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A Review on Quantum Computing for Business Applications

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Abstract: Quantum Computing is gradually gaining importance as a transformative technology with the potential to revolutionize business applications by solving complicated problems beyond the capabilities of classical computers. Using basic principles such as superposition and entanglement, quantum systems can concurrently handle a wide range of combinations of possibilities. It offers several benefits in optimization, financial modeling, supply chain management, risk analysis, and machine learning. Despite the limitations of existing hardware in the NISQ era, rapid developments are enhancing scalability and reliability. This study analyses the practical implications, opportunities, and challenges of integrating quantum computing into business environments, spotlighting its capacity to drive innovation, competitive advantage, and long-term strategic growth throughout industries. By situating quantum computing within a transdisciplinary engineering and business ecosystem, this review demonstrates that quantum technologies are not merely enablers of computational speed but catalysts for systemic innovation.

Index Terms: NISQ, quantum computing, business intelligence, quantum approximate optimization algorithm, variational quantum eigen solver, quantum support vector machine

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1. Introduction

Quantum Computing indicates a fundamental conceptual change in computational science, offering possibilities to solve complicated business problems that are unmanageable for classical systems. Different from traditional computers that represent information in binary bits, quantum computers take advantage of principles such as superposition and entanglement to perform parallel computations at unprecedented scales. This potential is specifically relevant in modern business environments marked by big size datasets, dynamic markets, and optimization challenges. As industries rely on data-driven decision-making, the need for faster and more productive computational models has become complicated. Quantum computing promises to enhance operational efficiency, strategic planning, and competitive advantage across finance, logistics, healthcare, energy, and manufacturing sectors [1].

The existing state of the art places quantum technology in the Noisy Intermediate-Scale Quantum (NISQ) era, where hardware restrictions such as noise and error rates remain important challenges. Leading technology companies including IBM, Google, Microsoft, and D-Wave have developed quantum processors and cloud-based platforms to examine commercial feasibility. Research efforts have focused on quantum algorithms such as Shor's algorithm for factorization, Grover's algorithm for search, and the Quantum Approximate Optimization Algorithm (QAOA) for combinatorial optimization [2]. Recent research reveals promising applications in portfolio optimization, supply chain routing, fraud detection, and machine learning acceleration. Hybrid quantum-classical approaches are presently considered practical approaches for near-term implementation, integrating quantum circuits with classical high-performance computing systems [3].

In spite of these developments, the field continues to be exploratory, with scalability, cost, and integration challenges limiting pervasive adoption. However, businesses and academic institutions are investing large amounts of money in pilot projects and preliminary validation models to assess real-world impact [4]. The multidisciplinary character of quantum computing, bridging physics, computer science, engineering, and business analytics, designates it not just as a computing tool, but as the driving force behind organized innovation.

2. Principles of Quantum Computing

Quantum computing is founded on the principles of quantum mechanics, which govern the behaviour of matter and energy at microscopic scales. Quantum computing exploits the probabilistic and wave-like properties of quantum systems in information processing, which is different from traditional classical computation which relies on deterministic binary logic. The basic working principles behind quantum computing are represented below:

2.1. Qubits and Quantum State Representation

Qubits form the core of quantum computing, which represents the quantum counterpart of bits. Unlike classical bits, which only have 0 or 1 states, a qubit exists in a linear combination of both states at the same time. In mathematical terms, a qubit is represented as:

$$| \psi\rangle = \alpha | 0\rangle + \beta | 1\rangle \tag{1}$$

where α and β are complicated probability amplitudes satisfying $| \alpha |^2 + | \beta |^2 = 1$. Because of this representation, quantum systems can encode exponentially more information than classical bits when many qubits are used together [5].

The basis vectors are portrayed as:

$$| 0\rangle = \begin{bmatrix}1\\0\end{bmatrix}, | 1\rangle = \begin{bmatrix}0\\1\end{bmatrix} \tag{2}$$

It is possible to disclose the quantum state of a multi-qubit system by applying the tensor product operation. For example, a two-qubit system is illustrated as:

$$| \psi\rangle = \alpha_{00} | 00\rangle + \alpha_{01} | 01\rangle + \alpha_{10} | 10\rangle + \alpha_{11} | 11\rangle \tag{3}$$

where the normalization condition is expressed as:

$$\sum_{i=0}^{3} | \alpha_i |^2 = 1 \tag{4}$$

Due to this exponential state space growth, quantum computers are qualified to process large computational data more optimally than classical computers.

2.2. Superposition

Superposition is considered the most important phenomenon in the quantum domain. As long as the qubit is not measured, it can be in several states at the same time through superposition. When a system has n qubits, it can simultaneously convey 2^n possible states due to superposition [6]. This property serves as the basis of quantum parallelism; as a result, quantum algorithms can search larger solution fields more efficiently than classical methods. The theory is mathematically conveyed as:

The probabilities of obtaining states $|0\rangle$ and $|1\rangle$ after measurement are respectively given by:

$$P(0) = |\alpha|^2 \tag{5}$$

$$P(1) = |\beta|^2 \tag{6}$$

A common method for producing superposition is the application of the Hadamard gate H, illustrated by:

$$H = \frac{1}{\sqrt{2}}\begin{bmatrix} 1 & 1 \\ 1 & -1 \end{bmatrix} \tag{7}$$

Applying the Hadamard gate to the basis state $|0\rangle$ produces:

$$H|0\rangle = \frac{1}{\sqrt{2}}(|0\rangle + |1\rangle) \tag{8}$$

This enables a quantum processor to evaluate multiple computational possibilities simultaneously, contributing to the speedup observed in algorithms such as Grover's and Shor's algorithms [7].

2.3. Entanglement

Although the qubits are far apart from each other, their status remains interdependent and this is the property known as entanglement of quantum processing. Entanglement is a quantum property where two qubits are so connected that a change in the state of one qubit can affect the state of the other, even if they are far apart [8]. When a change occurs in one interconnected qubit, it immediately affects the other qubits. By controlling the coherent state between qubits, entanglement increases processing power and plays an important role in complicated problem solving and secure communication protocols.

2.4. Quantum Interference

Quantum interference is a process by which potential magnitudes are either constructively or destructively coupled together. Quantum algorithms are designed in such a way that incorrect computation paths are reduced by damaging interference and correct resolutions are strengthened by productive interference. This principle is at the heart of the speedup seen in various quantum algorithms [9].

2.5. Quantum Gates and Circuits

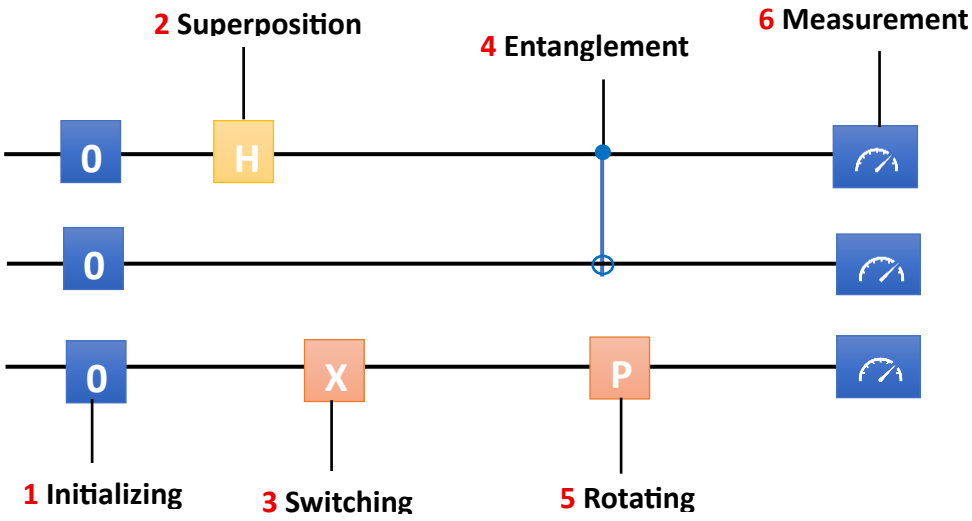


Fig. 1. Quantum Gates and Circuits

Qubits and quantum gates are the basic building blocks of quantum computing; however, they may be altered. A quantum gate is a reversible unitary operation used to control and change the state of a qubit. Hadamard (H), Pauli-X, Pauli-Y and Pauli-Z gates are common gates used in single qubits. A multi-qubit gate such as Controlled-NOT (CNOT) enables entanglement [10]. A quantum circuit is a sequential arrangement of gates, which are created to implement particular algorithms. Quantum gates are different from classical logic gates, because they maintain coherence and operate on the basis of linear transformation.

2.6. Measurement and Collapse

When measurement occurs in quantum computing, the superposition state of a qubit collapses and transitions to either a 0 or a 1 basis state, whose probability is determined by the value of the amplitude. This probabilistic property distinguishes quantum computation from deterministic classical computation and requires multiple checks for statistical accuracy.

3. Quantum Programming and Platforms

Quantum Computing is one of the emerging technologies that we can use for handling large datasets and solving complex problems in our daily life. Basically, there are two important concepts of quantum programming: these are superposition (S) and entanglement (E). Using those concepts, we can increase the overall accuracy and efficiency of complex problem solving. Because of S, qubits of quantum programming can exist in different states simultaneously. On the other hand, classical programming is operated by only the value 0 or 1. Quantum programming helps us to perform deep analysis on large and complex problems which can overcome the limit of traditional systems. Apart from this, secure data handling, management efficiency and advanced hybrid algorithm design play a vital role in solving any complex problems. The core of quantum computing is qubits. By using advanced techniques of qubit, we can compute or process some critical problems with high speed and accuracy which can make the overall process smooth and efficient as well as secure. There are several platforms or applications where this technology is widely used; these are –

3.1. IBM Quantum Experience

IBM Quantum, a leading cloud platform, makes real quantum processors accessible to the public, so users can learn quantum programming, test code, and effectively implement complex qubit-based algorithms. Qiskit, an open-source SDK that provides a powerful tool for quantum circuit design and analysis, is at the heart of the IBM quantum ecosystem. Users can easily connect directly to IBM's advanced quantum hardware through both free and premium access models. This SDK is designed in such a way that it ranges from basic education to advanced-level algorithms that help students, researchers and professionals. The modular structure makes it not only adaptable but also an innovative and future-ready platform that uses a combination of classical and quantum systems.

- Quantum circuits (design and simulation)
- Quantum algorithms (including search and optimization)
- ML integration
- Optimization modules for industrial applications

A key feature of Qiskit's hybrid workflow is its ability to address real-world problems. These variational algorithms operate through an iterative process that combines classical optimization with quantum state preparation. They have been widely studied in research, particularly for improving efficiency and accuracy. The IBM quantum community is open source, offering continuous updates, interactive tools, and global collaboration and the initiative takes the learning experience of students and researchers to a new height. Through IBM's quantum experience platform, users can run algorithms directly on IBM labs simulators and processors, giving them a realistic and research-based experience [11].

3.2. Amazon Braket

Amazon Braket is a core infrastructure component of AWS, it provides researchers and developers with integrated access to various quantum hardware technologies, which speeds up experimental work. Systems developed by IonQ, Rigetti and D-Wave are designed so that gate-based quantum computing and annealing, the two main methods, can work in combination., as a result it is possible to provide multidimensional solutions to complex scientific modelling, optimization problems and practical research. This platform enables such hybrid workflows where quantum and classical processes work together increasing efficiency and performance [12].

3.3. Microsoft Azure Quantum

Microsoft's quantum ecosystem is built around the Q# programming language which provides a unified platform for research, development and implementation. Azure Quantum consists of hardware and simulators, and this ecosystem provides an integrated development and implementation framework. This opens up new possibilities in quantum research. Quantinuum, IonQ and Rigetti — these are the three main hardware partners; as a result, users can choose from multiple

backend options. The QDK is not only a rich library of quantum algorithms; it also provides powerful tools for debugging, resource estimation and performance analysis. Through the integrated optimization of conventional and quantum resources, Azure Quantum provides a hybrid environment. Visual Studio Extensions simplify access to Q#; as a result, developers can build and optimize quantum apps faster. Innovations in quantum computing, interdisciplinary collaboration and Microsoft's rich educational resources for researchers and students aiming to enhance testing, take advantage of tutorials and open repositories [13].

3.4. Google Cirq

The Cirq framework was developed by Google and is a Python-based tool optimized for their QC architecture. Its main function is building a quantum computer and running it effectively. One of the biggest advantages of Cirq is the ability to accurately replicate real defects in modern quantum devices. Because of this feature, researchers can realistically evaluate the performance of algorithms in hardware environments and predict stability [14]. This method is widely used for testing quantum supremacy and for diverse algorithm searches. Through integration with Cirq, TensorFlow Quantum's learning elements help build hybrid models. Additionally, it provides useful tools for noise modelling and circuit improvement, which makes quantum algorithms more efficient [15].

3.5. Xanadu's PennyLane

PennyLane, developed by Xanadu, is particularly suited to support the development of hybrid quantum-classical systems, which plays an effective role in testing and ML research. Along with its strong design philosophy, PennyLane offers easy integration with major ML frameworks like TensorFlow and PyTorch, which makes it an essential tool for data scientists and Artificial Intelligence researchers. Instead of gate-based quantum platforms, PennyLane mainly focuses on the development and implementation of diversification algorithms, which is very useful for quantum chemistry, optimization and QML. PennyLane's plugin-based architecture is open source, allowing developers to integrate with multiple quantum backends without the need for rewriting. Its features allow researchers running the same algorithm on different platforms to conduct comparative analysis, paving the way for better management.

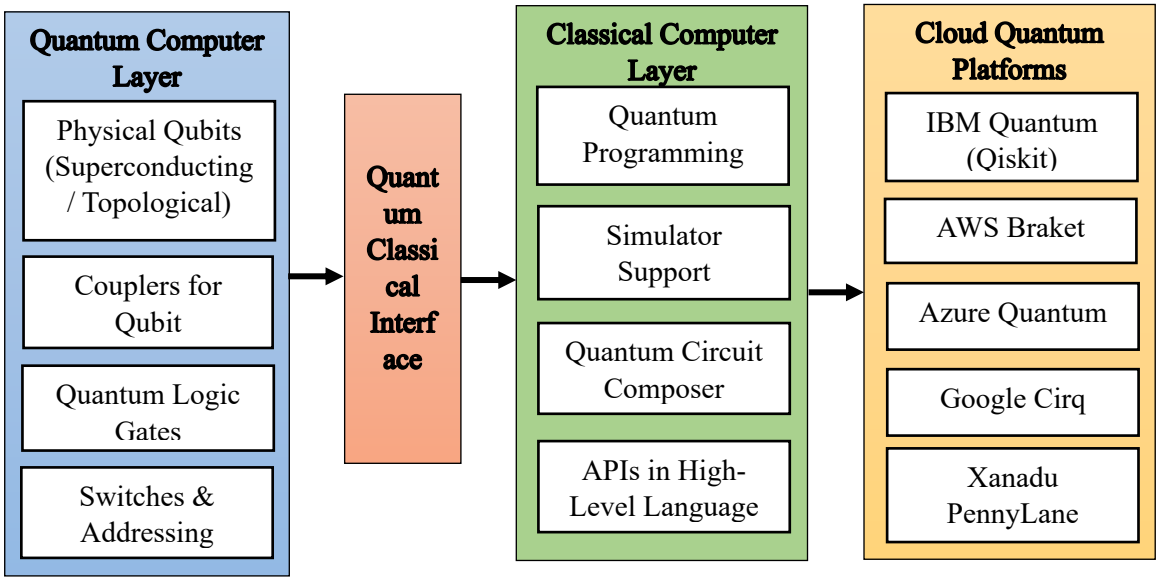


Fig. 2. Quantum Programming and Platforms

Due to its capabilities, it plays an effective role in industrial research and experimental business applications, among the prominent quantum platforms is the IBM Quantum Experience with its strong real hardware access and business integration. Amazon Braket, which assures access to various quantum hardware providers through cloud-based systems, delivers high scalability and creates more flexibility in business use. To support scalable business analytics and optimization activities Microsoft Azure Quantum prioritizes hybrid quantum-classical architecture and enterprise-oriented compatibility. Google Cirq is a practical platform for advanced quantum research due to its high computational capabilities; however, large-scale commercial access is not yet fully widespread. Xanadu PennyLane plays an important role in supporting quantum machine learning and AI-driven business models, because it is productively connected to differentiable programming frameworks. How useful modern quantum platforms will be for businesses mainly depends on cloud accessibility, hardware scalability, algorithmic performance and enterprise integration.

4. Business Use Cases

In addition to leading the entire industry towards restructuring, Quantum Computing is also designed to solve such problems which are almost impossible to solve by modern computers. The real power of quantum computing in business lies in its unique power, which enables the processing of large datasets and the simultaneous exploring of countless possibilities. As a result of this development, organizations are now able to determine the best solution faster and more efficiently than ever before.

4.1. Supply Chain Optimization

For complex business problems such as demand forecasting, route planning and inventory management, quantum algorithms undoubtedly provide more efficient results than conventional techniques. This approach helps international logistics and ecommerce businesses reduce delivery times, and analyses millions of possible alternatives enabling them to make their operations more efficient. The distribution network of a global store becomes more dynamic as a result of the application of quantum optimization, and can adapt instantly to situations such as sudden demand increases, traffic changes and port delays. For example, businesses like FedEx and DHL are already experimenting with quantum-inspired algorithms in the real world [16].

To make traffic control and route planning more efficient in a smart city environment, Volkswagen used quantum optimization methods. The system displayed the effectiveness of quantum-based logistics and supply chain management by increasing the precision of traffic forecasting and reducing congestion in urban transportation networks.

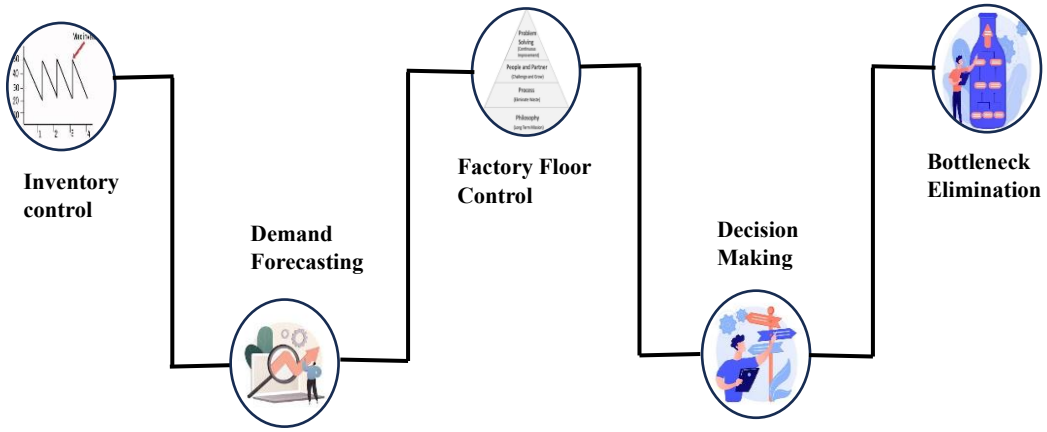


Fig. 3. Supply Chain Optimization

4.2. Financial Modeling

Future market trends in the banking industry and higher processing power are essential for accurate prediction and assessment, because massive data analysis and real time calculations form the basis of this process. Quantum Computing is an effective tool in financial analysis, because quantum Monte Carlo algorithms involve complex calculations such as option pricing and greatly reduce the time required for risk modeling and investment optimization. Quantum computing technology could revolutionize algorithmic trading and fraud detection, and also helps investors make quick decisions by accurately predicting market trends [17].

To develop more efficient hedging strategies and to minimize potential damage, a bank can model thousands of market scenarios simultaneously using Quantum Computing. It is not just limited to theory, because large companies like JPMorgan Chase and Goldman Sachs are already actively researching quantum algorithms for these applications.

JPMorgan Chase explores the use of hybrid quantum algorithms in portfolio optimization, fraud detection and risk analysis. Experimental benchmarks have presented that Quantum-based optimization methods are able to demonstrate enhanced efficiency over classical methods in processing large financial datasets.

4.3. Healthcare & Drug Discovery

Quantum simulations have made it possible to model molecules and understand how proteins fold at previously unheard-of speeds. Drug discovery is greatly impacted by the ability to identify the most promising molecules much earlier, before expensive clinical studies are necessary [18]. Based on a person's genetic profile, biotech and pharmaceutical companies may be able to diminish costs, expedite research, and get nearer to custom-built medicine. Furthermore, in addition to helping develop drugs for rare diseases, quantum-assisted modeling can represent biological interactions more precisely, allowing for the advancement of treatments with reduced data requirements. Quantum algorithms, like the Variational Quantum Eigen solver (VQE), are essential for drug design to estimate molecular energy states. Researchers can more precisely guess confining affinities utilizing quantum simulations of protein–ligand interplay than they can using conventional methods.

This method is also considered to be quite specific. In cases where data is deficient, solutions to rare ailments can be found because of the rare ability to mimic biology. Drug design, as one of the central components of the system, determines the energy states of molecules using advanced quantum algorithms such as the variational quantum eigen solver (VQE). It is considered as a fundamental and very important step, which is capable of significantly accelerating accurate molecular modeling and drug discovery processes. When predicting how a drug will bind to a protein, Quantum simulations then provide researchers with more accurate results than traditional classical methods [19].

Roche, in association with IBM, explores the use of quantum advances in molecular interactions and drug discovery processes. Research shows that quantum-based molecular modeling can accelerate drug research by reducing the complexity of chemical analysis.

4.4. Cybersecurity

Quantum computing technology creates new opportunities in data security, but it also brings complex challenges. Quantum Key Distribution (QKD) keeps data transmission secure, and although quantum computing can weaken older encryption methods, QKD actually makes transmission stronger. To ensure the protection of sensitive information, post-quantum cryptography (PQC) can be adopted as an essential strategy. When large-scale quantum computing becomes common in the future, organizations that are determined to protect security-sensitive information will be able to implement hybrid encryption infrastructure [20]. Currently, governments and research institutions are actively working on developing quantum-resistant protocols, secure communications infrastructure, and AI-powered quantum cybersecurity frameworks. Exploring the overall potential of quantum technology, developing a stable, reliable and automated security ecosystem is the future of data privacy and will significantly improve the quality of cyber defence.

Google's Quantum Dominance Experiment Brings to the Fore the Cyber Security Risks Posed by Future Quantum Systems especially in the case of conventional cryptographic methods. This has led to accelerated research into the development of post-quantum cryptography and quantum-secure communication systems.

The evaluation is done using the comparative scoring method in Table 1; each business use case uses two key parameters. Each business use case is evaluated on these two requirements: Impact Score indicates long-term impact and value, while Readiness measures current feasibility and technological maturity. It helps in setting strategic priorities.

Table 1. Business Use Cases

Business Use Case	Potential Impact Score (1-10)	Adoption Readiness (1-10)
Supply Chain Optimization	9	6
Financial Modeling	8	7
Healthcare & Drug Discovery	9	5
Cybersecurity	7	6

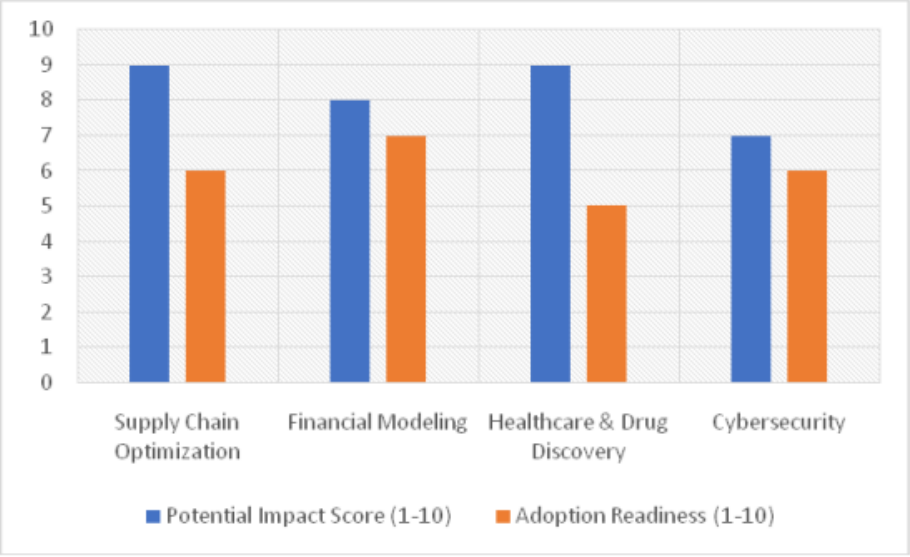


Fig. 4. Business Use Casses Impact vs Adoption

5. Challenges and Considerations

Although quantum computing shows significant potential in business applications, technical, economic and organizational issues need to be resolved before its widespread commercial acceptance. These challenges determine how quickly businesses can integrate quantum technology into their operational and strategic frameworks.

5.1. Hardware Limitations

Today's quantum computers are at the NISQ level, where the number of qubits is limited, the coherence time is short, and the error rate is relatively high [21]. Environmental disturbances such as temperature changes, electromagnetic interference, and vibrations easily affect quantum systems, causing decoherence and computational errors. Also, preserving the quantum state requires a highly controlled environment and often uses cryogenic temperatures close to absolute zero. Such technical barriers limit the range and complexity of problems that can be solved by current quantum hardware in real business applications [22].

5.2. Skill Gaps

Deep and expert knowledge of quantum physics, computer science, mathematics and algorithm design is essential in the development and implementation of quantum computing solutions. These interdisciplinary skills help in understanding quantum systems, developing efficient algorithms, and using the technology properly to solve real-world problems. However, the global workplace still lacks sufficient professionals with interdisciplinary expertise in these subjects. Businesses that want to work with quantum applications often struggle to hire or train staff who can develop quantum algorithms, design quantum circuits, and integrate them with classical computing [23]. Addressing this skills gap through education, training programs and academic and industry collaboration is essential to accelerate the adoption of the technology.

5.3. Integration Issues

Integrating quantum computing with existing business infrastructure can create significant challenges. Most organizations currently rely on classical computing systems, enterprise software and data management platforms, which cannot work directly with quantum hardware. However, creating efficient interfaces, communication systems and coordination of work steps between these systems is still a complex task, which requires additional research and technological development [24].

5.4. Cost and ROI Uncertainty

Building a quantum computing infrastructure requires large investments in research, hardware development, and skilled expert personnel. Because the technology is still in its infancy, the cost of experimentation and implementation is high for many organizations, but the return on investment (ROI) remains uncertain. Businesses need to carefully evaluate whether quantum solutions offer tangible and measurable benefits over classical high-performance computing for specific tasks. As a result, many organizations are currently adopting exploratory strategies such as pilot projects, collaborations with research institutions, and using cloud-based quantum platforms to assess long-term benefits as well as mitigate financial risks [25].

6. Becoming Quantum-Ready

Organizations need to actively prepare to integrate quantum computing into business operations in the future, as it continues to evolve. The process of becoming quantum-ready includes building strategic awareness, building technical capabilities, and establishing collaborative ecosystems for the use of experimental quantum technologies [26]. By preparing early, organizations can identify potential opportunities, understand limitations, and step-by-step integrate quantum solutions with classical computing. The strategies described below indicate important steps that help organizations prepare for the quantum era.

6.1. Awareness and Training

Raising awareness of quantum computing and its potential business impact is the first step in preparing organizations for the quantum era. Many leaders and professionals still have a limited understanding of how quantum technology works and where it can be applied. Therefore, companies need to invest in training programs, workshops and educational activities to acquire basic knowledge among managers, engineers and data scientists. Universities and professional institutions are increasingly offering specialized courses on quantum information science, quantum algorithms and quantum programming frameworks. By developing internal expertise and continuous learning efforts, organizations can reduce knowledge gaps related to emerging technologies and accurately assess future possibilities [27].

6.2. Collaborations

The joint efforts of industry, academia and research institutions play a key role in advancing quantum innovation. Because quantum computing combines knowledge from physics, computer science, engineering and business analytics, partnerships therefore enable organizations to use specialist knowledge and resources that they do not have internally [28]. Universities can partner with technology companies and research labs to conduct experiments, pursue collaborative efforts and prototype solutions for business enterprises. Collaboration in such ecosystems accelerates knowledge sharing and helps organizations stay updated with the latest technological innovations in quantum computing.

6.3. Pilot Projects

Pilot projects and proof-of-concept tests allow businesses to test the potential uses of quantum technology without large-scale investments. These small initiatives help organizations determine areas in which quantum algorithms can be more effective than classical methods, such as optimization, risk analysis, and data modeling. By testing quantum solutions on specific business problems, companies gain in-depth knowledge of their effectiveness, performance improvements, and technical limitations. Through the pilot program, institutions can learn how quantum systems integrate with existing computational frameworks [29].

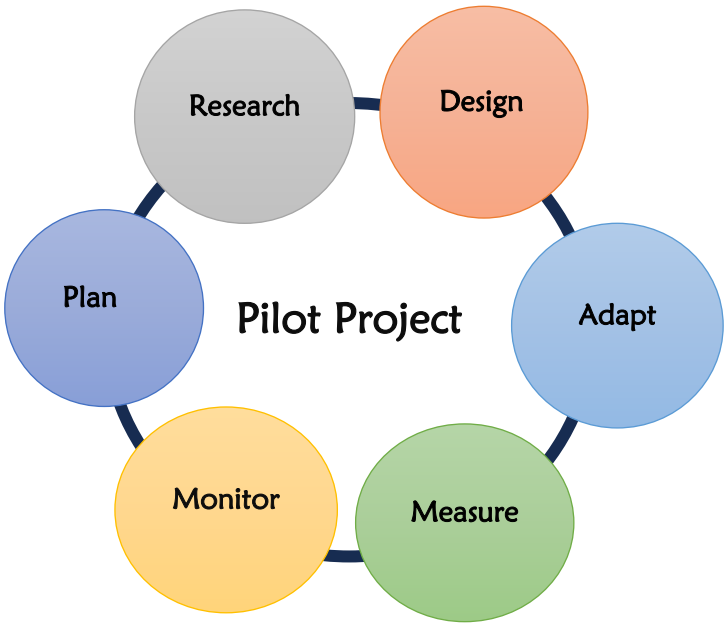


Fig. 5. Pilot Project

6.4. Roadmap Development

Formulating a long-term strategic roadmap for gradual adoption of quantum technology gives the organization the right direction. A clear roadmap sets out critical priorities for research, potential use areas, required funding, and timelines for testing and implementation. It helps organizations align quantum initiatives with larger digital transformation plans. By establishing clear objectives and periodic implementation plans, businesses are able to manage the risks of emerging quantum technologies as well as systematically prepare for future advancements [30].

7. Conclusion

Capable of radically transforming the structure of technology and commerce, Quantum Computing is considered a unique force in today's era. In sync with scientific progress, it represents a completely new approach that, compared with conventional computers, efficiently and quickly solves difficult or time-consuming problems involving large data sets. For financial analysis, Quantum Computing, powered by Superposition, Entanglement and quantum parallelism, can redefine fields such as logistics planning, medical innovation, cyber security and data intelligence, ensuring better decision making.

Computing is not limited to theory; business professionals need to know its basics and it has to be used strategically to solve real life complex problems for better results. Companies may apply quantum technology to gain significant competitive advantage in the future, as it is in its early stages, and through it they can innovate, increase efficiency, expand markets and solve complex problems. In the present time, organizations that invest in quantum applications have a statistically higher probability of leading the market in the future, because early research and implementation increase their technological readiness and innovative capacity. Currently, Quantum Computing is still in its early development stage, and as most systems operate in the noisy NISQ region, researchers face significant technical and theoretical problems — which is one of the main obstacles to progress. Trends in scientific research show that the rapid development of quantum technology, strong industry interest and a strong ecosystem are together creating an environment where viable and scalable quantum solutions are becoming a reality.

If companies quickly adopt this paradigm shift and quantum literacy and invest in collaborative alliances and pilot projects, they will lay a solid foundation to survive and lead the quantum economy of the future, which will multiply their innovation and challenges. Early adopters of quantum technology help achieve significant organizational learning, thereby reducing the time required to convert to an efficient quantum system. It not only provides competitive advantages,

but also long-term efficiency and innovation. While theoretical advances in Quantum Computing are becoming practical applications, its implications are not merely technical but also a matter of business decision, requiring deep innovation and reflection at every level of operations. So, now is the time to prepare for this upcoming digital transformation.

All the Declarations and Statements

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Conceptualization - Subhasree Bhattacharjee
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Data Collection - Jaya Kumari, Sreya Dey

All authors have read and agreed to the published version of the manuscript.

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Declaration of Generative AI in Scholarly Writing
During the preparation of this manuscript, the authors utilized generative AI tools to assist with language refinement, grammar correction, formatting, and improvement of manuscript readability. The authors carefully reviewed and edited all generated content and take full responsibility for the accuracy, originality, and integrity of the final submitted manuscript.

Abbreviations
The following abbreviations are used in this manuscript:

NISQ = Noisy Intermediate-Scale Quantum
VQE = Variational Quantum Eigen solver
ROI = Return On Investment
QAOA = Quantum Approximate Optimization Algorithm
QKD = Quantum Key Distribution
ML = Machine Learning
API = Application Programming Interface
PQC = Post quantum cryptography

Appendix A\B\C…, with appendix title
Not Applicable

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