QUANTUM COMPUTING

THE NEXT FRONTIER IN TECHNOLOGY

Volume 2 Issue 4

INFOMATRIX (IT CLUB)

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INDEX

From the Editor's Desk

Dr Priya Gupta
Faculty Advisor & Editor-in-Chief

Navigating the Quantum Paradigm

In an era defined by rapid technological acceleration, few developments promise to reshape the global landscape as profoundly as Quantum Computing. What once resided within the specialized discourse of theoretical physics is now precipitating a radical transition into the domains of industrial enterprise, strategic laboratories, and national policy frameworks. This edition, "Quantum Computing: The Next Frontier in Technology," captures this pivotal juncture—the moment where abstract possibility crystallizes into transformative practice.

Quantum computation represents more than a mere incremental improvement in processing speed; it is a fundamental departure from the binary constraints of classical informatics. By leveraging the principles of superposition and entanglement, quantum systems transcend the "0 or 1" dichotomy, exploring a multidimensional state-space that renders previously "intractable" problems solvable. From the complexities of post-quantum cryptography to the nuances of climate modeling and pharmacological simulation, the implications of this shift are both vast and structurally significant.

While we acknowledge that current systems are currently hampered by environmental noise and decoherence, the trajectory of the field is undeniable. For an institution like ABVSME, JNU, this evolution necessitates a critical re-evaluation of management pedagogy. As India formalizes its technological sovereignty through the National Quantum Mission, the onus falls upon us to bridge the gap between scientific innovation and organizational strategy. We are preparing a new generation of decision-makers who must not only understand the "how" of quantum mechanics but also the "why" of its integration into governance and global markets.

This volume is the result of a rigorous collective effort by the Infomatrix team. Their work reflects a commitment to intellectual inquiry and a desire to demystify the complexities of the "next frontier." I invite you to engage with these pages not merely as a technical survey, but as a conceptual lens through which we can rethink the future of innovation and problem-solving.
The quantum era is no longer a distant horizon, but it is an unfolding reality. Understanding its contours today is the prerequisite for leading its application tomorrow.

The Editor's Byte

Mokshika Arya

Newsletter Volume 2 Issue 3

Welcome to Volume 2, Issue 4 of Quantum Computing: The Next Frontier in Technology.

Quantum computing can feel a little unreal at first—but that's also what makes it exciting. Instead of working only in 0s and 1s, quantum computers use qubits that can behave in more than one way at the same time. That's why people are so hopeful about its potential in areas like optimization, simulations, cybersecurity, finance, and healthcare. We're still early in the journey (today's systems are limited and noisy), but the direction is clear—and the progress is happening fast.

This issue was possible because it's built with pure teamwork. A big thank you to everyone who contributed—researching, writing, coordinating, and pulling everything together. Every small effort added up to something we're genuinely proud to share.

And a very big, heartfelt thank you to Priya ma'am (Dr Priya Gupta), our Faculty Advisor & Editor-in-Chief, for always guiding us, motivating us, and helping us shape this issue with clarity and confidence. We truly couldn't have done this without her support.

Thanks for Reading

The Editor's Byte

Ankita Singh

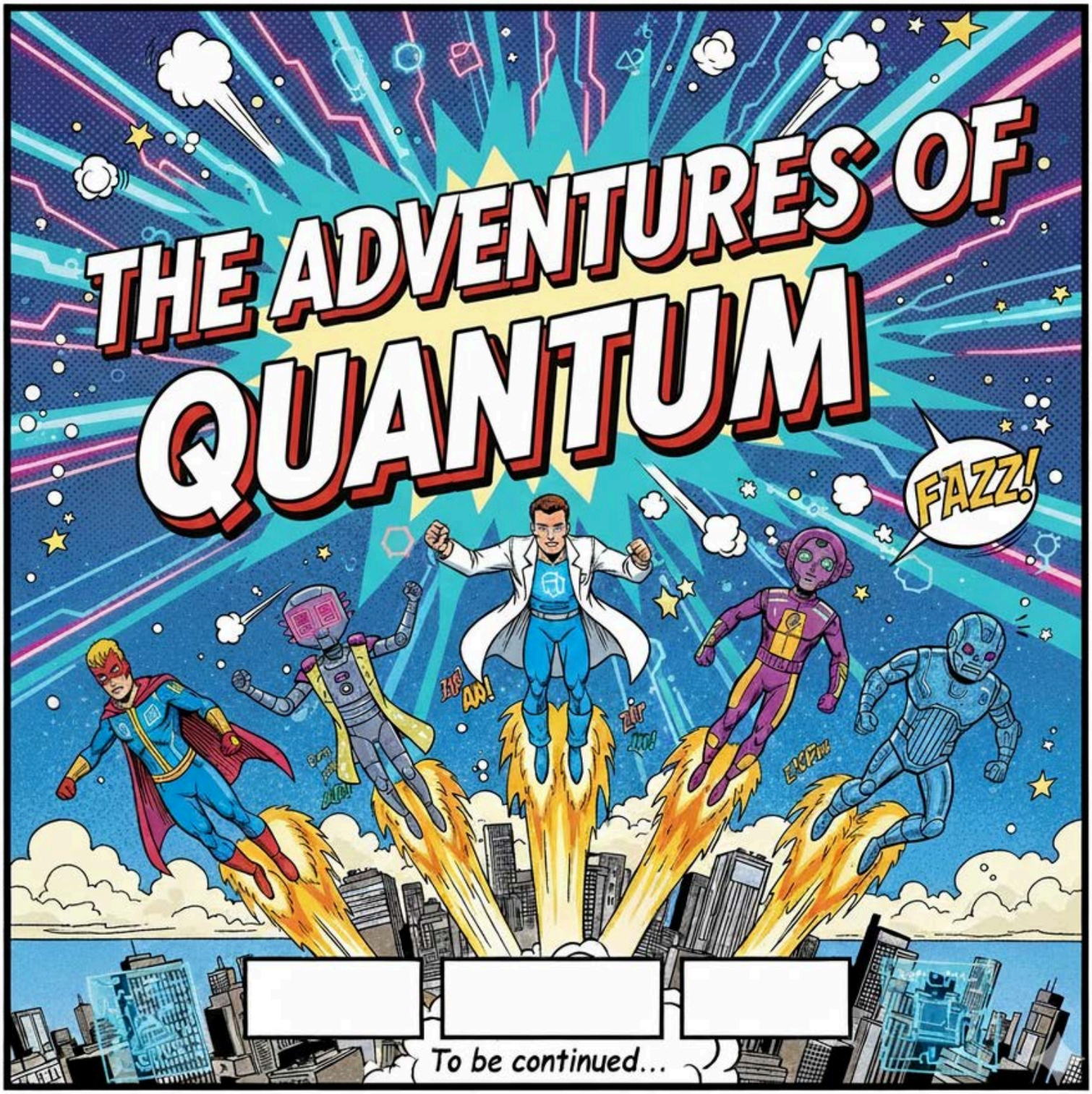
Newsletter Volume 2 Issue 3

We feature the Newsletter entitled Quantum Computing: The Next Frontier in Technology in Volume 2, Issue 4 of our newsletter. Quantum computing, once the realm of theoretical physics and science fiction, today steadily begins to enter the real world, real labs, and real business environments. That which was far away is now quickly becoming real.

At its core, quantum computing is a paradigm shift in how information is processed. Quantum computers use qubits instead of traditional bits in classical computers. They are able to test multiple solutions for various challenges concurrently, making complex or impossible tasks for regular computers feasible. Quantum computing opens an entirely new range of capabilities in various fields such as cryptography, healthcare, finance, climate modeling, and artificial intelligence.

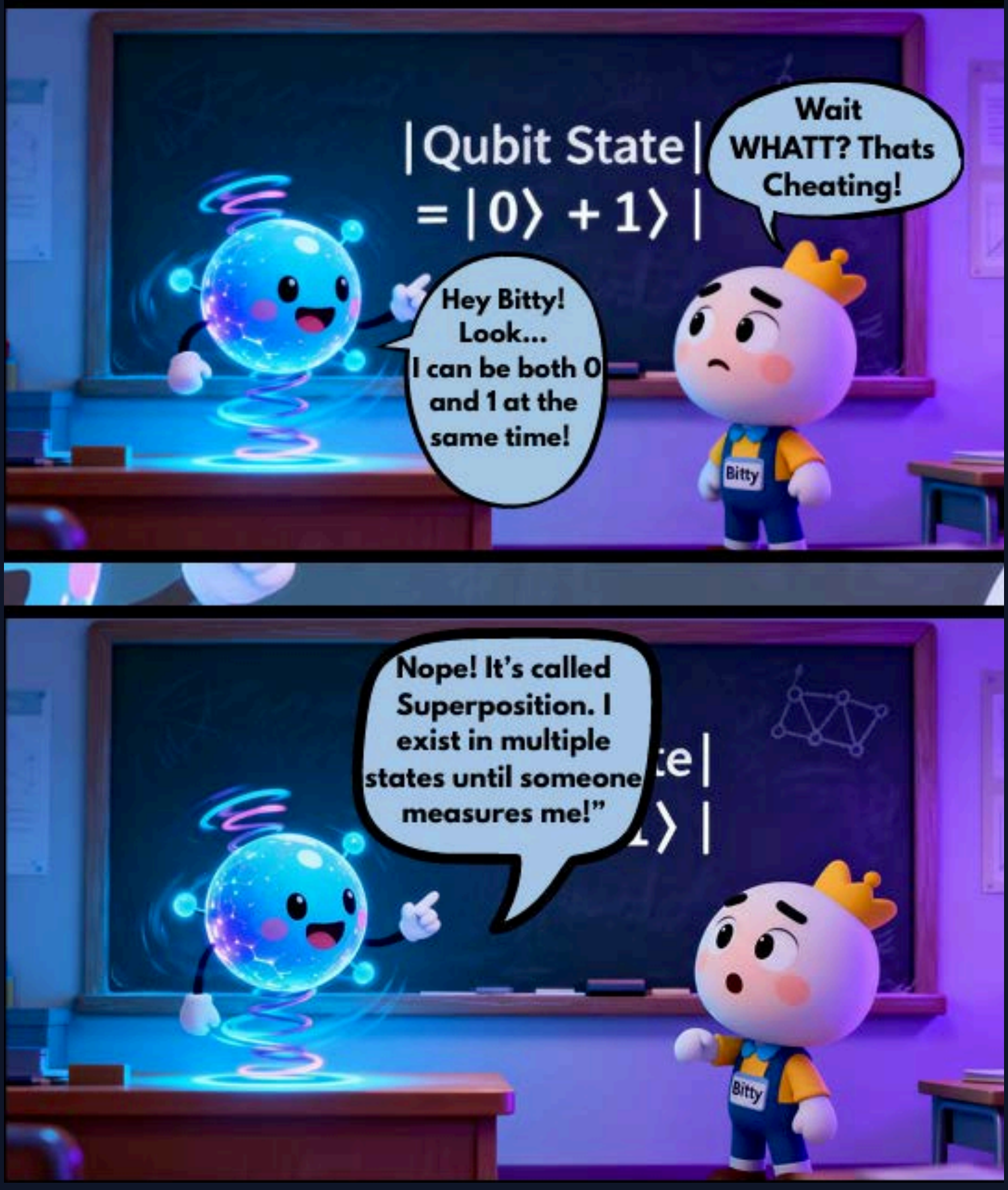
In this volume, it is explored how quantum technology has progressed, the challenges faced by researchers, and whose work is pushing the boundaries of innovation. While it may take time before it becomes mainstream, the rate of innovation shows serious progress in the state of computing in the future. This edition offers a glimpse into why quantum computing truly represents the next frontier in technology.

Thanks for reading



~ Yuktika Duggal

SUPERPOSITION BEGINS



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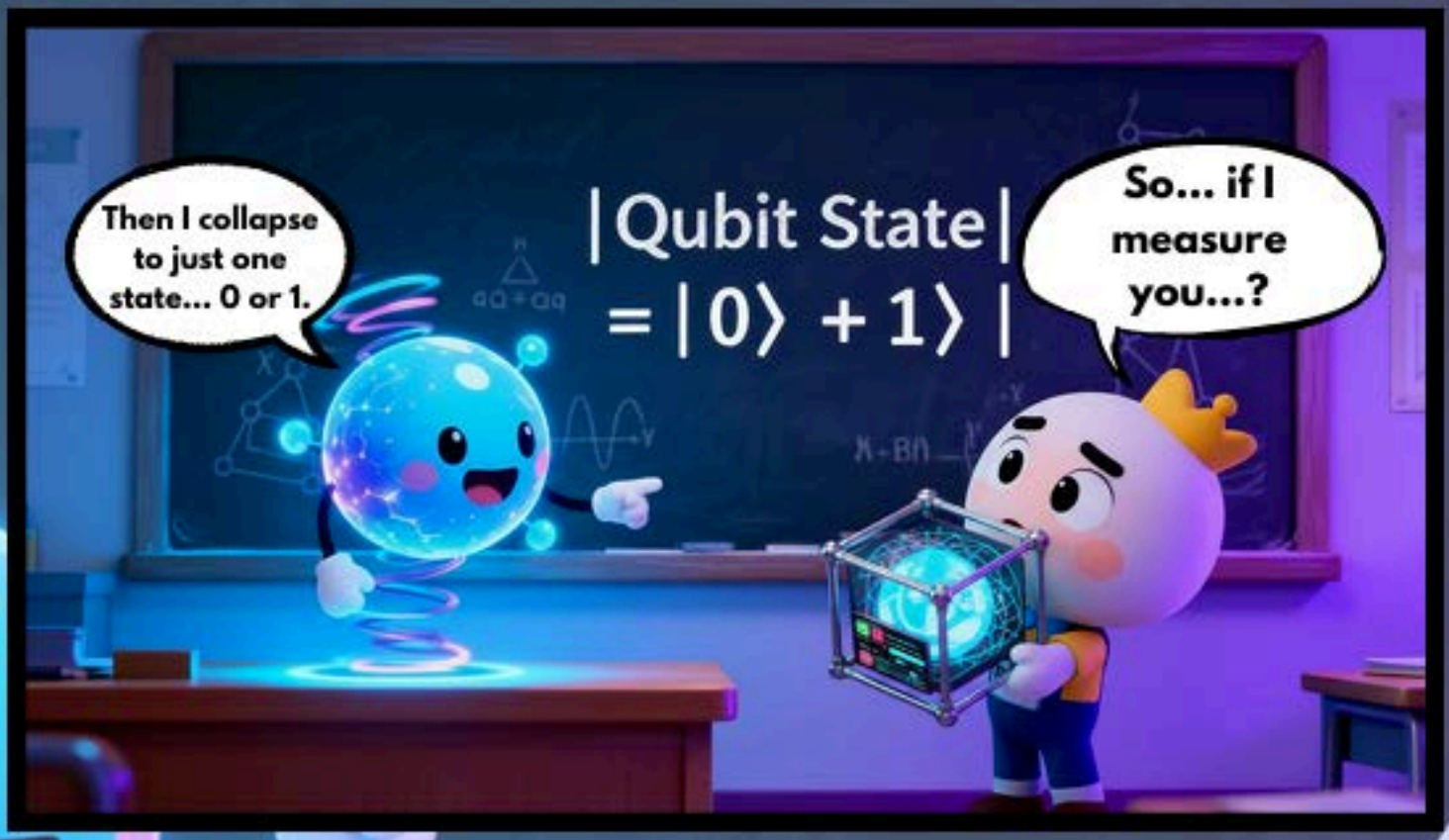

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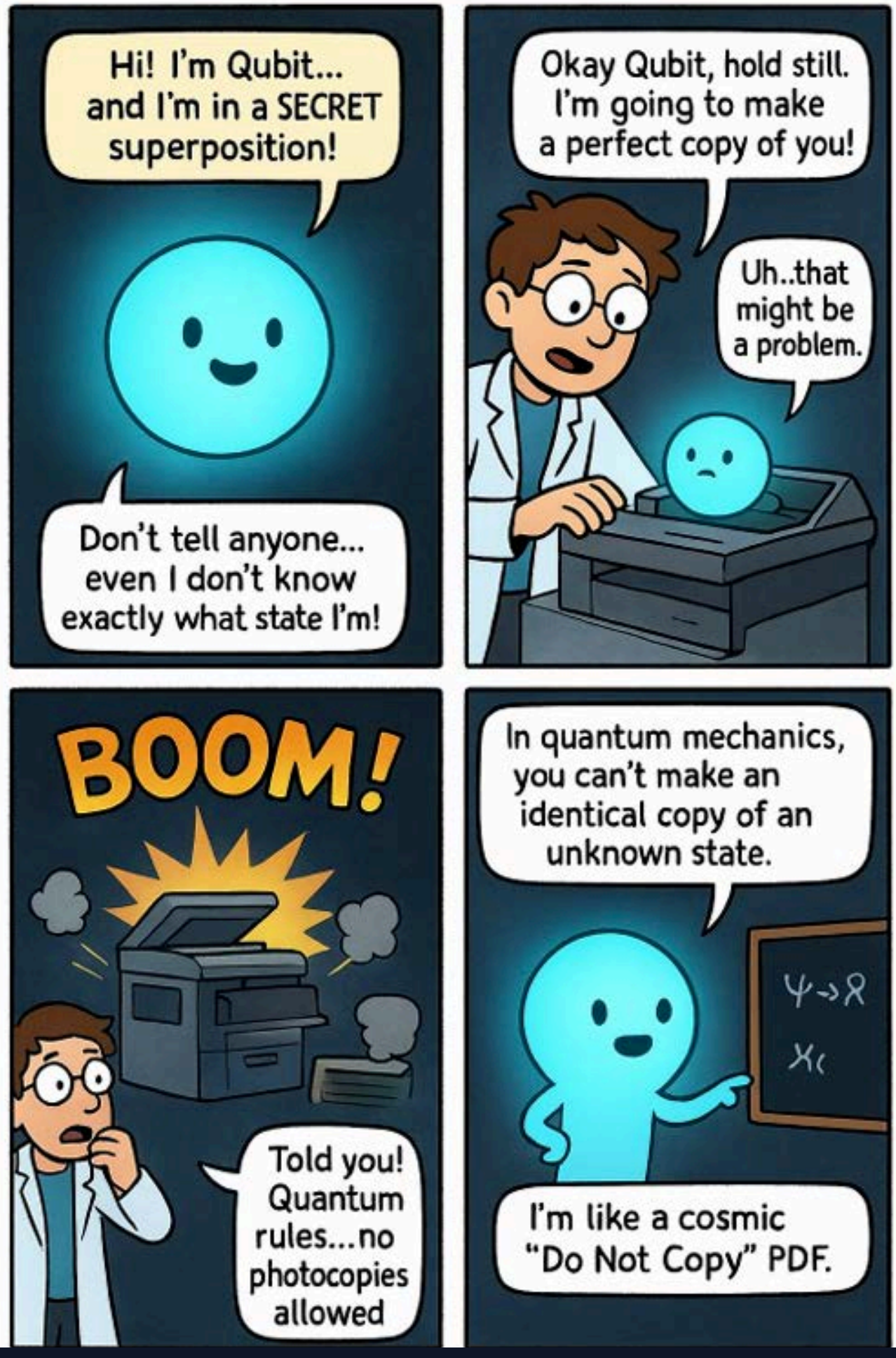


QUANTUM COMPUTING AND BUSINESS STRATEGY: AN ANSWER FOR WHY MANAGEMENT EDUCATION MUST ALIGN WITH INDIA'S NATIONAL QUANTUM MISSION

Dr Priya Gupta - Associate Professor, Atal Bihari Vajpayee School of Management and Entrepreneurship, Jawaharlal Nehru University, New Delhi

Business strategy has never been static. It has repeatedly changed as computing power has expanded. The early spread of enterprise software altered how organization operated. Later data analytics began to influence how managers make decisions. Today, artificial intelligence is shaping forecasting, marketing and customer engagement. Quantum computing marks the next stage in this progression. Although technology is still evolving, its strategic significance for businesses is already becoming clear. This matters not only for industry leaders but also for management students who will soon be responsible for shapingorganizational choices.

At its core quantum computing differs from classical computing in how information is processed. Conventional computers work with bits that take a value either zero or one. Quantum computers use quantum bits, that can exist in multiple states at the same time. This enables quantum systems to explore many possible solutions simultaneously, making them particularlysuitable for complex optimization and simulation problems that are difficult to handle using traditional methods.

Many managerial challenges fall into this category. Supply chain design, portfolio optimization, scheduling, pricing under uncertainty, and risk assessment involve evaluating millions of possible combinations under constraints. Today, firms rely on approximations because fully optimizing these problems is computationally expensive. Even modest improvements in these decisions can have large financial consequences. Quantum approaches promise to push these gains further.

From a business standpoint, the National Quantum Mission marks a clear shift. Quantum capabilities will no longer remain confined to overseas platforms and research labs but will gradually become available within India's own innovation ecosystem at the same time the mission places industry at the center of the transition from research to real world use. This creates a strong case for management education to evolve in parallel.

Management students are not expected to design quantum hardware or master quantum physics. Actually, they must understand how quantum computing changes the logic of decision making. They need to know which types of problems can benefit from quantum optimization. They must know how hybrid models combining classical and quantum systems work. They must also know what practical constraints still exist. Though we all know that current quantum computers are noisy and limited in scale, it has been seen that quantum inspired algorithms are already being tested on classical machines with promising results.

Quantum Computing: Key Facts

1. India's Commitment: Under the National Quantum Mission, India has allocated ₹6,000 crore (2023–2031) to develop quantum computing, communication, sensing, and skilled manpower.
2. Global Momentum: Worldwide public investment in quantum technologies has crossed USD 40 billion, signalling strong long-term strategic importance.
3. Business Value: Even 1–2 percent improvement in optimization heavy decisions such as logistics, finance, and scheduling can generate large cost and efficiency gains for firms.
4. Talent Gap: India's quantum push highlights the growing need for management professionals who can link quantum expertise with business strategy.

The relevance for management education lies in strategic preparedness. Firms that begin experimenting early can build internal capabilities. They can develop partnerships, and shape use cases aligned with their business models. Those firms who wait for full maturity may find themselves responding rather than leading. This corresponds earlier technological shifts, where early adopters of analytics and artificial intelligence gained durable competitive advantages.

There is also a strong talent dimension. The National Quantum Mission explicitly emphasizes human resource development. India will require not only scientists and engineers but also managers who can bridge technology and strategy. Professionals who understand both business objectives and quantum capabilities will be critical in areas such as investment evaluation, technology adoption, regulatory compliance, and ethical governance.

Financial services provide a clear illustration. Quantum methods are being explored for portfolio optimization, derivative pricing, and risk modelling. Even incremental improvements in risk assessment can have systemic implications for financial stability. Similarly, in manufacturing and logistics, quantum optimization could improve production planning and inventory management. In pharmaceuticals, faster simulations could shorten drug development cycles, directly affecting time to market and profitability. For management students, exposure to quantum computing encourages a shift in thinking. Instead of viewing strategy as linear planning, they begin to see it as navigating complex solution spaces under uncertainty. This perspective is valuable regardless of whether quantum computing is immediately deployed. It strengthens analytical reasoning and long-term strategic vision.

Importantly, quantum computing should be integrated into management curricula alongside existing tools such as operations research, data analytics, and artificial intelligence. The goal is not replacement but complementarity. Managers must learn to ask when classical methods are sufficient and when quantum or hybrid approaches may add value. This judgement is strategic, not technical. Quantum computing may still be emerging, but its strategic implications are already real. For business strategy and management education, the question is no longer whether to engage with quantum computing, but how early and how thoughtfully this engagement begins.

For management education, engaging with quantum computing early is not about prediction, but preparation.

QUANTUM COMPUTING:
CHANGING THE WAY SMART SYSTEMS WORK IN THE FUTURE

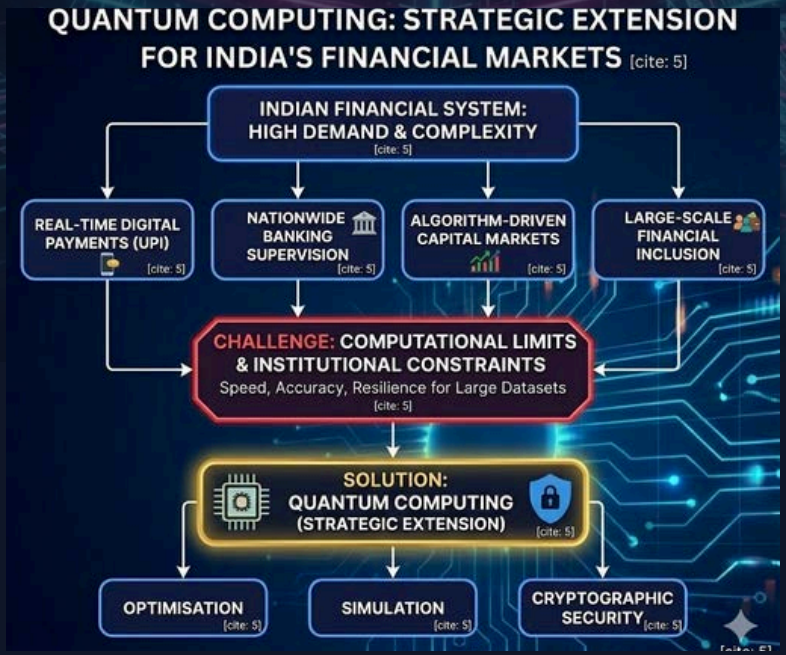
~ Aman Sharma

Quantum Computing is the field that is leading the way in the next digital revolution as technology moves forward faster and faster around the world. Quantum technology has quickly gone from being a theoretical idea to a powerful force that can change industries, research, and the way the world solves problems.

It is known for its unprecedented computing power. Infomatrix's main theme is Quantum Computing, which fits with this vision. This encourages students to think about how science, innovation, and thinking about the future all come together.

How Quantum Computing Works

Bits are the building blocks of classical computers. They can be either 0 or 1. Quantum computers, on the other hand, use qubits, which are quantum particles that can be in more than one state at the same time because of things like superposition and entanglement.



These new developments show that quantum computing is more than just a new technology; it's a strategic asset that will shape the next phase of growth.

The New Academic Environment and Quantum Computing

The academic movement towards future-focused learning is reflected in the choice of quantum computing as the Infomatrix theme. The need for experts in this field is growing as more and more multinational corporations invest in quantum research. In addition to understanding classical computing, students today are expected to develop an awareness of emerging technologies that will shape the workforce of the future.

Students who study this theme benefit from:

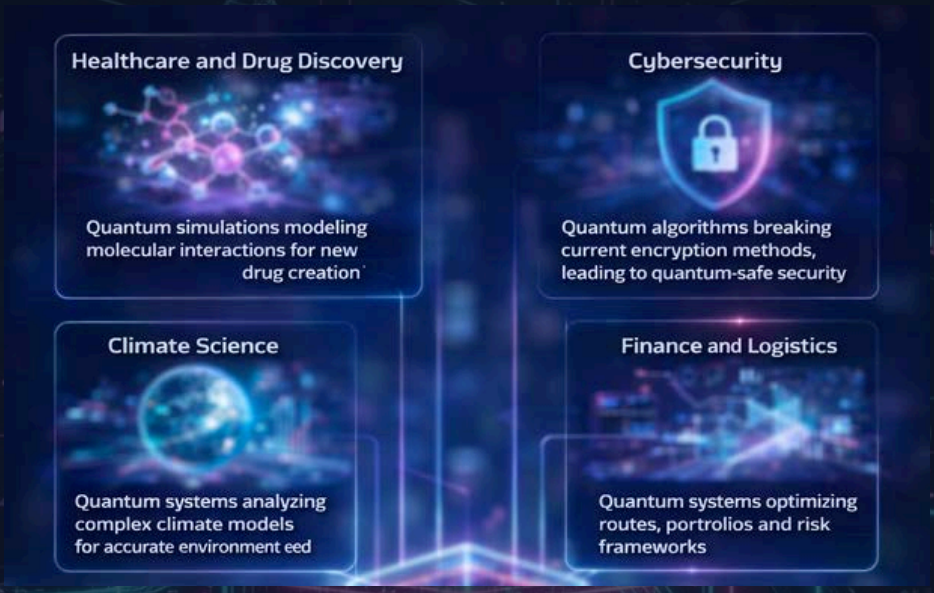
- A forward-looking viewpoint
- Knowledge of multidisciplinary applications
- Being exposed to innovative scientific ideas
- Preparedness for the changing market for technology

This lets quantum systems work on huge amounts of data at the same time, which means they can solve problems that classical machines would take years or even centuries to figure out.

Why Quantum Computing is Important

Quantum computing is important not just because it is fast, but also because it uses a different way of doing calculations. It could be useful in a lot of different areas:

- **Healthcare and Drug Discovery: Quantum simulations can speed up the process of creating new drugs by modelling how molecules interact with each other with an accuracy that has never been seen before.**
- **Cybersecurity: Quantum algorithms of the future might be able to break current encryption methods, which would lead to the rise of quantum-safe security.**
- **Climate Science: Quantum systems can look at very complicated climate models, which makes it possible to make more accurate predictions for making decisions about the environment.**
- **Finance and logistics: Industries can make routes, portfolios, & risk frameworks work better than ever.**



Technologies from laboratory settings to real life. In the next few years we may see:

- **Quantum processing in mainstream devices**
- **Increased quantum-safe encryption standards**
- **Growth in quantum computing start-ups**
- **Development of new academic coursework on quantum research**
- **Increased collaborations between academic institutions and quantum laboratories**

Students that begin to study today will lead the change tomorrow.

Conclusion

Quantum computing represents another milestone in technological history. It has changed computing to providecapabilities beyond what the most powerful classical computers can perform.

The Infomatrix fraternity underlines the importance of transparently-facing education for Technological Futures and aims to inspire students to imagine, innovate, and participate in technological futures.

As we begin to witness this next horizon in engineering, quantum computing reminds us that progress to greater performance occurs not only by faster computers, but also through new ideas and possibilities.

The Broader Vision

Quantum computing is based in physics and mathematics, but its impact goes far beyond the technical realm. It supports an explorative mindset that reminds us that the world is not limited to fixed dichotomies. While qubits can be in multiple states we encourage students to think in multiple possibilities, to push against the boundaries of tradition, and to creatively approach complexity. This fits the vision of Infomatrix, which seeks to create a culture of curiosity, innovation, and intellectual advancement for the entire student body.

Future Directions

While quantum technology is still emerging, its importance is increasing rapidly. Investment by governments, technology companies, and research organizations around the world is accelerating the transition of quantum

QUANTUM COMPUTING AND THE INDIAN FINANCIAL MARKETS

~HESTER JM

Every financial crisis is ultimately a failure of the models under stress. The future generation of computing is about expanding the limits of what we can model before the stressactually arrives.-HESTER JM

Why Quantum Computing Matters to India

India today operates one of the most computationally demanding financial systems in the world. Real time digital payments, nationwide banking supervision, algorithm driven capital markets, and large scale financial inclusion all depend on the ability to process large amount of datasets with speed, accuracy, and resilience. India's Unified Payments Interface (UPI) processes billions of transactions annually, while banks and regulators conduct periodic stress tests to ensure systemic stability. As financial scale and complexities raise together, computational limits are no longer theoretical concerns they are institutional constraints. Quantum computing becomesvery relevant precisely at this point. Not as a futuristic replacement for existing systems, but as a strategic extension of India's financial computing capability targeted at optimisation, simulation, and cryptographic security.

The Government of India's approval of the National Quantum Mission (₹6,003 crore, 2023–2031) signals formal recognition that quantum technologies will have economic and strategic relevance. For the financial sector, the question is no longer whether quantum computing matters, but where it can add value without compromising stability.

What Quantum Computing Changes

Quantum computing differs fundamentally from classical computing in how it represents and processes information. For certain classes of problems particularly those involving large search spaces, probabilistic outcomes, and complex constraints it can explore solutions more efficiently than classical methods

What It Does Not Change

Quantum computers do not outperform classical systems across all tasks, and today's systems remain noisy and limited in scale. As a result, the most credible near term value of quantum computing lies in hybrid quantum classical workflows rather than in replacing existing infrastructure. For Indian financial institutions, quantum computing should therefore be understood as a specialised backend capability that enhances specific high complexity computations, not as a front end transformation of financial systems.

Where Indian Finance Meets Computational Limits
Portfolio Optimisation in Asset Management

Stress Testing Stability:

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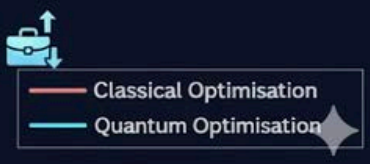


India's mutual fund industry manages assets exceeding ₹50 lakh crore. Portfolio construction today involves balancing risk limits, regulatory exposure caps, liquidity constraints, transaction costs, and increasingly ESG considerations. As constraints multiply, classical optimisation techniques face diminishing efficiency.

Quantum inspired optimisation approaches are designed specifically for such constraint heavy environments. While quantum hardware is not yet in operational use, early adoption of quantum inspired models can improve portfolio robustness particularly during periods of market stress

Stress Testing and Banking Stability:

The Reserve Bank of India mandates the periodic conductingof stress tests to assess the resilience of banks under adverse macroeconomic situations. These tests rely largely on thescale simulations that become computationally expensive as interdependencies across the assets, sectors, and institutions grow. International bodies like the Bank for International Settlements have acknowledged that

the advanced computational methods including the quantum assisted techniques may eventually enhance overall systemic risk analysis for a country like India where the financial stability is a core policy objective, this relevance is laregely strategic rather than speculative.

Detection in Digital Payments:

India operates the largest real time retail payment system in the world by transaction volume, The fraud detections in such a complex financial ecosystem is fundamentally a very bigdata scale challenge which involves the use of behavioural modelling techniques and anomaly detection across the highvelocity transaction streams. Quantum technology poweredmachine learning is still largely remaining in the experimental level, but its long term relevance completely lies in the strengthening of digital trust as the transaction volumes and complexities which continues to rise every passing second for a system as large as UPI even those small marginal improvements in detection of accuracy can have a magnified systemic impact as a whole.

Implications for the Financial IT Stack:

Capital Markets and Derivatives:

India hosts one of the world's most active derivatives markets by contract volume. Pricing and risk management in such markets require solving high dimensional stochastic models, particularly during periods of volatility. Globally, quantum approaches to derivatives pricing remain confined to controlled research environments.

In India, these applications belong to the medium to long term horizon, especially for exchanges and clearing corporations operating under strict regulatory oversight.

Quantum Computing and Financial Security:

One area where quantum computing presents a clearly recognised challenge is cryptography. In the long run, sufficiently powerful quantum systems could weaken widely used encryption standards. This has led regulators and cybersecurity agencies worldwide to emphasise post quantum cryptography. For India's financial infrastructure payments, settlements, and interbank communication planning for quantum-resistant security is a matter of institutional prudence, not technological speculation.

India's Regulatory Advantage & Talent Imperative:

India's financial regulators are often characterised to as conservative. In the emerging technologies, this conservatism can be seen as a strategic strength. Financial systems amplify both in innovation and failure. By prioritising controlled experimentation, models the explainability, and systemic resilience, regulators position India to integrate quantum computing deliberately without absorbing instability into core financial infrastructure. Quantum computing requires interdisciplinary understanding across mathematics, physics, computer science, and finance. At present such an expertise is concentrated largely only in the research institutions andbridging this gap will require financial institutions and business schools to invest heavily in quantum literacy enabling leaders to evaluate the quantum opportunities and risks intelligently rather than reactively.

Roadmap to Quantum Adoption:

In the short term, between 2025 and 2030, the progress is most likely to occur through quantum inspired algorithms which runs on classical systems, supported by academic industry pilot environments and carefully formulatedexperimentation in optimisation and risk analytics. This phase is less about the deployment and more about institutional learning building familiarity, testing assumptions, and identifying genuine computational challenges.

Over the medium term, as the hardware reliability improves, financial institutions can begin integrating the hybrid quantumclassical workflows into select backend functions, while post quantum cryptography gradually shifts from the theoretical concern to practical necessity within core security infrastructure. In the long term, broader adoption will depend not on the technological novelty but on institutional readiness, driven by hardware maturity, cost efficiency, and clear cutregulatory approval.

Conclusion

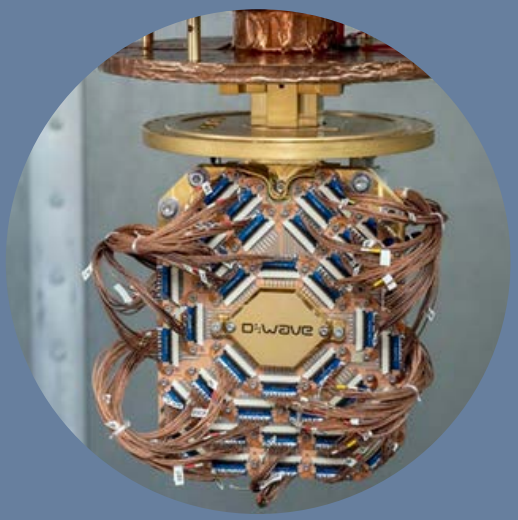
Quantum computing is not an impending disruption comingfor the Indian financial markets, nor does it need to be the disruption. Its real significance lies in its role as the strategic capability, one that will become increasingly relevant as financial systems grow larger, faster, and more interconnected. The institutions that are best positioned to benefit will not be those that rush to deploy unproven technology, but those ones that invest early in understanding its limits and possibilities, prepare their technology architectures, and strengthen their governance frameworks. In the world of finance, the penalty for premature adoption is far greater and higher than the cost of slow adoption. India's advantage, therefore, lies not in chasing quantum hype but in integrating quantum intelligence deliberately and responsibly into the foundations of financial stability, if done right thequantum computing will not destabilise India's financial system it will make it more resilient then ever.

Current Happenings

-Divya & Nandini

Why D-Wave Quantum (QBTS) Is Up 13.5% After €10M European Deal and US Funding Rumors

D-Wave Quantum recently secured a €10 million contract with Swiss Quantum Technology SA, marking a significant step toward commercial growth and international expansion. This, coupled with rumors of potential U.S. government equity stakes, has fueled debates about the risks and rewards of government involvement. While such funding could ease financial strain, it introduces dilution and conflicts of interest. The company's strong market enthusiasm faces financial uncertainties and valuation risks, making D-Wave's investment narrative a subject of intense debate. Investors should carefully consider both the potential and the risks before diving in



The QThe Quantum Thantum Threat:eat: HRF WHRF Warns Bitcoin Fns Bitcoin Faces ces a FuFuturure Tes Test

The Human Rights Foundation's new report, "The Quantum Threat to Bitcoin," warns that cryptographically relevant quantum computers could eventually compromise Bitcoin's core security, endangering the financial privacy of activists worldwide. HRF estimates roughly 6.5 million bitcoin could be exposed to quantum attacks targeting old or unconfirmed transactions. The foundation urges proactive research into quantum-resistant cryptography, such as lattice- and hash-based schemes, framing quantum preparedness as a human rights imperative to safeguard global users who depend on Bitcoin's resilience.

Quantum Art: Shrinking Quantum Computers, Expanding Possibility

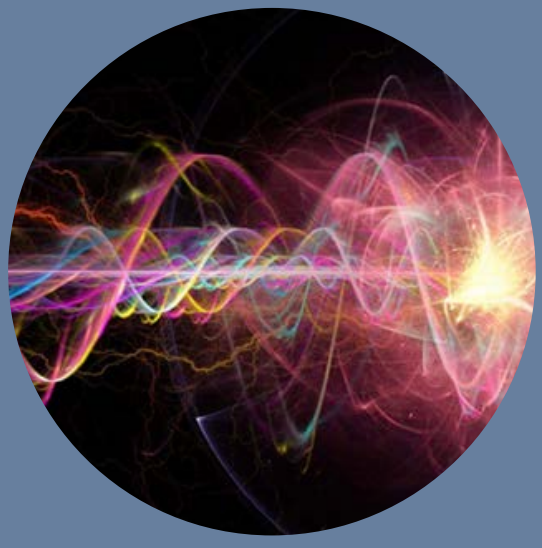
Israeli startup Quantum Art aims to reinvent quantum computing with a compact, ultra-fast design. Its two-inch QPU could host one million qubits—up to 50 times smaller yet 100 times faster than current systems. Using multi-qubit gates and dynamic reconfigurability, the company says it can perform hundreds of operations in a single step. CEO Tal David projects quantum advantage by 2027 and a million-qubit system by 2033. If realized, Quantum Art's approach could mark a turning point, bringing quantum power to standard server racks.

This Week in Science: Quantum Limits, Supersonic Dreams, and the End of the Simulation Theory

Researchers this week reported that even future quantum computers would find some problems—like identifying certain quantum phases of matter—effectively unsolvable, requiring "unfathomable" time to compute. NASA's X-59 supersonic jet made its first test flight, advancing efforts to bring back fast air travel without the deafening sonic boom. Meanwhile, physicists mathematically disproved the popular simulation hypothesis, showing that reality's fundamental laws are nonalgorithmic and cannot be contained within a computer program—so we can officially stop worrying about living in someone else's simulation.

Quantum Computers Put Reality to the Test

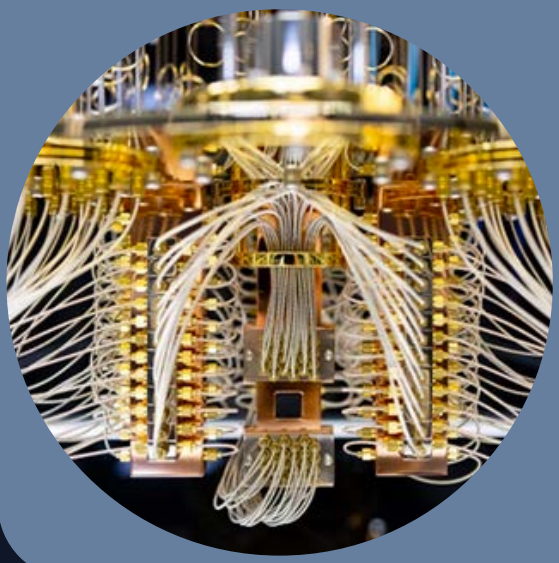
A landmark experiment at the University of Cambridge has used IBM's Heron quantum computer to run the Pusey-Barrett-Rudolph (PBR) test, probing whether quantum mechanics truly reflects reality. The results show that, for small numbers of qubits, quantum systems are ontic—their strange behaviors are real, not just statistical illusions—ruling out hidden variable theories at that scale. While noise prevents testing larger systems, the findings strengthen confidence that quantum computers genuinely exhibit "quantumness," helping confirm they can achieve true quantum advantage rather than mimic classical algorithms.



This Week in Tech: Nvidia's Quantum Leap and a Superconducting Breakthrough

At its annual GTC event, Nvidia unveiled major partnerships with Oracle and the U.S. Department of Energy to build AI supercomputers powered by over 100,000 GPUs, as well as new "digital twin" collaborations with global manufacturers and a hardware-agnostic NVQLink platform connecting AI and quantum systems. Meanwhile, researchers turned germanium into a superconductor—a milestone that could revolutionize energy efficiency and quantum computing. Despite huge AI investments, experts say limited real-world training data still keeps generative AI from mastering complex financial workflows.

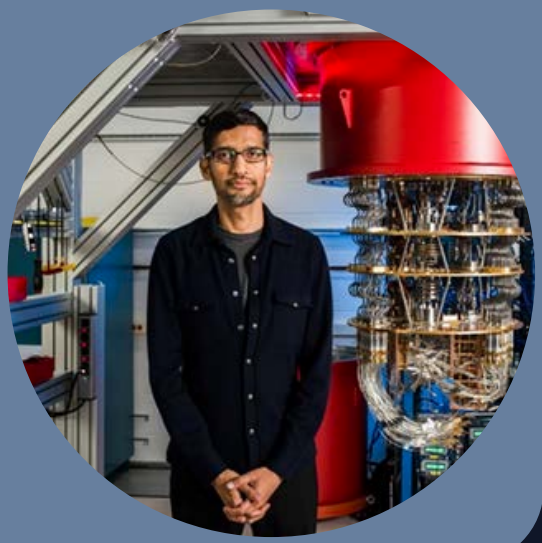
Israel's Quantum Moment: A Once-in-a-Century Revolution



Israel's deep-tech ecosystem is converging around quantum computing as researchers and entrepreneurs predict a near-term inflection point. Industry leaders like Quantum Machines and ClassiQ Technologies say practical quantum use cases are just a few years away. Global breakthroughs—from Google's "Quantum Echoes" chip to local pilots optimizing traffic with quantum algorithms—signal accelerating progress. With new Nobel recognition for superconducting pioneers and growing investor confidence, experts call this a "once-in-a-century revolution," positioning Israel as a potential global leader in the quantum era ahead.

Google's Quantum Leap Could Redefine Manufacturing

Google's new Willow quantum processor has achieved the first verifiable quantum advantage, running its "Quantum Echoes" algorithm 13,000 times faster than leading supercomputers. The experiment, which tracked how quantum information evolves and interferes, marks a breakthrough in simulating complex materials and molecular systems. For manufacturing, this could revolutionize materials science, battery design and prototyping by reducing reliance on trial-and-error testing. While still experimental, Willow's success moves quantum computing closer to real industrial use—signaling a shift from theory to tangible, high-impact applications in advanced manufacturing.



CLUB ACTIVITY

-Anshul &Vidhi

EVENT-1 "BUILDING A DIGITAL MARKETING STRATEGY FROM SCRATCH" (24% AI)

The discussion started from Search Engine Optimization (SEO) and Social Media Advertising, particularly on Facebook, Instagram, and LinkedIn. The class identified a number of ways to enhance the ranking of a website, traffics and leads thereby improving its visibility in the online s by properly optimizing the content and running targeted advertisements.

1. Search Engine Optimization (SEO)

The class started off with an overview of Search Engine Optimization and how advantageous it is in improving the rank of websites on search engines. Key areas discussed included:

Meta Keywords & Focus Keywords

Focus keywords and additional keywords were identified and integrated into the content with emphasis to increase its search visibility.

Types of SEO:

On-page SEO is the optimization carried out within the website, including structuring of content and keyword use.Off-page SEO means doing outside strategies to improve the authority, which includes link building and social sharing.

Technical SEO includes the optimization of site performance, speed, structure, and crawlability for a better user experience to improve rank.

Ranking factors in Google

The importance of user engagement was discussed: how Google reads time spent on a webpage and ranks pages based on that.

Meta Descriptions

The focus was to write clear and concise meta descriptions that can help attract clicks and improve performance in search.

2. Facebook Ads

The next session was on Facebook Ads, how to plan, setup, organize and run successful campaigns on it.

Campaign Structure:

The students were then shown how to apply Target Audience and define Interests to increase the reach and interaction of ads.

How to run ads:

Accordingly, the key elements involved in the setup of Facebook Ads were discussed:

- Ad Creative - visuals and copy
- Selection of Media
- Headline creation Button idea and button direction, Creation of Form: title, description, and contact details.
- Targeting and Retargeting in Detail: How to target audiences more precisely and re-target users who have interacted with the ad previously.

3. LinkedIn and Instagram social media advertising platforms

Further, the class also discussed advertising through other platforms like Instagram Ads: Visual Content to Engage Audiences.

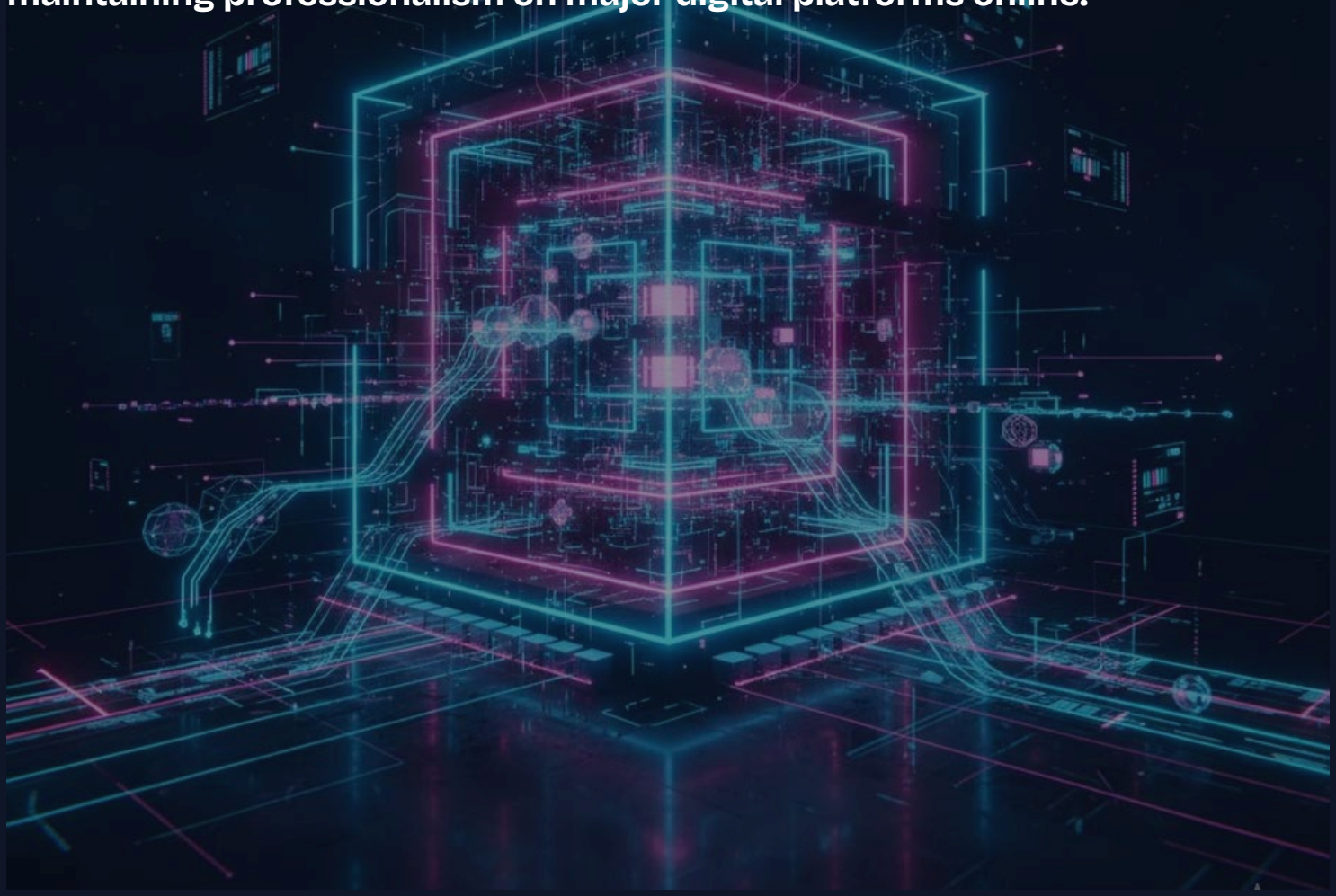
LinkedIn Ads: Especially, the 'Document' option in LinkedIn Ads could be useful for professional promotions, which is not available on Meta and Instagram.

4. Google Business Page

Finally, the students were introduced to the concept of Google Business Profiles via the website business.google.com. It creates a business page to enhance local SEO, builds credibility, and provides more customer engagement to Google Search and Maps.

Conclusion

The session delivered an overview of SEO and other online advertising strategies that one should know for online business: optimization of website content, applying data-driven advertising techniques, and maintaining professionalism on major digital platforms online.



EVENT-2 “DESIGN THINKING- A HUMAN CENTERED INNOVATION STRATEGY”

The engaging workshop on Design Thinking – A Human Centered Innovation Strategy was hosted by the INFOMATRIX Club of ABVSME on 10 November 2025. The session was led by Mr. Vikas Jain, who is widely known for his practical insights into innovation and problem-solving. His approachable style and real-world examples made the topic easy to connect with.

Mr. Jain explained the concept of Design Thinking in a very relatable manner to start off the session. He spoke about how at the heart of finding meaningful solutions lies an understanding of people: their needs, challenges, and motivations. His explanation helped students view design thinking as something more than a methodology, but rather a way of thinking.

He also talked about design thinking improving recruitment practices during the workshop. By looking at candidates through a lens driven by empathy, an organization could better frame problems and make better decisions in hiring. This perspective was of special interest to students who want to work in HR, consulting, or as a leader in their preferred fields.

He then walked everyone through the five stages of the Design Thinking process, adding small examples and scenarios that made each step easy to understand:

Empathize: Get to know the user's experiences and feelings.

Define - Clearly state the actual problem that requires attention.

Ideate: Think broadly and generate creative solutions.

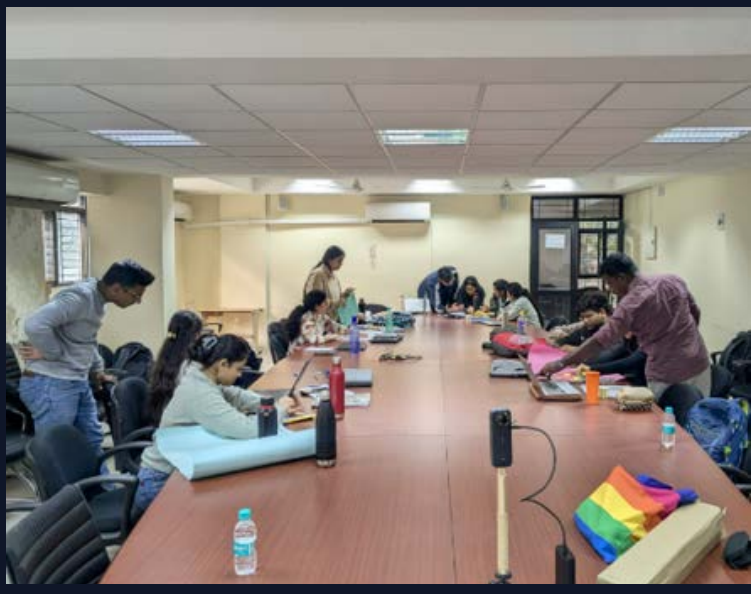
Prototype-create rapid prototypes to test ideas by making them tangible.

Test - Try out the prototype, refining based on feedback.

The highlight of the session was its interactivity. Mr. Jain posed various questions very often, and made the participants think out of the box, beyond simple answers. Activities carried out by him inculcated a sense of teamwork and fun while helping students understand how design thinking applied to real-life situations.

By the end of the workshop, students expressed that they genuinely enjoyed the session. Many shared that the concepts felt clearer and more practical after the activities, and that the workshop gave them a fresh way to approach problems both academically and professionally.

All in all, the session was an enriching and inspiring one, with everyone leaving with newfound ideas and valuable insight into human-centered innovation.



Case Studies

Quantum Computing Strategies of IBM and Google

-Ananya & Keshav

Case Study 1: IBM's Strategic Bet on Quantum Computing Leadership

In the mid-2010s, IBM recognized that classical computing was nearing its physical limits. To remain competitive in the future computing landscape, IBM made an early and bold investment in quantum technology—despite its high cost, technical uncertainty, and unclear timeline for commercial returns.

IBM's milestones included: - Introduction of the 127-qubit Eagle processor (2021) - Followed by the 433-qubit Osprey processor - Creation of a robust quantum ecosystem, not just hardware

Core Elements of IBM's Ecosystem Strategy

- Partnerships through the IBM Quantum Network with leading enterprises
- Cloud-based access to quantum hardware for researchers and developers
- A talent development pipeline via universities and research programs
- A long-term roadmap targeting machines with 1,000+ qubits

Internal Challenges Faced by IBM

- High and recurring R&D spending
- Difficulty in retaining specialized quantum scientists
- Stakeholder skepticism over long-term financial returns

Despite these challenges, IBM positioned quantum computing as a future-defining capability, similar to the role of mainframes in shaping its historical market dominance.

Questions for Analysis

- Was IBM's ecosystem-driven strategy the most effective approach to building competitive advantage? Why or why not?
- How should IBM evaluate ROI for a technology with applications potentially 5–10 years away?
- What strategic risks arise from heavy R&D investment, and how can leadership mitigate them?
- Does IBM's quantum roadmap create long-term differentiation, or can competitors replicate it?
- How does IBM's quantum strategy reflect platform thinking and network effects?

Case Study 2: Google and the Global “Quantum Supremacy” Controversy

In 2019, Google announced that its Sycamore processor had achieved “Quantum Supremacy” by solving a problem in 200 seconds that would take a classical supercomputer thousands of years.

The announcement triggered global excitement as well as criticism: - IBM publicly disputed the claim - Many leaders objected to the term “supremacy” - The breakthrough lacked direct commercial value - It intensified the technological race with China

Google’s research team viewed the milestone as a major scientific achievement, but executives also recognized its brand and strategic implications.

Strategic Questions for Analysis

- From a communication perspective, was it appropriate for Google to use the term “Quantum Supremacy”? Evaluate.
- How does this achievement strengthen Google’s position in the global tech race despite limited commercial value today?
- What potential business models could Google pursue to monetize its quantum capabilities?
- Could Google’s announcement escalate geopolitical technology tensions? Discuss.
- How should Google balance academic research ambitions with investor expectations for profitability?

Task 4: Identify Financial Risk

Determine:

- **Which cost category contributes most to the profit decline**
- **Whether revenue growth alone is sufficient to protect margins**

Task 5: Managerial Recommendation

Based on your analysis, answer:

- **Should AstraCore approve a fixed annual budget or a flexible budget range?**
- **What precautions should management take before committing expenses?**

Support your recommendation using numbers from your analysis.

Discussion Questions

1. **Why is a single annual budget risky in an uncertain economic environment, even if it is carefully prepared?**
2. **In this case, which matters more for protecting profitability: improving revenue growth or controlling costs? Why?**
3. **Which cost category would you prioritise for management attention under the downside scenario, and what action would you recommend?**
4. **How should management decide how much flexibility to build into the budget without creating confusion or loss of accountability?**
5. **If you were presenting this analysis to the Board, which one insight would you highlight to influence decision-making and why?**
6. **How would your budgeting recommendation change if the firm had strong cash reserves versus tight liquidity?**
7. **Should scenario-based budgeting be a one-time exercise for uncertain years, or a permanent practice? What are the trade-offs?**

1. What is the smallest unit of information in quantum computing called?

a) Bit

b) Byte

c) Qubit

d) Quantum Byte

2. Quantum computers rely on which principle that allows particles to exist in multiple states at once?

a) Entanglement

b) Superposition

c) Relativity

d) Decoherence

3. Which of the following companies developed the ‘Sycamore’ quantum processor?

a) IBM

b) Google

c) Microsoft

d) Intel

4. Quantum entanglement is sometimes described as:

a) Random movement of electrons

b) The connection between distant particles

c) A type of encryption

d) A type of algorithm

5. What is the name of the famous quantum algorithm used for factoring large numbers?

a) Grover's Algorithm

b) Shor's Algorithm

c) Newton's Algorithm

d) Dirac's Algorithm

6. Quantum computers are expected to outperform classical computers especially in:

a) Word processing

b) Video rendering

c) Cryptography & optimization issue

d) Web browsing

7. Which of the following best describes a quantum gate?

a) A physical barrier controlling electrons

b) A fundamental operation on qubits

c) A firewall in a network

d) A classical logic switch

8. The main challenge in building quantum computers is:

a) Shortage of transistors

b) Maintain qubit stability & reducing decoherence

c) Software unavailability

d) Lack of internet connectivity

9. Which field of study underlies the principles of quantum computing?

a) Classical mechanics

b) Quantum mechanics

c) Relativity

d) Thermodynamics

10. Which of these is NOT a current quantum computing platform?

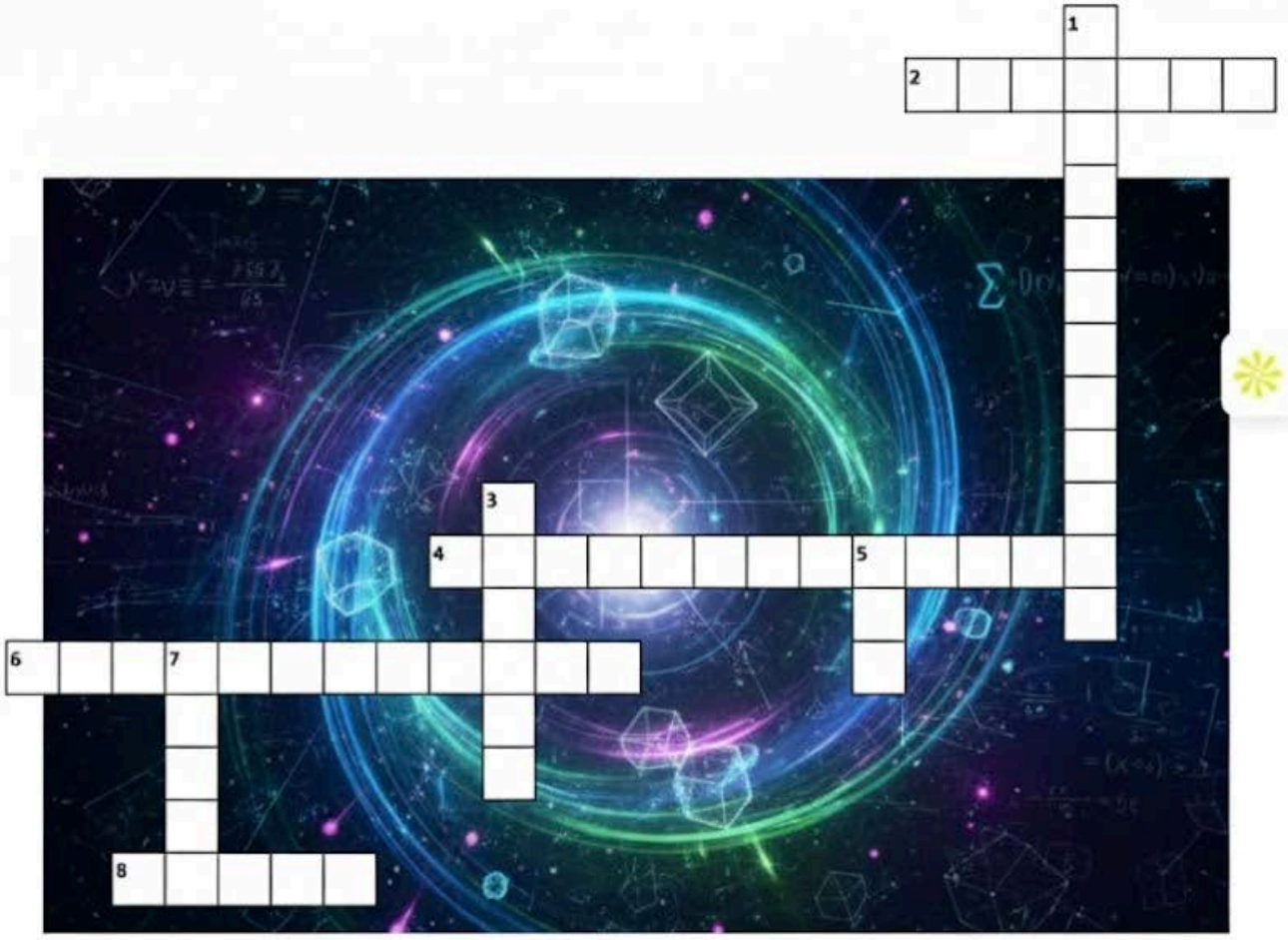
a) IBM Quantum

b) Google Sycamore

c) NASA QubitNet

d) D-Wave Systems

QUANTUM COMPUTING
CROSSWORD



Across

2. A branch of physics dealing with tiny particles

4. Ability of a particle to be in multiple states at once

6. Phrase that describes quantum computing's potential (two words)

8. Logical operations in quantum computing

Down

1. Phenomenon where particles remain connected across distances

3. The basic unit of quantum information

5. Company developing quantum processors (hint: starts with I)

7. Material used to build qubits in superconducting systems

ANSWERS

Quiz Answers:

1. c) Qubit
2. b) Superposition
3. b) Google
4. c) A correlation between qubits that allows instant state change
5. b) Shor's Algorithm
6. c) Cryptography and optimization problems
7. b) A fundamental operation on qubits
8. b) Maintaining qubit stability and reducing decoherence
9. b) Quantum mechanics
10. c) NASA QubitNet

CROSSWORD ANSWRES

Answers

Across:

1. QUBITS
2. SUPERPOSITION
3. ENTANGLEMENT
4. GATES

Down:

1. QUANTUM
2. IBM
3. TESLA
4. NEXT FRONTIER

EXCEL MANTRA

Case Study 3 : Budget Forecasting Under Economic Uncertainty (When precision is impossible, flexibility becomes a strategy)

Case Context

AstraCore Solutions is a mid-sized Indian services firm preparing its budget for the next financial year. The economic environment is uncertain. Inflation is high, demand outlook differs across clients, and future policy signals are unclear. In the past, the firm prepared a single annual budget and used it as a fixed target. This year, the CFO believes that the approach is risky. She argues that committing to one number creates confidence without preparation. The finance team has been asked to prepare a budget that reflects uncertainty, not certainty.

The Problem

Senior management wants clear answers to three questions:

1. How much can profits change if demand or costs move slightly away from expectations?
2. Which costs create the greatest pressure on margins during difficult conditions?
3. Should the firm lock in spending now, or keep room to adjust during the year?

Your task is to help management make these decisions using Excel.

Dataset

You are given historical data for the last three years as follows:

Year	Revenue (₹ Cr)	Fixed Costs (₹ Cr)	Variable Costs (₹ Cr)	Inflation Rate (%)	Demand Growth Rate (%)
2022	120	45	30	5	6
2023	132	48	34	6.5	7
2024	140	52	38	7.2	5.5

Task 1: Prepare a Baseline Budget

Using the most recent year as a reference, prepare a projected budget for the next year, assuming conditions remain broadly stable.

Task 2: Develop Alternative Scenarios

Create three different future situations:

- **A favourable situation where demand improves, and cost pressure reduces**
- **A normal situation where current trends continue**
- **A difficult situation where demand slows, and costs rise**

For each situation, estimate revenue, costs, and profit.

Task 3: Compare Outcomes

Place the results of all scenarios side by side and observe:

- **How profit changes across scenarios**
- **How much does the cost increase relative to revenue**
- **Which scenario puts the firm under the most pressure**

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Welcome to the New Edition of Volume 3– Insights by Infomatrix!

Onwards and Upwards! 🚀

In this edition, we take you through "India in Space: A Journey Since Independence"—tracing the nation's remarkable ascent from humble beginnings to becoming a global space power, highlighting landmark missions, scientific breakthroughs, and India's growing influence beyond Earth.