Expanding the Innovation Frontier: Introducing Quantum Computing as a New Sub-Theme

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As technological innovation accelerates, index methodologies must evolve to reflect the next wave of transformative growth. The recent enhancement to the Nasdaq Global Artificial Intelligence and Big Data™ Index (NYGBIG™) introduces Quantum Computing as a distinct sub-theme, recognizing its increasing relevance within the broader AI-driven innovation landscape.

Since its launch in 2018, NYGBIG has been defined by a forward-looking, patent-driven approach to capturing technological innovation. By systematically analysing global patent activity, the index identifies companies that not only participate in key technology trends but also may help shape their evolution through sustained research and development. This framework provides consistent exposure to companies at the forefront of innovation across core AI-related technologies.

Importantly, this innovation-led framework has translated into strong relative performance, with the index delivering a total return of 426.39% since inception, equivalent to an annualised return of 24.30%.[1] By systematically prioritising companies with high levels of patent activity and relevance across key technological domains, the index has consistently tilted toward businesses with early ownership in emerging innovation cycles.

Introducing Quantum Computing

NYGBIG is designed to track the performance of companies most actively driving innovation across a defined set of AI and Big Data sub-themes, including Deep Learning, Natural Language Processing, Image Recognition, Speech Recognition & Chatbots, Cloud Computing, Cybersecurity, and Big Data. These technology pillars were initially identified as the core building blocks directly relevant to the advancement of the AI & Big Data investment theme.

As the technological frontier continues to expand, new areas of research are increasingly intersecting with and enhancing these existing capabilities. In this context, the introduction of Quantum Computing as a distinct sub-theme reflects its growing role as a complementary technology - one that has the potential to contribute to advancements across AI and big data applications.

[1] Source Bloomberg. Data from November 12, 2018 to June 30, 2026

Quantum computing represents a fundamental shift in computational capability, leveraging quantum-mechanical principles to solve complex problems beyond the reach of classical systems.[2] While still in its early stages of commercialization, the field has rapidly moved from theoretical exploration to tangible enterprise and government investment, particularly in areas such as cryptography, optimization, and advanced simulation. Recent developments highlight a more active role by governments, with the US committing roughly $2 billion to the sector while taking minority equity stakes in leading quantum companies, underscoring both the technology's early-stage nature and its long-term strategic importance.[3]

At the same time, private market participation has accelerated significantly, reflecting rising investor conviction. Venture and private investment in quantum technology start-ups reached $12.6 billion in 2025, a more than sixfold increase versus 2024, with around 90% directed toward quantum computing. Notably, the funding mix has shifted decisively toward private capital: while public sources accounted for roughly one-third of investment in 2024, their share fell to just 3% in 2025.[4]

Quantum computing is increasingly viewed as complementary to artificial intelligence with the potential to significantly enhance data processing and analytical capabilities. While AI relies on large-scale datasets and advanced algorithms, quantum computing can accelerate complex optimization, pattern recognition, and simulation tasks that are computationally intensive for classical systems. For example, quantum machine learning (QML) is already showing potential to speed up some of the mathematical and optimization processes that make AI model training resource-intensive, while quantum circuits could enable smaller, more efficient AI models.[5] At the same time, AI is already being used to improve quantum system design, algorithm development, and error correction, creating a reinforcing feedback loop between the two technologies.[6]

More broadly, while AI and quantum computing may represent a particularly transformative combination, their impact depends on a wider ecosystem of enabling technologies. Innovation is increasingly shaped by the simultaneous advancement and convergence of sensors, cloud computing, AI, quantum computing, 6G, and space-based systems.

This convergence could materially expand both the range and scale of addressable problems across areas such as financial modelling, cybersecurity, drug discovery, and logistics optimization. In this context, theoretical models suggest that quantum systems could accelerate certain AI optimization tasks by up to $10^6\times$ in select problem types.[7]

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[2] In simple terms, classical computers use bits that are either 0 or 1 and process information step by step. Quantum computers use qubits, which can represent 0 and 1 at the same time, allowing them to explore many possibilities simultaneously and potentially solve very complex problems, such as advanced simulation and probabilistic modeling, more efficiently.
[3] https://www.techspot.com/news/112499-us-government-bets-billions-quantum-computing-direct-stakes.html
[4] https://www.mckinsey.de/capabilities/mckinsey-technology/our-insights/mckinsey-quantum-technology-monitor-2026-a-commercial-tipping-point
[5] In simple terms, quantum approaches could help speed up parts of AI training by making the search for optimal model parameters more efficient. At the same time, quantum approaches may allow complex patterns to be represented more efficiently, potentially reducing the size and complexity of AI models.
[6] https://www.mckinsey.com/capabilities/mckinsey-technology/our-insights/quantums-bold-promise-what-business-leaders-need-to-know
[7] https://www.forbes.com/sites/chuckbrooks/2026/06/13/the-quantum-frontier-how-quantum-computing-is-reshaping-our-future/

As quantum technologies continue to mature, early adopters are expected to be best positioned to capture value. McKinsey estimates that quantum computing could generate multi-billion-dollar enterprise value over the next decade, with broader economic impact potentially reaching up to ~$2.7 trillion by 2035.[8]

Conclusion

The addition of Quantum Computing extends the index's innovation-driven framework into a new frontier of technological advancement, reflecting the growing convergence of next-generation computing capabilities with AI and big data. By maintaining a focus on measurable innovation, as reflected through patent activity, the methodology aims to capture companies shaping the earliest stages of emerging innovation cycles.

As these technologies continue to evolve, the ability to identify and track foundational innovation at an early stage becomes increasingly relevant for long-term investors. In this context, the inclusion of Quantum Computing reinforces the index's role in aligning with the shifting drivers of technological progress and the expanding scope of the global innovation landscape.

[8] https://www.mckinsey.de/capabilities/mckinsey-technology/our-insights/mckinsey-quantum-technology-monitor-2026-a-commercial-tipping-point

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