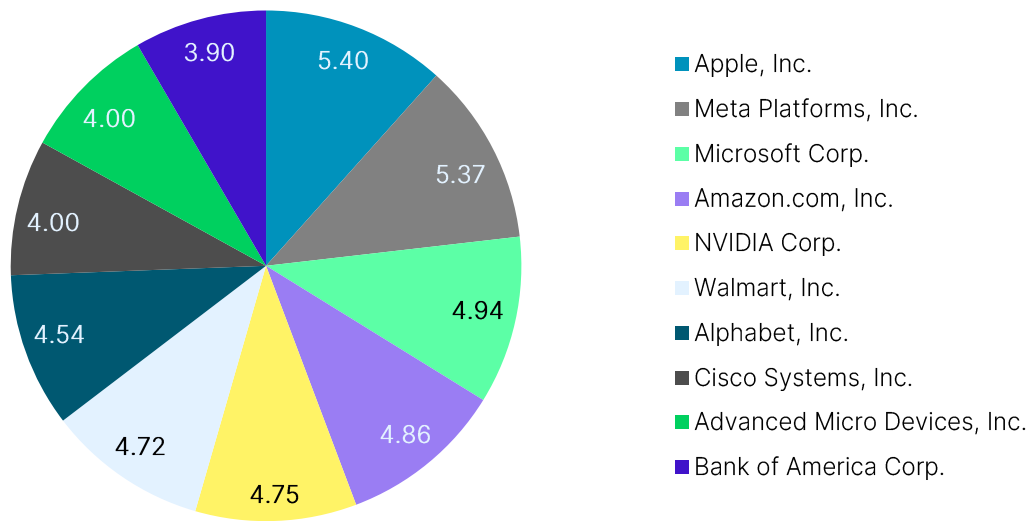
The composition of the top 10 reflects the diverse range of industries participating in the AI and Big Data ecosystem. While technology companies account for the majority of the largest positions, the presence of Walmart and Bank of America highlights how AI-related innovation increasingly extends beyond traditional technology businesses into sectors such as retail and financial services.

Performance among the top 10 holdings varied considerably. AMD was the strongest performer, gaining 77% in 2025 and a further 135% YTD in 2026. Cisco Systems also generated notable returns of 44% YTD, while Alphabet and Nvidia were among the strongest performers in 2025.⁷

⁶ Quantum Computing was identified as their primary sub-theme.

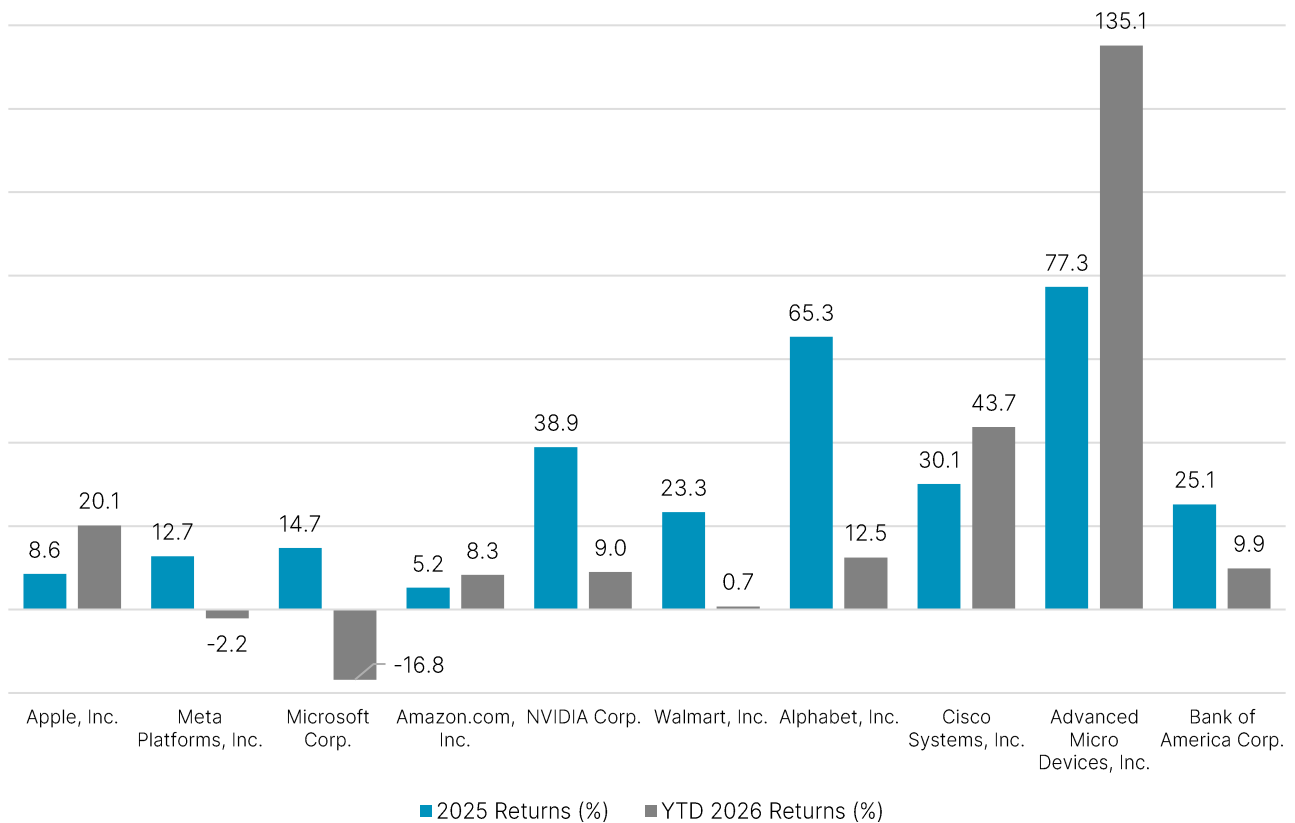
⁷ FactSet. Data as of July 20, 2026

Top 10 Index Weights as of July 20, 2026 (%)



Source: Nasdaq. Data as of July 20, 2026

Top 10 Index Weights: YTD'26 vs. FY'25 Returns (%)

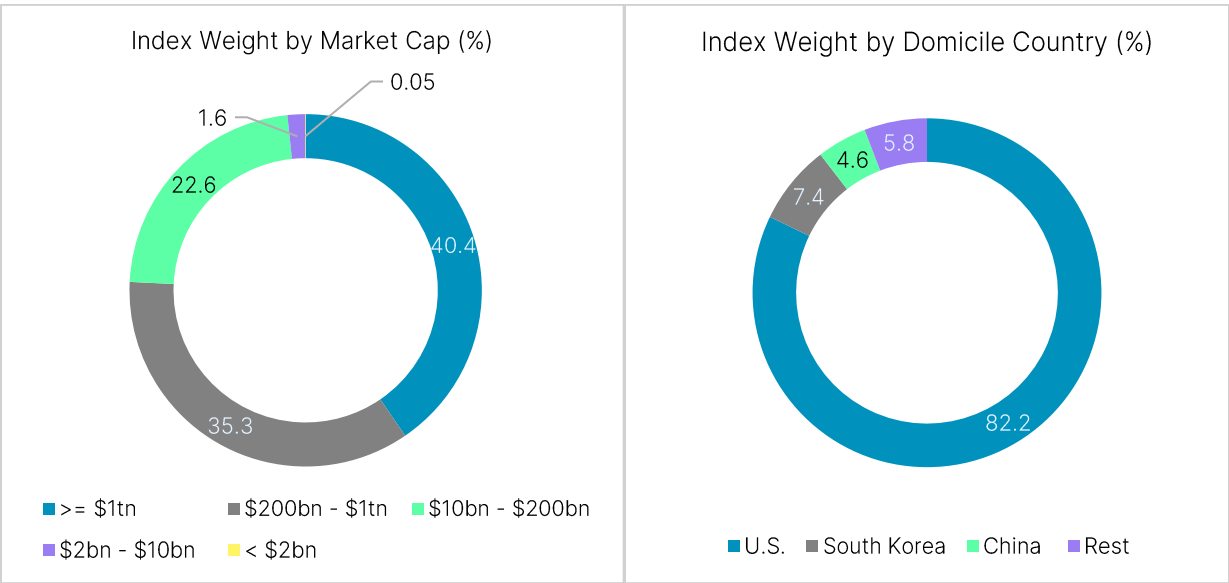


Source: Nasdaq, FactSet. Data as of July 20, 2026

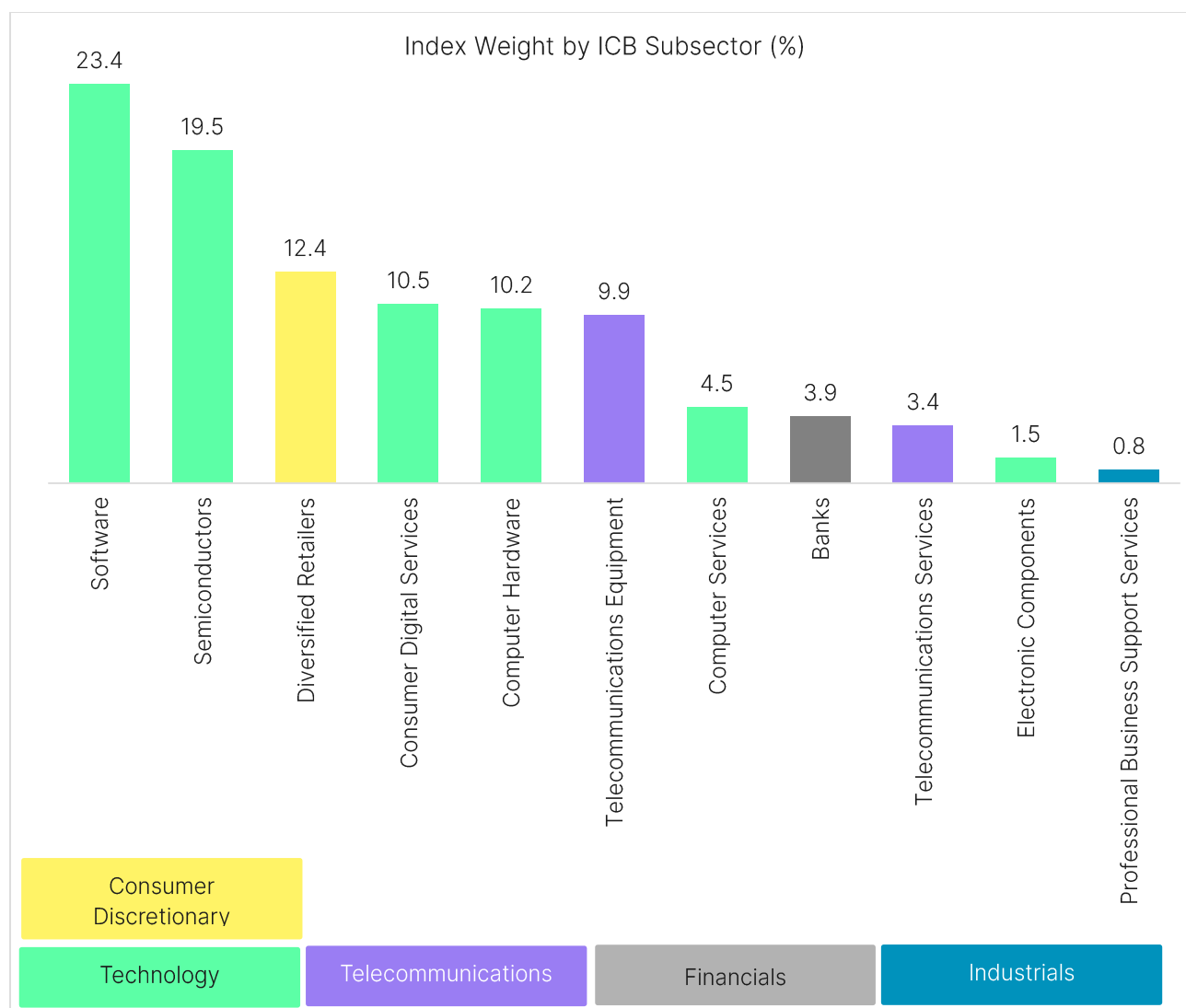
Beyond individual holdings, examining the portfolio's market-cap, geographic, and sector allocations provides additional insight into how NYGBIG's patent-driven framework translates innovation exposure into index construction.

NYGBIG maintains a pronounced large-cap tilt, with approximately 76% of index weight represented by companies with market capitalizations above \$200 billion. Companies valued between \$10 billion and \$200 billion account for roughly 23% of the portfolio, while securities below \$10 billion collectively represent less than 2% of index weight. A deeper look at the large-cap segment reveals that companies with market capitalizations exceeding \$1 trillion contribute more than 40% of total index weight.

U.S.-listed companies represent approximately 82% of total weight. South Korea and China are the next largest country exposures at 7.4% and 4.6%, respectively, while the remaining allocation is distributed across a range of developed and emerging markets, including Germany, Taiwan, Ireland and Japan.



Source: Nasdaq. Index Data as of July 20, 2026. Market Cap Data as of June 30, 2026



Source: Nasdaq. Data as of July 20, 2026

The sector composition of NYGBIG remains firmly rooted in the technology ecosystem. Technology accounts for 69.6% of index weight, led by Software (23.4%) and Semiconductors (19.5%), while Telecommunications contributes a further 13.3% through exposure to Telecommunications Equipment and Telecommunications Services. Together, these sectors account for more than 80% of the portfolio, reflecting the central role of software, semiconductors, communications infrastructure and computing hardware in supporting AI and Big Data innovation. At the same time, the portfolio is not exclusively concentrated in technology-related industries. Consumer Discretionary represents 12.4% of index weight through Diversified Retailers, while Financials account for 3.9% through Banks. These exposures illustrate how AI and data-driven technologies are increasingly being deployed across a broader range of industries, extending beyond the companies directly developing the underlying infrastructure.

Company Spotlight

To illustrate how the index captures innovation, the following company spotlights provide a deep dive into the patent activity of new additions Walmart, AMD, Cambricon Technologies, Hon Hai Precision Industry, and IonQ. By examining their patent profiles and selected patent examples, we can gain a better understanding of the technologies and innovation trends that contributed to their inclusion in the index.

1. Walmart

Walmart is increasingly positioning itself as a technology-driven retailer, embedding artificial intelligence across its customer-facing platforms and core operations. Beyond using AI to enhance product discovery, personalization, and demand forecasting, the company has introduced AI-powered agents such as Sparky, a conversational shopping assistant, while deploying machine learning and automation to optimize logistics, fulfillment, and delivery workflows. Walmart is also investing in emerging technologies such as digital twins and physical/spatial AI to improve store operations and predictive maintenance. Together, these initiatives reflect a broader strategy of leveraging Walmart's scale, data, and technology capabilities to enhance both customer experience and operational efficiency.⁸

Walmart's expanding use of AI across customer engagement, logistics, fulfillment, and store operations is also reflected in its patent portfolio. The company's patent profile is notable for its breadth rather than its concentration in a single technology domain. Walmart achieved the maximum Intensity Score of 8, with patent activity spanning all eight AI & Big Data sub-themes. Collectively, these sub-themes account for 18.8% of Walmart's total patent activity, led by Deep Learning (4.0%), Big Data (3.6%), NLP (3.0%), and Image Recognition (2.5%).

Walmart	Deep Learning	Image Recognition	NLP	Speech Recognition & Chatbots	Big Data	Cloud Computing	Quantum Computing	Cyber Security
Pure Ratio ⁹	4.0%	2.5%	3.0%	1.3%	3.6%	1.7%	1.1%	1.7%
Contribution Ratio	0.47%	0.30%	0.35%	0.20%	0.41%	0.27%	0.17%	0.16%

Source: Nasdaq. Patent data as of May 31, 2026

⁸ <https://corporate.walmart.com/news/2025/06/06/walmart-the-future-of-shopping-is-agentic-meet-sparky>
<https://blogs.microsoft.com/blog/2024/01/09/walmart-unveils-new-generative-ai-powered-capabilities-for-shoppers-and-associates/>
<https://www.cnn.com/2025/08/30/walmart-stores-ai-innovation-retail-shopping-shift.html>
<https://www.businessinsider.com/walmart-ai-changing-how-people-work-shop-2026-6>

⁹ The Pure Score measures how strongly a company's patent activity is concentrated in a particular AI & Big Data sub-theme relative to its overall patent portfolio. Higher Pure Scores indicate that a larger share of the company's patent activity is associated with a given technology area and therefore provide insight into its relative areas of innovation focus.

One example of Walmart's AI-focused innovation is the patent titled "Systems and methods of transforming image data to product storage facility location information", which describes a computer vision system designed to determine where inventory is located within warehouses and fulfillment centers by reading storage and location labels captured by mobile and robotic cameras as they move through the facility. The technology combines image deblurring, optical character recognition (OCR)¹⁰, and machine learning algorithms to extract information from storage labels and determine the precise location of inventory, potentially improving warehouse efficiency and inventory management.¹¹

Walmart's innovation efforts also extend to Natural Language Processing. The patent titled "Methods and apparatus to generate textual data using machine learning processes," describes a machine learning system that automatically generates customer-friendly product descriptions from product attributes such as brand, quantity, and packaging information. Using transformer-based NLP models, the technology can convert complex product titles into concise, conversational descriptions, potentially enhancing search, recommendation, and voice-shopping experiences.¹²

2. AMD

Advanced Micro Devices (AMD) is a U.S.-based semiconductor company that designs high-performance CPUs, GPUs, and adaptive computing solutions for data centers, personal computers, gaming, and embedded applications. Over the past several years, AMD has become a key player in the AI infrastructure market, leveraging its expertise in high-performance computing to provide processors and accelerators that power AI training and inference workloads.¹³

While AMD is primarily known for its leadership in high-performance computing and AI accelerators, the company has also expanded its presence in quantum computing. AMD's CPUs, GPUs, and adaptive computing technologies are used to support quantum research, simulation, and hybrid quantum-classical computing architectures, where classical and quantum systems work together to solve complex computational problems. Through collaborations with organizations including IBM, Quantum Machines, Xanadu, and JPMorganChase, AMD is helping build the infrastructure that may underpin future commercial quantum computing applications.¹⁴

This growing involvement in quantum and next-generation computing technologies is also reflected in AMD's patent profile. Quantum Computing was identified as the company's primary sub-theme, reflecting the company's patent activity in next-generation computing technologies. AMD received an Intensity Score of 6, indicating patent activity across six of NYGBIG's AI & Big Data sub-themes.

AMD's Pure Scores highlight a patent profile centered on Quantum Computing (2.1%), followed by Cloud Computing (1.4%), Deep Learning (0.7%) and Big Data (0.7%). Collectively, these AI & Big Data sub-themes account for 5.4% of AMD's overall patent activity.

¹⁰ A technology that converts text contained in images, scanned documents, PDFs, receipts, or photographs into machine-readable text.

¹¹ <https://patents.justia.com/patent/12591847>

¹² <https://patents.justia.com/patent/12632655>

¹³ <https://www.amd.com/en/corporate.html>

¹⁴ <https://www.amd.com/en/solutions/quantum-computing.html>

<https://www.jpmorganchase.com/about/technology/blog/oqc-jpmc-amd-quantum-ai-platform>

AMD	Deep Learning	Image Recognition	NLP	Speech Recognition & Chatbots	Big Data	Cloud Computing	Quantum Computing	Cyber Security
Pure Ratio	0.7%	0.1%	-	-	0.7%	1.4%	2.1%	0.5%
Contribution Ratio	0.15%	0.02%	-	-	0.15%	0.40%	0.64%	0.08%

Source: Nasdaq. Patent data as of May 31, 2026

The company's quantum computing patent activity includes technologies designed to improve the reliability of quantum calculations. The patent titled "Combining quantum states of qubits on a quantum processor" describes a method in which the same quantum computation is run as multiple instances in parallel, each on a separate set of qubits.¹⁵ The corresponding quantum states across these instances are then combined to produce a final output, helping reduce the impact of noise and errors that can arise in today's quantum hardware.¹⁶

3. Cambricon Technologies

Cambricon Technologies is a Chinese semiconductor company founded in 2016 by Chen Tianshi and Chen Yunji, researchers from the Chinese Academy of Sciences. The company specializes in the design of AI processors and AI accelerators for cloud data centers, edge computing, and intelligent devices. Bloomberg recently described Cambricon as "China's challenger to Nvidia," reflecting its growing role in supplying AI hardware amid increasing domestic demand for AI computing and ongoing efforts to strengthen China's semiconductor self-sufficiency.¹⁷

Cambricon's patent profile reflects a strong focus on next-generation computing technologies. The company achieved an Intensity Score of 6, indicating patent activity across six AI & Big Data sub-themes, with Quantum Computing identified as its primary sub-theme.

Collectively, the six AI & Big Data sub-themes in which Cambricon has patent activity account for 35.7% of the company's overall patent portfolio, underscoring its strong alignment with the technologies captured by NYGBIG.

¹⁵ A qubit (quantum bit) is the quantum-computing equivalent of a bit in a traditional computer. A bit is the smallest unit of information in a traditional computer.

¹⁶ <https://patents.google.com/patent/US12387121B2/en>

¹⁷ <https://finance.yahoo.com/news/meet-cambricon-2-genius-brothers-093000035.html?guccounter=1>
<https://www.trendforce.com/news/2025/12/15/insights-cambricon-remains-chinas-top-ai-chip-startup-rumored-2026-triple-output-faces-smic-limits/>

Cambricon Technologies	Deep Learning	Image Recognition	NLP	Speech Recognition & Chatbots	Big Data	Cloud Computing	Quantum Computing	Cyber Security
Pure Ratio	7.0%	0.6%	1.3%	-	1.9%	1.3%	23.6%	-
Contribution Ratio	0.27%	0.02%	0.05%	-	0.07%	0.07%	1.24%	-

Source: Nasdaq. Patent data as of May 31, 2026

An example of Cambricon's recently granted patents is titled "A Device and Method for Performing Matrix Multiplication Operation," which describes a specialized hardware architecture for accelerating matrix multiplication, a foundational computational task underpinning modern artificial intelligence workloads. The invention combines a dedicated matrix operation unit with specialized storage, register, and control components to enhance the efficiency of the calculations that power neural networks and deep learning applications. By integrating dedicated matrix memory with custom computing hardware, the architecture supports matrices of varying sizes and dimensions more flexibly than earlier accelerator designs constrained by fixed hardware resources. While primarily intended for AI and high-performance computing workloads, efficient matrix multiplication is also broadly applicable to scientific computing applications, including the classical simulation of quantum systems.¹⁸

4. Hon Hai Precision Industry

Hon Hai Precision Industry (Foxconn) is a Taiwanese technology manufacturer and one of the world's largest electronics production companies. Beyond its traditional manufacturing business, the company has become an important participant in the AI ecosystem through its growing presence in AI servers, cloud infrastructure, and high-performance computing solutions.¹⁹

The company achieved an Intensity Score of 7, indicating patent activity across seven AI & Big Data sub-themes, with Image Recognition identified as its primary sub-theme. Collectively, the seven AI & Big Data sub-themes in which Hon Hai has patent activity account for 6.4% of the company's overall patent portfolio.

¹⁸ <https://patents.google.com/patent/CN111090467B/en>

- Matrix multiplication - a mathematical operation used to combine large sets of numerical data. It is a core building block of modern artificial intelligence, enabling tasks such as image recognition, natural language processing, recommendation systems, and the training and inference of deep learning models.
- Matrix operation unit - the "engine" that performs the matrix calculations. Instead of using a general-purpose CPU, Cambricon designed dedicated hardware optimized for matrix multiplication, allowing calculations to be executed more efficiently.
- Storage unit - a dedicated memory area used to store the matrices involved in the computation. Keeping the data close to the processing unit reduces the need to constantly access slower external memory
- Register unit - stores small pieces of information needed for the calculation, such as matrix addresses, matrix dimensions, vector lengths, and scalar values.
- Control unit - coordinates the entire process.
- Classical simulation of quantum systems - the use of conventional computers to model the behavior of quantum systems, often requiring large-scale matrix computations.

¹⁹ <https://nvidianews.nvidia.com/news/foxconn-ai-factory-tsmc-taiwan-nvidia>
<https://www.foxconn.com/en-us/about/group-profile>

Hon Hai Precision Industry	Deep Learning	Image Recognition	NLP	Speech Recognition & Chatbots	Big Data	Cloud Computing	Quantum Computing	Cyber Security
Pure Ratio	1.7%	3.9%	0.1%	0.1%	0.1%	-	0.1%	0.1%
Contribution Ratio	0.30%	0.67%	0.03%	0.03%	0.02%	-	0.03%	0.02%

Source: Nasdaq. Patent data as of May 31, 2026

An example of the company's image recognition patent activity is a patent covering an AI-based image reconstruction method that improves image quality by preserving edge and boundary information during the reconstruction process. The technology extracts edge features from both a target image and a reconstructed image, compares their structural characteristics, and uses any discrepancies to refine the underlying machine learning model. By incorporating edge-consistency measures into the training process, the system can generate sharper and more accurate images while retaining important visual details. Such innovations are relevant to image recognition because accurate object identification often depends on the quality of visual inputs and the model's ability to distinguish shapes, contours, and boundaries.²⁰

5. IonQ

IonQ is a U.S.-based quantum computing company focused on developing quantum systems based on trapped-ion technology.²¹ In addition to quantum computing hardware, the company is active in quantum networking and quantum security, with research and commercial initiatives spanning areas such as artificial intelligence, optimization, materials science, and drug discovery.²²

A recent collaboration with AstraZeneca, AWS, and Nvidia demonstrated how quantum computing can be integrated with advanced cloud and GPU infrastructure to accelerate molecular simulations used in drug development, illustrating the broader convergence of quantum computing, AI, and data-intensive scientific research.²³

IonQ's patent profile reflects a highly concentrated focus on quantum technologies. Quantum Computing represents the company's largest area of focus by a significant margin, accounting for 78.6% of total patent activity, followed by Cloud Computing (2.0%), Deep Learning (1.0%) and Image Recognition (1.0%).

²⁰ <https://patents.google.com/patent/US12211238B2/en>

²¹ Trapped-ion quantum computing is one of the leading approaches to building quantum computers. Rather than using traditional silicon-based transistors, it uses individual charged atoms (ions) as quantum bits, or qubits. These ions are suspended in electromagnetic fields inside a vacuum chamber and manipulated using highly precise laser pulses. Because individual atoms are naturally identical and can maintain their quantum states for relatively long periods, trapped-ion systems are known for their high accuracy and stability, making them well suited for complex computational tasks in fields such as optimization, artificial intelligence, chemistry, and materials science.

²² <https://www.ionq.com/>

²³ <https://www.ionq.com/blog/ecosystem-innovation-ionqs-life-sciences-application-workflow-accelerates>

IonQ	Deep Learning	Image Recognition	NLP	Speech Recognition & Chatbots	Big Data	Cloud Computing	Quantum Computing	Cyber Security
Pure Ratio	1.0%	1.0%	-	-	-	2.0%	78.6%	-
Contribution Ratio	0.02%	0.02%	-	-	-	0.07%	2.58%	-

Source: Nasdaq. Patent data as of May 31, 2026

Recent patents also illustrate the company's efforts to expand quantum computing into application-oriented use cases. For example, the patent titled "Change detection in images using quantum computers" covers a quantum-enabled image change detection method that uses quantum circuits to compare a reference image with a new image and identify whether meaningful changes have occurred. Rather than relying on traditional pixel-by-pixel analysis, the approach leverages quantum information processing techniques to evaluate image differences more efficiently as datasets grow in size and complexity.²⁴

²⁴ <https://patents.justia.com/patent/12547921>

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