

ELEC5882M Final Report

6G and AI in Cloud Computing and Edge Paradigm

VASANT MAHANTESH DODAMANI

Student ID: 201752741

Submitted in accordance with the requirements for the degree of  
**Master of Science in Engineering Technology and Business Management**

Supervisor: **Maryam Hafeez**

**The University of Leeds**

**School of Electronic and Electrical Engineering**

August 2024

Declaration of Academic Integrity

The candidate confirms that the work submitted is his/her own, except where work which has formed part of jointly-authored publications has been included. The contribution of the candidate and the other authors to this work has been explicitly indicated in the report. The candidate confirms that appropriate credit has been given within the report where reference has been made to the work of others.

This copy has been supplied on the understanding that no quotation from the report may be published without proper acknowledgement. The candidate, however, confirms his/her consent to the University of Leeds copying and distributing all or part of this work in any forms and using third parties, who might be outside the University, to monitor breaches of regulations, to verify whether this work contains plagiarised material, and for quality assurance purposes.

The candidate confirms that the details of any mitigating circumstances have been submitted to the Student Support Office at the School of Electronic and Electrical Engineering, at the University of Leeds.

VASANT MAHANTESH DODAMANI

Date: 30 August 2024

# Table of Contents

Contents

[Table of Contents 3](#_Toc175912400)

[Abstract: 8](#_Toc175912402)

1.[Introduction: 9](#_Toc175912403)

[1.1 What is 6G?: 9](#_Toc175912404)

[1.2 Artificial Intelligence: 10](#_Toc175912406)

[1.3 - Cloud Computing: 11](#_Toc175912407)

[1.4 – Edge Paradigm: 12](#_Toc175912408)

[1.5 - 6G and AI-Enabled Cloud and Edge Computing: 12](#_Toc175912409)

[1.6 How it can improve quality of life: 13](#_Toc175912410)

[1.7 How does a non-tech audience see it? 14](#_Toc175912411)

[1.8 How quickly it is growing and how big the market is: 14](#_Toc175912412)

[2. IBM 15](#_Toc175912413)

[2.1 Company’s Overview: 15](#_Toc175912414)

[2.2 Here’s how IBM’s strengths connect with the goals of my project: 16](#_Toc175912415)

[2.3 Managing for innovation at IBM 17](#_Toc175912416)

[2.4 Ecosystem Analysis 18](#_Toc175912417)

[2.4 Scenario Planning Approach for IBM 21](#_Toc175912441)

[2.5 To determine what IBM should or should not do to be successful in various scenarios: 23](#_Toc175912443)

[2.6 The Innovation Challenge for IBM: 24](#_Toc175912444)

3. [Operations 25](#_Toc175912446)

[3.1 When contemplating clients for IBM's 6G and AI services in cloud and edge computing, several main sectors spring to mind, encompassing numerous industries and types of organizations: 25](#_Toc175912447)

[3.2 Needs in market 26](#_Toc175912455)

[3.3 Key Performance Indicators (KPIs) for IBM’s 6G and AI in Cloud Services: 27](#_Toc175912456)

[3.4 House Of Quality: 27](#_Toc175912457)

[3.5These are the specific technical capabilities that IBM must develop or enhance to satisfy the customer needs listed above. 28](#_Toc175912459)

[3.6Supply chain network for IBM’s 6G and AI in cloud services 30](#_Toc175912460)

[3.7 IBM’s 6G and AI services in cloud computing should be positioned in terms of quality, pricing, availability, and easy access: 31](#_Toc175912461)

[3.8 PORTRERS Model 32](#_Toc175912462)

[3.9 Performance Objectives for IBM’s 6G and AI in Cloud Services 35](#_Toc175912472)

[4. Perception: 37](#_Toc175912479)

[4.1 Why public perception is important for my project: 37](#_Toc175912480)

[4.2 A Mental Models in the Context of IBM's 6G and AI in Cloud Services 37](#_Toc175912481)

4.2 B [Poster representation of 6G and AI in cloud computing for all the audience: 40](#_Toc175912482)

[4.3 For IBM, the evaluation process could involve: 41](#_Toc175912483)

[4.4Expert Model Flow Chart 42](#_Toc175912484)

[4.5 Non-Expert Model for IBM’s 6G and AI Project 44](#_Toc175912485)

[Conclusion: 46](#_Toc175912486)

[References: 48](#_Toc175912487)

# 6G And AI in Cloud and Edge Computing

## Abstract:

This report looks into the revolutionary confluence of 6G technology with Artificial Intelligence (AI) within cloud and edge computing settings, aiming to create a new standard in both technological innovation and business management. The project focuses on designing and analysing a high-performance, AI-driven 6G architecture that not only pushes the boundaries of ultra-low latency and high-speed data transmission but also redefines strategic business applications across diverse sectors, including smart cities, autonomous systems, and industrial automation.  
  
Leveraging 6G's improved communication capabilities, this research studies how AI at the edge can handle enormous information in real time, thus enabling faster decision-making and lowering dependency on centralized cloud infrastructure. The process comprises the construction of a prototype system where AI-enhanced edge nodes are easily integrated into a 6G network, offering dynamic resource allocation, predictive analytics, and increased security measures targeted for business-critical applications.  
  
The integration of 6G with AI delivers a robust platform for innovation, enabling unprecedented opportunity for organisations to streamline operations, enhance consumer experiences, and develop new income streams. The project also examines the economic effect, scalability, and market potential of these technologies, ensuring that the offered solutions are not only technically viable but also strategically aligned with present and future business landscapes.  
  
This interdisciplinary approach highlights the potential of 6G and AI to change both technology and business management, presenting a roadmap for the next generation of intelligent, connected systems that will influence future industry standards.

Index Terms: 6G technology, AI-driven architecture, Cloud computing, Edge computing, Ultra-low latency, High-speed data transmission, Real-time analytics, Autonomous systems, Smart Technology, Industrial automation, Business management, Strategic innovation, Market potential, Economic impact, Predictive analytics.

## Introduction:

The rapid growth of technology in the realm of communication networks and computing technologies has prepared the ground for the rise of 6G technology. AI cloud computing, and edge computing, as drivers of innovation in engineering management. These cutting-edge technologies offer chances for enterprises to improve network performance reduce data processing and boost decision-making processes. My project focus will be on examining the synergies between 6G and AI in the context of cloud computing and edge computing looking at both technical and administrative factors.

By learning the capabilities of 6G technology and AI algorithms, anyone can uncover possibilities for real-time data analysis, automation, and better connectivity. We will analyze the problems and opportunities connected with integrating and supervising these technologies within our surroundings. Many important factors such as resource allocation, security measures, and strategic decision-making will be examined to provide insights, into how engineering managers can utilize 6G technology and AI in cloud computing and edge computing to drive innovation and gain an advantage in day-to-day life.

### 1.1 What is 6G?:

In telecoms, 6G technology refers to the ongoing development of the 6th generation standard for wireless communications technologies that support cellular networks.

That is the subsequent phase of 5G. It is expected to surpass the speed of 5G.

As with its predecessors, 6G networks are likely to be broadband cellular networks, where the service area is partitioned into small geographic regions known as cells.

Companies such as Nokia, Erickson, Huawei, Samsung, LG, Apple, Xiaomi, together with countries including India, China, Japan, and Singapore.

Expected to exhibit greater diversity than 5G networks, 6G networks are poised to facilitate applications that extend beyond present mobile usage scenarios, including virtual and augmented reality (AR/VR), ubiquitous instant messaging, omnipresent intelligence, and the Internet of Things (IoT).

The purpose of developing 6G is to facilitate the widespread implementation of 5G applications by focusing on optimizations and cost reduction, particularly at the corporate environment.

The 6G mobile technology is anticipated to enable communications with a latency of one micro-second or potentially sub-microsecond, hence achieving nearly instantaneous communication.[1]

### How is 6G different from 5G:

* The 6G network will be 100 times considerably faster than 5G. ¬ It can achieve more dependability and better network coverage.
* We are already employing AR and VR systems with 5G plus interconnected cities and diverse technology used in farms, intelligent robots work in the factories, furthermore there is vehicle-to-vehicle communication and many more. But 6G will continue to serve all these areas with greater strength and will also provide more capacity that will promote innovation.
* 6G networks may one day allow you to reach maximum speeds of 1 terabit per second (Tbps) utilizing an internet device which is significantly quicker than 5G as the peak speed of 5G is 10GBPS.
* We are already employing AR and VR systems with 5G plus interconnected cities and diverse technology used in farms, intelligent robots work in the factories, furthermore there is vehicle-to-vehicle communication, and many more. But 6G will continue to serve all these areas with greater strength and will also provide more capacity that will promote innovation.
* The 6G technology may reveal such things that we have not contemplated and thought. [1]

### 1.2 Artificial Intelligence:

Artificial intelligence (AI) is the technology allowing computers and other devices to replicate human learning, comprehension, problem-solving, decision-making, creativity, and autonomy.

Artificial intelligence-equipped tools and applications can observe and recognize items. Human language is understandable to them and they can reply. New knowledge and experience let them grow. They can provide professionals and consumers with thorough recommendations. They can act autonomously, therefore substituting for human intelligence or intervention—a classic example would be a self-driving car.

But most AI researchers and practitioners—as well as most AI-related headlines—are concentrated in 2024 on generative artificial intelligence (gen AI), a technology capable of producing original writing, photos, videos, and other content. First understanding the technology on which generative AI tools are built—machine learning (ML) and deep learning—helps one to properly appreciate generative AI. [2]A digital image of a human head and various electronic objects

Description automatically generated with medium confidence

### 1.3 - Cloud Computing:

Cloud computing is the on-demand availability of computer system resources, especially data storage (cloud storage) and computing power, without direct active management by the user.Large clouds often have functions distributed over multiple locations, each of which is a data center. Cloud computing relies on the sharing of resources to achieve coherence and typically uses a pay-as-you-go model, which can help reduce capital expenses but may also lead to unexpected operating expenses for users. [3]

A cloud computing system surrounded by computers

Description automatically generated

In other words, Cloud computing is defined as the on-demand delivery of computing services, including servers, storage, databases, networking, software, and analytics, over the internet. This concept lets users to access and save data remotely rather than depending on local servers or personal PCs.

### 1.4 – Edge Paradigm:

Edge computing is a distributed information technology (IT) architecture in which client data is handled at the edge of the network, as near to the originating source as possible.   
  
Data is the lifeblood of modern companies, giving important business insight and facilitating real-time management over crucial business processes and activities. Today's organizations are drowned in an ocean of data, and vast amounts of data can be routinely acquired from sensors and IoT devices working in real time from remote places and harsh operating environments practically anywhere in the world.   
  
But this virtual flow of data is also transforming the way organizations use computing. The traditional computer architecture predicated on a centralized data centre and ordinary internet isn't well suited to transporting continuously expanding torrents of real-world data. Bandwidth limits, latency concerns and unanticipated network outages can all conspire to hamper such attempts. Businesses are responding to these data concerns through the adoption of edge computing architecture.   
  
In simple terms, edge computing moves some percentage of storage and compute resources out of the central data center and closer to the source of the data itself. Rather than delivering raw data to a central data center for processing and analysis, that work is instead performed where the data is actually generated -- whether that's a retail store, a factory floor, a large utility or throughout a smart city. Only the result of that computing effort at the edge, such as real-time business insights, equipment repair projections or other actionable solutions, is sent back to the main data center for review and other human interactions. [4]

### 1.5 - 6G and AI-Enabled Cloud and Edge Computing:

6G and AI-enabled cloud and edge computing generate a potent synergy, changing connection and cognitive processing. 6G enables ultra-high-speed data transfer, ultra-low latency, and huge device connectivity, building a basis for real-time, immersive applications. AI boosts this infrastructure by optimizing network performance, forecasting maintenance, and assuring security using intelligent algorithms. Cloud computing delivers centralized resources for storing, processing, and analyzing enormous data, allowing scalable AI model training. Edge computing complements the cloud by processing data closer to its source, reducing latency and enabling real-time decision-making for applications like autonomous vehicles, smart cities, and industrial automation. Together, these technologies mutually reinforce one other, creating a future where real-time, intelligent decision-making becomes the norm. This integration promotes innovation across industries, from healthcare to manufacturing, delivering new levels of efficiency, customization, and responsiveness, profoundly reshaping the digital landscape. [5]

### 1.6 How it can improve quality of life:

The convergence of 6G, AI, cloud, and edge computing has the potential to greatly improve quality of life in multiple ways. This technological convergence will enable ultra-fast, low-latency communications and intelligent, distributed computation, leading to disruptive breakthroughs across numerous sectors.

A city with cars and people

Description automatically generated  
  
In healthcare, it will provide real-time health monitoring, AI-driven diagnostics, and remote medical services, allowing for more personalized and accessible care. Patients in faraway places might receive expert consultations using holographic telepresence, while AI algorithms analyse massive volumes of medical data to design more effective treatments.   
  
In transportation, improved autonomous driving systems powered by edge AI might substantially reduce road accidents, while intelligent traffic management in smart cities could alleviate congestion and shorten commute times. This will not only increase safety but also promote urban mobility and minimise stress for commuters.   
  
Public safety would gain from improved emergency response systems and predictive policing, perhaps lowering crime rates and boosting overall security. Smart city infrastructure could optimize resource management, leading to more sustainable urban settings with lower energy usage and enhanced air quality.   
  
In school and employment, immersive extended reality experiences could transform learning and remote collaboration, making high-quality education and job possibilities more accessible regardless of physical location. [6]

## 1.7 How does a non-tech audience see it?

For a non-tech audience, the combination of 6G, AI, and cloud-edge computing could appear like a complex technical advancement, but its influence on daily life is easy and important. Imagine a world where your healthcare is individualized and constantly accessible, with doctors able to check your health remotely in real-time. Picture places where traffic congestion is a thing of the past because smart technology manages traffic flow, lowering your commute time and increasing air quality. Education becomes more engaging and suited to your requirements, whether you're in a classroom or learning online. Entertainment is more immersive and participatory, with virtual reality experiences that feel remarkably lifelike. These technologies work together to make life easier, safer, and more pleasurable, creating a future where everything is linked, responsive, and tailored to improve our everyday lives. [6]

## 1.8 How quickly it is growing and how big the market is:

The market for 6G, AI, and cloud-edge computing is huge and fast-rising, driven by their disruptive influence across multiple sectors. As of 2024, the AI market is valued at over $310 billion, with a projected annual growth rate of 32% over the next decade. AI's incorporation into areas like healthcare, finance, and retail is propelling this boom, as firms strive to harness AI for better decision-making, automation, and consumer experiences.  
  
The cloud computing market is equally robust, valued at roughly $500 to $900 billion in 2024, with expected to expand at a CAGR of approximately 17% through 2030. This expansion is fuelled by the increasing demand for scalable, flexible computing resources and the rise of cloud-native apps.  
  
6G technology is currently in the early phases of development but is projected to dramatically impact the market by the late 2020s. Initial investments and research are estimated to reach hundreds of billions of dollars globally, with the technology likely to create breakthroughs in connectivity and new business models.  
  
Overall, the combined market for 6G, AI, and cloud-edge computing is anticipated to approach $1 trillion by 2030. This growth indicates the rising need for advanced digital solutions that enhance efficiency, connection, and innovation across industries. [7]

# 2. IBM

## 2.1 Company’s Overview:

The International Business Machines Corporation (IBM) is a major worldwide firm in the disciplines of technology and consulting, well recognized for its excellent invention and skill in computing solutions. Established in 1911, IBM has a demonstrated history of transforming industries with sophisticated technology and strategic acumen. IBM, with its headquarters in Armonk, New York, United States of America conducts activities in more than 180 nations, serving to clients in several industries such as finance, healthcare, manufacturing, and government. [8][9]



IBM leads the way in many critical technical sectors such as cloud computing, artificial intelligence (AI), and quantum computing. IBM Cloud provides a comprehensive range of services, including hybrid cloud solutions that readily interact with on-premises IT systems. IBM Watson, the principal artificial intelligence platform, utilises powerful machine learning, natural language processing, and data analytics to support intelligent automation and increase decision-making efficiency.   
  
Furthermore, IBM is a forerunner in edge computing, offering solutions that provide rapid data processing at the perimeter of the network, which is critical for applications in smart cities, industrial automation, and other related industries. IBM's unwavering approach to research and development, as reflected by its large collection of patents and discoveries, continues to impact the trajectory of technology and enable organisations globally to succeed in an ever more digitalized environment. [8][9]

2.2 Here’s how IBM’s strengths connect with the goals of my project:  
  
Expertise in Cloud Computing  
IBM has positioned itself as a leader in cloud computing, particularly in hybrid cloud systems. With the acquisition of Red Hat, IBM has increased its capacity to deliver flexible and scalable cloud solutions that can interface seamlessly with on-premises and edge systems. IBM Cloud is designed to manage complicated workloads and provides a stable platform for implementing AI applications at scale. For a project that involves 6G, AI, and edge computing, IBM’s hybrid cloud architecture ensures that data can be processed and analyzed rapidly, regardless of where it is generated or stored. This capacity is critical for 6G applications, which demand low latency and high reliability, traits that are intrinsic to IBM’s cloud services.  
  
Leadership in AI Technology  
IBM Watson, the company’s flagship AI platform, offers a full range of AI tools and services that may be exploited to enhance the capabilities of 6G networks. Watson provides advanced AI and machine learning models that can be deployed across cloud and edge environments, enabling real-time data processing, predictive analytics, and decision-making. AI is projected to play a significant role in managing the massive volumes of data created by 6G networks, optimizing network performance, and allowing new applications like autonomous systems and immersive experiences. IBM’s AI technology is well-suited to manage these issues, offering a solid basis for building and delivering AI-driven 6G solutions.  
  
Pioneering Research in 6G and Edge Computing  
Although 6G is still in its infancy, IBM is actively involved in research that explores the integration of AI with next-generation networks. IBM’s focus on quantum computing and its potential to revolutionize data processing coincides with the future needs of 6G networks, where ultra-low latency and high-speed processing will be vital. Additionally, IBM’s work in edge computing meets the objectives of 6G, where data processing will increasingly occur at the network edge to minimize latency and improve efficiency. IBM’s ability to deploy AI and cloud services at the edge makes it a strong partner for initiatives trying to exploit the full potential of 6G technology.

## 2.3 Managing for innovation at IBM

A graph of a diagram

Description automatically generated with medium confidence

**1. Idea Generation:** This phase encompasses the cognitive process of creating and uncovering novel ideas. IBM promotes open innovation by actively soliciting input from both internal teams and external collaborators, such as universities, entrepreneurial ventures, and other technology enterprises. Furthermore, IBM's research and development laboratories have a vital function in the identification and investigation of revolutionary technologies in fields such as quantum computing, artificial intelligence, and hybrid cloud environments. [10][11]

2. **Idea Selection:** Once ideas have been produced, the subsequent stage involves assessing and ranking them according to their strategic congruence with IBM's objectives, market potential, and physical viability. The process entails evaluating the ability of the concepts to satisfy certain market requirements and their compatibility with IBM's long-term vision. Selected concepts are often ones that offer substantial commercial value and may be expanded into scalable solutions. [10][11]

3. **Development:** Following the selection of concepts, they proceed to the development phase. The agile development approaches employed by IBM facilitate the quick prototyping and refinement of new products and services. During this phase, IBM engages in co-creation with clients, collaborating closely with them to customize solutions that specifically meet their requirements. The collaborative development process guarantees that the innovations are both pragmatic and aligned with the needs of the customers. [10][11]

4**. Implementation:** In this step, the developed ideas are brought to market. IBM’s worldwide go-to-market strategy leverages its large sales and distribution networks to commercialize new products effectively. During deployment, IBM also provides complete support to clients, helping them incorporate new technology into their existing systems. This support comprises training, consultation, and technical assistance, assuring easy adoption and operation. [10][11]

5. **Evaluation:** Post-implementation, IBM examines the performance of its innovations by important measures like customer satisfaction, revenue growth, and market share. Continuous input from customers, partners, and internal teams is gathered to measure the success of the innovation. This feedback is crucial for finding areas of improvement and refining the items to better suit consumer needs. [10][11]

6. **Sustaining Innovation:** The third step is about sustaining a culture of innovation within IBM. This involves engaging employees through innovation programs, encouraging risk-taking, and boosting creative problem-solving. IBM’s leadership plays a critical role in fostering this culture by articulating a clear vision for innovation and ensuring that the organization remains committed to exploring new frontiers in technology. [10][11]

## 2.4 Ecosystem Analysis

IBM operates within a complex and interrelated ecosystem comprising various stakeholders. These interactions extend beyond its core business of providing technology solutions and services, spanning a wide range of external entities that contribute to and are affected by IBM's operations. Below is an explanation of IBM's primary stakeholders and their ties, followed by a table summarizing these links.

## 1. Funding Sources

Investors/Shareholders: IBM is a publicly listed corporation, therefore it relies on equity investments from institutional investors, mutual funds, and individual shareholders. These investors influence IBM's strategic decisions and expect returns on their investments through dividends and stock gains. Largest shareholders include **Vanguard Group Inc, BlackRock Inc, Morgan Stanley.** [12]

Financial Institutions: Banks and other financial entities offer IBM with loans, credit lines, and financial instruments critical for business operations, expansion, and acquisitions. Example **Bank of America**. [12]

## 2. Regulatory Bodies

Government Agencies: IBM must comply with various regulations pertaining to data protection, cybersecurity, labor legislation, and trade practices in different countries where it operates. Regulatory authorities monitor IBM to ensure it adheres to these regulations. [13]

Standards Organizations: IBM engages with worldwide standards agencies to define and adhere to industry standards, particularly in technology and data security. [13]

## 3. Collaborators

Academic Institutions: IBM partners with **universities** **like University of Zurich , Queen Mary University London** and research institutions for **R&D**, particularly in developing domains like AI, quantum computing, and cloud computing. These agreements help IBM stay at the forefront of technical innovation. [9]

Technology Partners: IBM works with other tech businesses, such as **Microsoft, SAP, and Red Hat**, to provide integrated solutions and services. These collaborations are vital for IBM's cloud services and enterprise solutions. [9]

Open Source Communities: IBM is significantly involved in open-source initiatives, donating to and adopting open-source software, particularly through its acquisition of Red Hat. [9]

## 4. Competitors/Complementors

Competitors: IBM confronts competition from large IT businesses like **Microsoft, Amazon, Google, and Oracle** in areas including cloud computing, AI, and corporate software. This rivalry encourages innovation and market distinctiveness. [9]

Complementors: IBM's products and services are complemented by software and hardware from other suppliers, which enhance the value and usefulness of IBM's offerings. [9]

## 5. Buyers/Clients

Enterprise Clients: IBM’s key customers are large organisations spanning numerous areas such as **banking, healthcare, and retail**. These clients rely on IBM for IT infrastructure, consulting, and cloud services. [14]

SMEs: Small and Medium Enterprises also employ IBM’s cloud computing and AI services, though they constitute a smaller percentage of IBM’s client base.[14]

Government Agencies: Various governmental agencies leverage IBM’s technology solutions for **infrastructure, data management, and cybersecurity like USA UK.** [14]

## 6. Suppliers Hardware Suppliers:

These firms provide the components necessary for IBM’s servers, storage systems, and other hardware products. [15][16]

Software Vendors: IBM integrates software from numerous vendors to strengthen its product offerings, particularly in cloud services and AI. [15][16]

Service Providers: Companies that offer logistical, maintenance, and support services to IBM. [15][16]

## 7. Manufacturers

Chip Manufacturers: Companies like **Intel and AMD** produce CPUs and other semiconductor components vital for IBM’s systems. [15][16]

OEMs (Original Equipment Manufacturers): These manufacturers develop hardware based on IBM’s designs or standards. [15][16]

|  |  |  |
| --- | --- | --- |
| **Stakeholder Type** | **Key Stakeholders** | Relationship with IBM |
| Funding Sources | Investors/Shareholders, Financial Institutions | Provide capital, influence strategic decisions, offer financial products and services  Companies: **Vanguard Group Inc, BlackRock Inc, Morgan Stanley** |
| Regulatory Bodies | |  | | --- | |  |  |  | | --- | | Government Agencies, Standards Organizations | | Ensure compliance with laws, and oversee data privacy, cybersecurity, and industry standards.  **USA, UK** |
| Competitors/Complementors | Microsoft, Amazon, Google, Oracle, Complementing Vendors | Compete in cloud computing, AI, and enterprise solutions, and collaborate on complementary products  **Companies: Oracle, Microsoft** |
| Buyers/Clients | Enterprise Clients, SMEs, Government Agencies | Use IBM’s IT infrastructure, consulting, cloud services, and technology solutions. |
| Suppliers | Hardware Suppliers, Software Vendors, Service Providers | Provide necessary hardware components, software, and support services to IBM. |
| Manufacturers | Chip Manufacturers, OEMs | Produce and supply semiconductors and other hardware components for IBM’s products.  Companies: **Intel and AMD** |

## 2.4 Scenario Planning Approach for IBM

The strategic tool of scenario planning enables organizations such as IBM to proactively predict many future scenarios and get insight into the likely outcomes of numerous external circumstances. Considering IBM's status as a worldwide frontrunner in technology and innovation, it is essential to comprehend the several eventualities that may occur in order to sustain its competitive advantage and adjust to change.

A close-up of a diagram

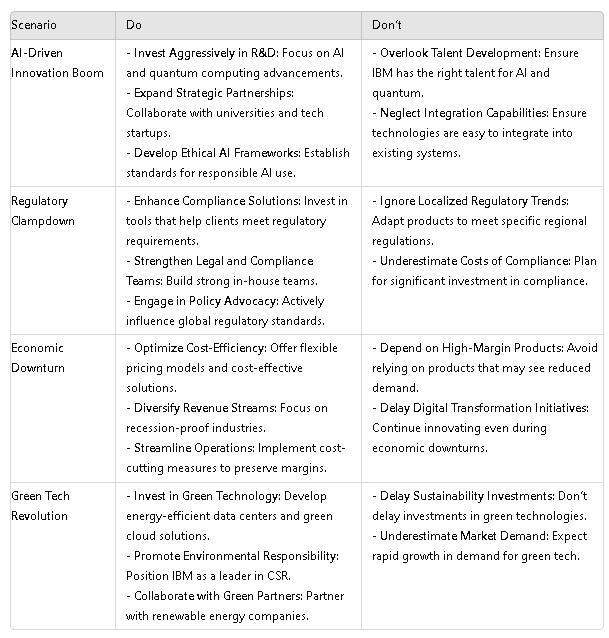
Description automatically generated

Fig representation scenario planning

## By using a **PESTEL** analysis, we can identify important and uncertain driving factors, and then explore potential scenarios to determine what IBM should or should not do to be successful.

* **Political:** Governments globally are progressively implementing stringent rules on data protection, so exemplified by the GDPR in Europe. The uncertainty is in the potential evolution of these rules and the level of consistency with which they will be implemented in various places.[17]
* **Economic**: Economic stability directly affects corporate IT spending, which impacts IBM's revenue. Economic downturns could lead to reduced spending on IT infrastructure, while a robust economy might see increased investments in technology.[18]
* **Social:** The global COVID-19 epidemic has expedited the transition to remote work. Although this trend is expected to persist, there is ambiguity about the long-term consequences and the degree to which firms will embrace hybrid or completely remote operations.[19]
* **Technological:** IBM is a leader in AI and quantum computing. However, the pace of technological advancements and the potential for disruptive innovations from competitors are highly uncertain.[20]
* **Environmental:** Increasing environmental concerns are pushing companies to adopt greener technologies. IBM's focus on sustainability could be a competitive advantage, but the uncertainty lies in the rate of adoption and regulatory changes.[21]
* **Legal:** Protecting intellectual property is crucial for IBM, especially in emerging technologies like AI and quantum computing. The uncertainty is moderate, as legal frameworks are generally well-established but may vary by region.[22]

## 2.5 To determine what IBM should or should not do to be successful in various scenarios:



## 2.6 The Innovation Challenge for IBM:

Ambidextrous Innovation: Striking a Balance between Exploitation and Exploration  
  
IBM is confronted with a substantial obstacle in sustaining ambidextrous innovation, which refers to the capacity to effectively utilize current capabilities while also investigating novel technologies and markets. This challenge is essential since the technology landscape is continuously shifting, with emerging sectors like AI, quantum computing, and blockchain ready to reshape the industry.  
  
Exploitation entails enhancing and refining IBM's present goods, services, and technologies to enhance efficiency and revenue. This includes expanding cloud computing, AI solutions, and corporate software, where IBM currently has a significant market presence.  
  
Exploration necessitates IBM to allocate resources towards novel, untested technologies that may not directly generate profits but are essential for future expansion. For IBM, this includes pioneering initiatives in quantum computing, AI ethics, and blockchain breakthroughs.  
  
**Impact:** Focusing too much on exploitation could result in IBM missing out on future technical advancements, resulting in a loss of competitive advantage. Conversely, pursuing research without assuring continuous revenue from existing products could strain resources and endanger short-term financial stability.  
  
**Approach:** IBM must build an organizational structure that promotes both exploitation and exploration. This can be achieved by:  
  
Creating separate teams or divisions focused on these diverse sorts of innovation, with distinct goals and performance criteria.  
Encouraging a culture that rewards both modest gains and dramatic innovation.  
Ensuring strong leadership to align these initiatives with the company’s broader strategy.  
By skilfully handling this ambidextrous problem, IBM can continue to lead in present markets while setting itself for future success in emerging technologies.[23]

# Operations

## 3.1 When contemplating clients for IBM's 6G and AI services in cloud and edge computing, several main sectors spring to mind, encompassing numerous industries and types of organizations:

## 1. Enterprise Clients

Large Corporations: Companies in fields such as banking, healthcare, retail, and manufacturing that demand advanced technology for digital transformation. These companies generally aim to better their operations using AI-powered insights, cloud computing scalability, and cutting-edge 6G connection. [24]

**Example Sectors:**

Finance: Banks and financial institutions looking to harness AI for fraud detection, customer service automation, and real-time data analysis.

Healthcare: Hospitals and medical research organisations interested in AI-driven diagnostics, telemedicine, and remote monitoring enabled by 6G and edge computing.

Retail: Large retail chains aiming to apply AI for tailored consumer experiences, inventory management, and supply chain optimization. [24]

2. Small and Medium Enterprises (SMEs) Growing Businesses: SMEs across many sectors that need scalable cloud solutions, AI capabilities for data analytics, and reliable connectivity delivered by 6G. These organisations might not have the capacity to construct such infrastructure in-house but might profit substantially from IBM's services. [24]

**Example Sectors**: E-commerce: Online firms seeking to leverage AI for customer suggestions and supply chain efficiency. [24]

Startups: Particularly those in tech-focused professions, necessitating cloud services to host applications and AI technologies to analyze consumer data and enhance operations.

## 3. Government Agencies

Public Sector Clients: Governments at the municipal, state, and national levels requiring robust, secure cloud and AI solutions to handle large volumes of data, improve public services, and boost cybersecurity. [24]

Use Cases:

Smart Cities: Governments looking to incorporate AI and 6G in urban planning, traffic management, and public safety.

Defense and Security: Agencies focussing on national security that require advanced AI and real-time data processing through 6G networks. [24]

4. Telecommunications Companies Telcos and ISPs: These companies could be both customers and partners, using IBM's 6G and AI capabilities to enhance their own service offerings, such as smarter network management, improved customer service, and the development of new connectivity solutions for end-users. [24]

## 5. Educational Institutions

Universities and Research Institutions: These entities may leverage 6G and AI cloud services for cutting-edge research, including AI algorithm creation, quantum computing studies, and the deployment of virtual learning environments. [24]

## 6. Industry-Specific Solutions

automobile: Manufacturers and suppliers in the automobile industry utilising 6G for connected cars and AI for autonomous driving and predictive maintenance.

Energy and Utilities: Companies that need AI for grid management, predictive maintenance, and 6G for real-time data monitoring and reaction. [24]

## 7. Technology Partners and Integrators

Software Developers and System Integrators: These companies may leverage IBM's AI and cloud services to build or integrate new apps for their clients, utilising 6G for connection and real-time processing capabilities.[24]

## 3.2 Needs in market

IBM’s 6G and AI services in cloud and edge computing serve the increasing needs of many industries by offering innovative solutions that boost efficiency, security, and real-time decision-making. Enterprise clients benefit from AI-driven insights and scalable cloud infrastructure, while SMEs seek cost-effective, user-friendly tools. Government agencies rely these technology for data management, compliance, and crisis response, while educational institutions need robust remote learning systems. The automobile industry, energy utilities, and telecommunications firms rely on IBM's technologies for network optimization, predictive maintenance, and linked services. IBM’s services give these sectors with the capabilities to manage an increasingly digitalizing environment.[25]

## 3.3 Key Performance Indicators (KPIs) for IBM’s 6G and AI in Cloud Services:

A screenshot of a report

Description automatically generated

## 3.4 House Of Quality:

## Explanation for the House of Quality for IBM’s 6G and AI in Cloud Services

The House of Quality is a tool used to ensure that the customer's needs are thoroughly understood and translated into specific, actionable technical requirements. Here’s an explanation of how each aspect of the House of Quality relates to IBM’s 6G and AI in cloud services:

Customer Needs

These represent the critical demands and expectations of IBM’s customers, which include enterprises, SMEs, government agencies, and educational institutions.

Real-Time Data Processing: Customers need the ability to process and analyze large volumes of data in real-time, which is crucial for applications like autonomous vehicles, financial transactions, and real-time healthcare monitoring.

Scalability: IBM’s services must be able to scale rapidly to handle increasing data loads or expanding operations without compromising performance or reliability.

Security: Security is a top priority, particularly in sectors like finance and healthcare, where data protection and privacy are critical. IBM needs to ensure that its 6G and AI cloud services meet stringent security standards.

Low Latency: For applications that require immediate response, such as in autonomous driving or remote surgery, low latency is crucial. IBM’s 6G technology is expected to provide the ultra-low latency required for these real-time applications.

Cost-Effectiveness: While consumers expect high-quality services, they also demand value for money. IBM’s pricing must be competitive while guaranteeing that the services deliver tangible benefits that justify the cost.[25]

## 3.5These are the specific technical capabilities that IBM must develop or enhance to satisfy the customer needs listed above.

* High-Speed 6G Connectivity: This is critical for attaining the low latency and high data throughput required for real-time data processing and other performance-critical applications.[26]
* AI Integration: AI is essential for processing large data sets, making real-time decisions, and automating complex processes. Integrating sophisticated AI capabilities into the cloud services ensures that IBM meets customer expectations for intelligent data processing. [26]
* Edge Computing: Edge computing brings processing capacity closer to the data source, reducing latency and improving performance for time-sensitive applications. It also helps in offloading duties from the central cloud, enhancing scalability. [26]
* Advanced Security: Implementing advanced security protocols and technologies is necessary to secure data integrity and ensure compliance with regulations. This is especially essential for sectors like healthcare, finance, and government. [26]
* Scalable Cloud Infrastructure: A scalable infrastructure ensures that IBM can meet increasing customer demands without compromising service quality. It also enables IBM to offer flexible solutions that can grow with the customer’s needs.[26]

House of Quality for IBM’s 6G and Cloud Services can be constructed in a table format:

A table with text on it

Description automatically generated

* **Customer Needs**: Represents what the customers require from IBM’s 6G and Cloud Services.
* **Technical Requirements**: These are the specific technological features that IBM must deliver to satisfy customer needs.
* **Relationship Scores**: The numbers in the table (9, 6, 3) represent the strength of the relationship between customer needs and technical requirements:
* **9**: Strong relationship
* **6**: Moderate relationship
* **3**: Weak relationship

## 3.6Supply chain network for IBM’s 6G and AI in cloud services

A table with text on it

Description automatically generated

## 3.7 IBM’s 6G and AI services in cloud computing should be positioned in terms of quality, pricing, availability, and easy access:

A white sheet with black text

Description automatically generated

## 3.8 PORTRERS Model

A close-up of a list of services

Description automatically generated

The model is divided into two primary activities: Support Activities and Primary Activities, each contributing to the firm’s overall value addition. Here's an explication of each component in the context of IBM's 6G and AI initiatives:  
  
Support Activities Administration and Management  
  
Activities: This includes legal, accounting, finance, and AI-driven decision systems.  
Explanation: IBM leverages AI-based decision-making tools to enhance the efficacy of its administrative processes. These tools enable for more accurate financial forecasting, compliance with legal standards, and streamlined management decisions, contributing to overall strategic efficiency.[26]

Human Resource Management  
  
Activities: Recruitment, training, and AI-enhanced workforce planning systems.  
Explanation: AI-driven talent analytics and planning enable IBM to recruit and retain top talent more effectively. AI tools analyze data to identify skill gaps, forecast workforce requirements, and optimize training programs, ensuring that IBM has the human resources necessary to maintain its leadership in 6G and AI technologies. .[26]

Product and Technology Development  
  
Activities: Product and process design, AI and 6G co-design systems.  
Explanation: IBM incorporates 6G technology with AI-powered R&D to innovate and develop new products. This integration accelerates the development process, allowing IBM to bring cutting-edge solutions to market quicker while maintaining high standards of quality and innovation. .[26]

Procurement  
  
Activities: Supplier management, AI-powered procurement platforms.  
Explanation: IBM employs blockchain technology for procurement and AI for forecasting, which enhances supplier management. This ensures a reliable supply chain, reduces costs, and improves procurement efficiency by predicting market trends and optimizing supplier relationships..[26]

Primary Activities:

Inbound Logistics  
  
Activities: Quality control, receiving, automated logistics system.  
Explanation: IBM’s use of automated warehousing and quality control systems ensures that all inbound materials and components satisfy stringent quality standards. This automation enhances the speed and accuracy of inventory management, critical for maintaining the integrity of IBM’s 6G and AI products. .[26]

Operations  
Activities: Manufacturing, AI-driven cloud service automation.  
Explanation: In operations, AI-driven automation plays a significant role in streamlining the production process. This not only reduces operational costs but also increases the speed and precision of manufacturing cloud services, which is crucial for keeping up with the rapid tempo of technological advancements in 6G and AI. .[26]

Outbound Logistics  
  
Activities: AI-enabled delivery of cloud services.  
Explanation: The deployment and delivery of IBM’s cloud services are optimized using AI, ensuring that customers receive high-quality, reliable services in a timely manner. This also permits IBM to better manage its resources and predict customer demand. .[26]

Marketing and Sales  
  
Activities: AI-enhanced CRM, targeted marketing.  
Explanation: IBM leverages AI-enhanced customer relationship management (CRM) tools and targeted marketing strategies to identify customer requirements and tailor its offerings accordingly. This increases customer satisfaction and promotes sales by ensuring that marketing efforts are both efficient and effective. .[26]

Customer Service  
  
Activities: AI-based customer support, maintenance.  
Explanation: AI-based customer support systems enable IBM to provide high-quality, personalized service at scale. These systems can quickly resolve customer inquiries and forecast maintenance needs, reducing downtime and enhancing the overall customer experience.  
Overall Impact on Firm Value  
Value Addition: Each of these activities, whether support or primary, contributes to the overall value IBM offers to its consumers. By integrating AI and 6G technologies across its value chain, IBM not only enhances efficiency and reduces costs but also positions itself as a leader in innovation, offering cutting-edge solutions that are responsive to market requirements.  
Strategic Advantage: The use of AI and 6G in both support and primary activities ensures that IBM remains competitive in the constantly evolving tech industry. This strategic advantage enables IBM to deliver superior products and services while maintaining flexibility and scalability to meet future demands. .[26]

## 3.10 Performance Objectives for IBM’s 6G and AI in Cloud Services

1. Quality: Delivering reliable and high-performance 6G and AI solutions that meet or exceed client expectations.  
Impact: High-quality services decrease long-term costs by limiting downtime and errors, thereby boosting customer happiness and loyalty. For IBM, ensuring top-tier quality in AI algorithms and cloud architecture means that clients can depend on the services for key activities.[25]

2. Speed: The ability to promptly process and deliver services from the moment a consumer wants them to the point of fulfillment.  
Impact: Faster service delivery gives IBM a competitive edge by allowing clients to install and benefit from 6G and AI technologies sooner than with competitors. It also helps IBM maintain low inventory levels and respond swiftly to client requests.[27]

3. Flexibility: The capability to adjust to customer requests, such as variable service volumes, multiple versions of AI solutions, or changing delivery timetables.  
Impact: Flexibility allows IBM to deliver bespoke solutions that match individual customer demands, from small businesses to huge enterprises, thus preserving profitability across varied market sectors. It also enables IBM to alter services fast in response to technical improvements or market adjustments.[26]

4. Dependability: The ability to supply services exactly as promised, without delays or variations.  
Impact: Dependability fosters trust with clients by ensuring that IBM’s 6G and AI products are delivered on time and work as expected. This decreases the possibility of costly penalties or consumer unhappiness, ultimately contributing to long-term economic success.[28]

5. Cost Management : Efficiently managing production and operational costs to provide competitive pricing while retaining profitability.[29]  
Impact: Effective cost control helps IBM to offer its 6G and AI services at affordable pricing, making them accessible to a broader variety of clients. By minimising resource use, IBM can reinvest savings into R&D and innovation, further strengthening its market position.

## Linking Performance Objectives:

* Quality decreases costs by decreasing the need for rework and boosting customer happiness, which in turn encourages loyalty and repeat business.  
  Speed enhances flexibility by providing quick answers to consumer needs and market changes, minimising inventory costs and driving speedier problem resolution.[25][29]
* Dependability minimises costs by guaranteeing that services are supplied as intended, minimising the inefficiencies associated with missed deadlines and unexpected complications.[27][29]
* Flexibility boosts IBM's ability to manage expenses and maintain reliability by adjusting to changing circumstances without affecting operations.  
  Cost is the overriding objective that is influenced by quality, speed, dependability, and adaptability. Proper management of these aspects helps IBM decrease operational expenses and maximize profits.[27][29]

# 4 Perception:

## 4.1 Why public perception is important for my project:

Public perception is critical for the success of IBM’s 6G and AI services in cloud computing. As these technologies are at the forefront of innovation, they profoundly impact different elements of business, healthcare, and daily life. Positive public perception is vital for developing trust, especially in an era where data privacy, security, and ethical considerations are paramount. If the public considers IBM's services as secure, dependable, and valuable, it can lead to better adoption rates, customer loyalty, and competitive advantage.[27]  
  
Moreover, public perception might impact regulatory scrutiny and policymaker actions. A positive image can result in more favorable rules, whereas bad perception might lead to tougher control and hurdles to market entry. Public trust also affects investor confidence, which is vital for funding continued innovation and development in such cutting-edge industries.[25]  
  
In an increasingly connected world, where customer criticism may spread swiftly through social media and other channels, managing public perception successfully is crucial. Negative perceptions can quickly undermine IBM's reputation, resulting to missed business prospects and reduced market share. Therefore, maintaining a positive public image through openness, ethical procedures, and customer interaction is vital for the long-term success of IBM's 6G and AI cloud services.[27]

## 4.2 Mental Models in the Context of IBM's 6G and AI in Cloud Services

Mental models are cognitive frameworks that help individuals understand and negotiate difficult challenges by altering their perceptions, beliefs, and decisions. In the context of IBM's 6G and AI in cloud services, recognising and addressing the mental models of both professionals and the general public (laypeople) is vital for ensuring that these novel technologies are understood accurately, accepted extensively, and used effectively. This method contains four important steps: Normative (expert model), Descriptive (lay model), Prescriptive (intervention strategy), and Evaluation.[30]  
  
1. Normative (Expert Model):

What Should People Know to Make More Informed Decisions?  
The normative model, or expert model, describes the ideal state of knowledge that individuals should have to make informed decisions on IBM’s 6G and AI services. Experts in the area feel that to employ these technologies effectively, consumers should understand the core concepts of 6G technology, including its possibilities for ultra-low latency, high-speed data transmission, and huge interconnectedness. They should also be aware of the potential of AI to process huge volumes of data, automate decision-making processes, and increase service delivery across industries. [30]  
  
Moreover, experts suggest that customers need to realise the consequences of combining 6G with AI in the cloud, such as how this integration might alter sectors like healthcare, banking, and smart cities by providing real-time analytics, tailored services, and more effective operations. Additionally, recognising the dangers connected with these technologies, such as cybersecurity issues and data privacy concerns, is vital for making well-informed decisions. [30]  
  
2. Descriptive (Lay Model):

What Do People Already Know and How Are They Making Their Decisions?  
The descriptive model refers to the existing state of knowledge and understanding among the general public or laypeople. In many circumstances, there is a large gap between what individuals already know and what they need to know to make educated judgements. For IBM’s 6G and AI in cloud services, the general public may have a basic awareness of cloud computing and AI but may not completely comprehend the exact breakthroughs and capabilities that 6G technology brings to the table. [30]  
  
People may recognise that AI can automate processes and analyze data, but they might not comprehend the complexity involved in AI decision-making, the necessity of data quality, or the potential ethical consequences. Similarly, while people may be familiar with the concept of better internet speeds with 5G, they might not realize how 6G’s capabilities go well beyond that, enabling new applications and services that were previously inconceivable. [30]  
  
This lack of deep understanding can lead to misconceptions, anxiety, or resistance, particularly when it comes to worries about privacy, job displacement owing to automation, or the possible misuse of AI in decision-making processes. As a result, users may make judgements based on insufficient or erroneous information, which might limit the adoption and effective use of IBM’s services. [30]  
  
3. Prescriptive (Intervention Plan):

What Do People Still Need to Know to Make More Informed Decisions?  
The prescriptive model entails establishing an intervention strategy to bridge the gap between what individuals now know (descriptive model) and what they should know (normative model). For IBM, this involves designing educational and communication initiatives that enlighten the public about the benefits and hazards of 6G and AI technologies in a straightforward, accessible manner. [30]  
  
To achieve this, IBM might implement a range of efforts, such as:  
  
Educational Campaigns: Launching campaigns that explain the core ideas of 6G and AI, their potential uses, and how they might improve everyday life. These advertisements should be geared to varied groups, ranging from tech-savvy people to those with less technology expertise. [30]  
  
Transparency Initiatives: Providing transparent information about how IBM handles data, maintains cybersecurity, and addresses ethical concerns. This might include extensive descriptions of AI algorithms and their decision-making processes, as well as the safeguards in place to protect user privacy. [30]  
  
Interactive Platforms: Developing interactive platforms where consumers can learn about 6G and AI through hands-on experiences, such as virtual demos, online workshops, or simulations. This technique can help demystify the technology and make them more approachable.  
  
Stakeholder Engagement: Engaging with stakeholders, including customers, regulators, and industry experts, to receive feedback and handle any concerns. This can assist create confidence and guarantee that IBM’s communication efforts are aligned with public expectations. [30]

## Poster representation of 6G and AI in cloud computing for all the audience to gain public perception:

  
  
4. Evaluation:

Does the Communication Help People Make More Informed Decisions?  
The final step in the process is evaluation, which entails examining whether the communication techniques and educational programs have been helpful in helping individuals make more informed decisions. This can be done through a variety of ways, including surveys, focus groups, and data analysis. [30]

A white rectangular grid with black text

Description automatically generated

4.3 For IBM, the evaluation process could involve:  
  
Surveys and Polls: Conducting surveys before and after the deployment of communication initiatives to monitor changes in public awareness and attitudes towards 6G and AI technology.[30]  
  
Feedback Mechanisms: Establishing feedback channels where users can share their opinions and experiences with IBM’s educational content. This input can provide vital insights into what’s working and what needs improvement.[31]  
  
Engagement data: Tracking data such as website visits, video views, and participation in interactive platforms to assess the extent of public engagement with the educational activities.[32]  
  
Decision-Making Impact: Analyzing if the improved understanding has led to better decision-making, such as increased use of IBM’s 6G and AI services, more educated customer inquiries, or stronger public support for these technologies.[27]

## 4.4Expert Model Flow Chart

Explanation of the Expert Model Flowchart for IBM’s 6G and AI Project  
This flowchart depicts an expert model for IBM’s 6G and AI services, illustrating the process from initial awareness to establishing sustainable market leadership. Each level in the flowchart illustrates a vital phase in the deployment and effectiveness of these technologies.  
  
**1. Awareness Stage Description**: The process begins with a general lack of public information concerning AI and 6G technology. At this level, the public may have only a basic understanding or may not completely realise the possibilities and ramifications of these technologies.[33]

.  
**2. Education and Outreach:**  
Description: To bridge the knowledge gap, IBM launches educational and outreach programs. This comprises providing content through webinars, cooperation with educational institutions, and other outreach initiatives meant to enlighten the public and stakeholders about 6G and AI.  
Outcome: As a result, IBM helps the public grasp the underlying concepts, benefits, and future applications of 6G and AI, encouraging a more informed and engaged audience.[34]

**3. Understanding the Impact**

Description: With the foundation of education and outreach in place, IBM works to ensure that the public knows how these technologies will impact daily life. This stage entails showing the practical uses and transformative potential of 6G and AI, such as advancements in healthcare, transportation, and communication.  
Outcome: The public becomes more aware of the real-world benefits and ramifications of these technologies, leading to increased acceptance and demand.[35]

A screenshot of a chat

Description automatically generated

**4. Addressing Concerns**  
Description: As public knowledge develops, so do concerns connected to privacy, security, and ethical consequences. IBM tackles these concerns by adding sophisticated features and AI ethics into their technology development process. This stage is vital for creating confidence and ensuring appropriate usage of the technologies.  
Outcome: IBM reassures stakeholders that the technologies are created with safety, privacy, and ethical issues in mind, which is crucial for earning public trust and regulatory approval.[36]

**5. Installation**

Description: With public comprehension and trust established, IBM pushes forward with the installation of its 6G and AI services. This involves rolling out the technologies to major markets, ensuring that they are accessible and effectively suit the demands of businesses and consumers.  
Outcome: Successful deployment in target markets, with early adopters beginning to incorporate 6G and AI into their operations.[37]

**6. Evaluation and Continuous Improvement**  
Description: Following implementation, IBM regularly examines the performance of its technologies, collecting feedback from users and stakeholders. This step is critical for identifying areas of improvement and ensuring that the services stay competitive and effective.  
Outcome: IBM refines its offers based on real-world input, boosting the quality and relevance of its 6G and AI services.[38]

**7. Sustained industry Leadership**

**Description:** Through continual improvement and innovation, IBM aspires to maintain its leadership position in the industry. By staying ahead of the competition and responding to changes, IBM secures long-term success.  
Outcome: IBM’s 6G and AI services become industry benchmarks, confirming the company’s status as a pioneer in cutting-edge technology.[39]

**8. Successful firm Description:**

The final conclusion of this procedure is the establishment of IBM as a successful firm that leads in the 6G and AI sectors. This success is fuelled by the company's capacity to educate, develop, and adapt in a quickly evolving technology context.  
Outcome: IBM maintains continuous industry leadership, with strong customer loyalty, solid market share, and ongoing innovation in 6G and AI technologies.[40]

## 4.5 Non-Expert Model for IBM’s 6G and AI Project

Evaluation Plan for IBM’s 6G and AI Communication Strategy  
The evaluation plan for IBM’s 6G and AI communication strategy is meant to rigorously examine the efficacy of the communication activities in raising public awareness, engaging stakeholders, addressing concerns, and promoting the adoption of these advanced technologies.  
  
**Key Performance Indicators (KPIs):** The plan begins with the definition of KPIs that include awareness measures, engagement metrics, sentiment analysis, and adoption indicators. Awareness metrics will quantify how well the public understands 6G and AI before and after the campaign, measured by surveys and the reach of communication materials. Engagement metrics will measure public involvement with the information, such as participation in webinars and social media engagement.[41]  
  
**Data Collection Methods:** Various data collection methods will be implemented, including surveys, web and social media analytics, and qualitative input through interviews and focus groups. These tools will help capture a comprehensive view of public perception, engagement levels, and the efficacy of the communication plan.[42]  
  
**Timeline:** The evaluation will be conducted in phases—starting with a pre-campaign baseline to understand the initial public awareness and perceptions, followed by a mid-campaign check-in to identify immediate issues or areas for improvement, and concluding with a post-campaign assessment to measure overall success.[43]  
  
**Analysis and Reporting**: The collected data will be reviewed against the established KPIs to discover trends, strengths, and areas for development. A full report will be generated, summarizing the findings and providing practical recommendations for future communication tactics.[44]  
  
**Feedback Loop:** The evaluation findings will be used to modify and enhance future communication initiatives. This continual feedback loop ensures that IBM’s communication initiatives stay successful, relevant, and aligned with the developing demands and concerns of the public and stakeholders.[45]

# Conclusion:

Conclusion for MS Final Project: IBM’s 6G and AI in Cloud Computing   
  
The successful completion of this research marks a critical milestone in the investigation of IBM’s creative journey towards the confluence of 6G and AI in cloud computing. Through an in-depth investigation of IBM’s strategy, technology, and market positioning, this project has produced a complete knowledge of how these cutting-edge technologies may alter industries, boost efficiencies, and generate new business opportunities. The findings and analyses undertaken during this research have emphasised the great potential of 6G and AI in transforming the future of connectivity and intelligent systems, placing IBM as a leader in this rapidly expanding technological landscape.   
  
The project began with a detailed assessment of the technological breakthroughs in 6G and AI, focusing on their integration with cloud computing. This analysis emphasised the transformative capabilities of 6G, which promises enormous data throughput, ultra-low latency, and vast device connection, all of which are important enablers of next-generation AI applications. The study also illustrated how AI, enabled by these 6G networks, may change data analytics, automation, and decision-making processes across numerous sectors, including healthcare, banking, manufacturing, and smart cities.   
  
A crucial component of this project was the development and evaluation of communication techniques to successfully convey the benefits and uses of 6G and AI to a broad audience. By building both expert and non-expert models, the project addressed the varied levels of comprehension across stakeholders, from technical professionals to the general public. The communication tactics focused on explaining complicated concepts, addressing common concerns like as privacy and security, and demonstrating real-world applications that showcase the practical benefits of these technologies. This strategy was vital in generating a positive reputation and driving the uptake of IBM’s 6G and AI services.   
  
Moreover, the project’s evaluation plan established a robust framework for analysing the effectiveness of IBM’s communication initiatives. By defining specific KPIs, deploying varied data collection methods, and establishing a timeframe for continual assessment, the project insured that IBM’s messaging would stay successful, adaptive, and aligned with the demands of its audience. This continual feedback loop is vital for preserving IBM’s leadership in the market and ensuring that its technology advances are welcomed by a broad spectrum of consumers.   
  
  
  
In conclusion, this initiative has not only proved the revolutionary potential of 6G and AI but also presented IBM with a strategic plan to capitalize on these technologies. By merging enhanced communication methods, ongoing review, and a thorough awareness of market dynamics, IBM is well-positioned to lead the next wave of technical innovation. As the world evolves towards a more connected and intelligent future, IBM’s commitment to pushing the boundaries of 6G and AI will be important in shaping the technology landscape of tomorrow.

# References:

[1] S. Bandekar and Singh, “6G TECHNOLOGY,” *International Journal of Research Publication and Reviews Journal homepage: www.ijrpr.com*, vol. 3, no. 12, pp. 4659–4661, 2022, Available: <https://ijrpr.com/uploads/V3ISSUE6/IJRPR5383.pdf>

[2] IBM, “What Is Artificial Intelligence (AI)?,” *IBM*, Aug. 16, 2024. <https://www.ibm.com/topics/artificial-intelligence>

[3] not known, “Cloud computing,” *Wikipedia*, Jul. 30, 2020. <https://en.wikipedia.org/wiki/Cloud_computing#:~:text=Cloud%20computing%20is%20the%20on>

[4] S. J. Bigelow, “What Is Edge Computing? Everything You Need to Know,” *Techtarget*, Dec. 2021. <https://www.techtarget.com/searchdatacenter/definition/edge-computing>

[5] F. Tariq, M. R. A. Khandaker, K.-K. . Wong, M. A. Imran, M. Bennis, and M. Debbah, “A Speculative Study on 6G,” *IEEE Wireless Communications*, vol. 27, no. 4, pp. 118–125, Aug. 2020, doi: <https://doi.org/10.1109/MWC.001.1900488>.

[6 ]M. Giordani, M. Polese, M. Mezzavilla, S. Rangan, and M. Zorzi, “Toward 6G Networks: Use Cases and Technologies,” *IEEE Communications Magazine*, vol. 58, no. 3, pp. 55–61, Mar. 2020, doi: <https://doi.org/10.1109/MCOM.001.1900411>.

[7] Anonymous, “Grand View Research,” *Grandviewresearch.com*, 2024. <https://www.grandviewresearch.com/industry-analysis> (accessed Aug. 29, 2024).

[8] **Invalid source specified.**IBM, “IBM - Archives - Valuable resources on IBM’s history - United States,” *www.ibm.com*, Aug. 20, 2013. <https://www.ibm.com/ibm/history>

[9]“IBM on the Forbes Just Companies List,” *Forbes*, 2019. Available: <https://www.forbes.com/companies/ibm/>

[10]IBM, “IBM Research,” *IBM Research*, Feb. 09, 2021. <https://research.ibm.com/>

[11]“- YouTube,” *Youtu.be*, 2024. <https://youtu.be/_n_Ndm_2zMg> (accessed Aug. 29, 2024).

[12]“IBM Investor relations,” *www.ibm.com*, Jan. 21, 2020. <https://www.ibm.com/investor>

[13]“IBM Privacy Statement,” *Ibm.com*, 2024. <https://www.ibm.com/privacy/us/en/> (accessed Aug. 29, 2024).

[14]“Industry Solutions,” *Ibm.com*, 2019. <https://www.ibm.com/industries>

[15]“IBM Global Procurement,” *www.ibm.com*. <https://www.ibm.com/procurement>

[16]“IBM Sterling Blog - Insights on an intelligent Supply Chain,” *IBM Sterling Blog*, May 14, 2020. <https://www.ibm.com/blogs/supply-chain/>

[17]GDPR.EU, “Complete guide to GDPR compliance,” *GDPR.eu*, 2019. <https://gdpr.eu/>

[18]Gartner, “Gartner: Fueling the Future of Business,” *Gartner*, 2024. <https://www.gartner.com/en>

[19]“The future of work after COVID-19 | McKinsey,” *www.mckinsey.com*. <https://www.mckinsey.com/capabilities/people-and-organizational-performance/our-insights/the-future-of-work-after-covid-19>

[20]“IBM Research Blog | IBM Research,” *IBM Research Blog*, Feb. 09, 2021. <https://research.ibm.com/blog>

[21]“IBM Sustainability Solutions,” *www.ibm.com*. <https://www.ibm.com/sustainability>

[22]WIPO, “What is Intellectual Property?,” *WIPO*, 2016. <https://www.wipo.int/about-ip/en/>

[23]C. A. O’Reilly III and M. L. Tushman, “The Ambidextrous Organization,” *Harvard Business Review*, Apr. 2004. <https://hbr.org/2004/04/the-ambidextrous-organization>

[24]IBM, “IBM - United Kingdom,” *www.ibm.com*, 2023. <https://www.ibm.com/uk-en>

[25]G. Keatts, “IBM and SAP unlock business and industry value with new generative AI solutions,” *IBM Blog*, Jun. 04, 2024. <https://www.ibm.com/blog/announcement/ibm-and-sap-unlock-business-and-industry-value-with-new-generative-ai-solutions/> (accessed Aug. 30, 2024).

[26]“Technology Solutions for the US Federal Government,” *www.ibm.com*. <https://www.ibm.com/industries/federal>

[27]“IBM Consulting Expands Capabilities to Help Enterprises Scale AI,” *IBM Newsroom*, 2024. <https://newsroom.ibm.com/Blog-IBM-Consulting-Expands-Capabilities-to-Help-Enterprises-Scale-AI#:~:text=IBM%20Consulting%20has%20taken%20a> (accessed Aug. 30, 2024).

[28]Prakash Pattni, “Helping enterprises across regulated industries leverage hybrid cloud and AI,” *IBM Blog*, May 08, 2024. <https://www.ibm.com/blog/regulated-industries-hybrid-cloud-ai/> (accessed Aug. 30, 2024).

[29]“IBM and SAP Partnership,” *Ibm.com*, 2024. <https://www.ibm.com/strategic-partnerships/sap> (accessed Aug. 30, 2024).

[30]Sampoorna, “Cloud - IBM Blog,” *IBM Blog*, 2024. <https://www.ibm.com/blog/category/cloud/> (accessed Aug. 30, 2024).

[31]“IBM Impact: IBM Community Engagement,” *Ibm.com*, 2023. <https://www.ibm.com/impact/initiatives/ibm-engagement#:~:text=The%20IBM%20Community%20Engagement%20program> (accessed Aug. 30, 2024).

[32]*Ibm.com*, 2023. <https://learn.ibm.com/>

[33]*Ibm.com*, 2023. <https://www.ibm.com/impact/initiatives/ibm-engagement>

[34]“IBM Impact: Initiatives | IBM,” *www.ibm.com*. <https://www.ibm.com/impact/initiatives>

[35]“What Is Artificial Intelligence (AI)? | IBM,” *Ibm.com*, Aug. 09, 2024. <https://www.ibm.com/topics/artificial-intelligence#:~:text=Reduced%20physical%20risks.-> (accessed Aug. 30, 2024).

[36]“AI Ethics | IBM,” *www.ibm.com*. <https://www.ibm.com/impact/ai-ethics#:~:text=IBM%20believes%20AI%20should%20make>

[37]“Emerging Technology - IBM Policy,” *IBM Policy*, Nov. 17, 2021. <https://www.ibm.com/policy/emerging-technology/#:~:text=Emerging%20Technology%20%2D%20IBM%20Policy&text=From%20blockchain%20and%20the%20Internet> (accessed Aug. 30, 2024).

[38]“What Is Process Improvement | IBM,” *Ibm.com*, Jun. 21, 2024. <https://www.ibm.com/think/topics/process-improvement#:~:text=It%20supports%20continuous%20improvement%20by> (accessed Aug. 30, 2024).

[39]“IBM Newsroom - IBM Distinguished Industry Leaders,” *IBM Newsroom*, 2024. <https://newsroom.ibm.com/IBM-Distinguished-Industry-Leaders> (accessed Aug. 30, 2024).

[40]F. Laricchia, “Top 10 tech companies by market cap 2022,” *Statista*, Mar. 26, 2024. <https://www.statista.com/statistics/1350976/leading-tech-companies-worldwide-by-market-cap/>

[41]“Trust Transparency,” *IBM Policy*. <https://www.ibm.com/policy/trust-transparency-new/>

[42]“IBM Developer,” *Ibm.com*, 2024. <https://developer.ibm.com/articles/awb-transforming-user-feedback-to-insights-with-watsonx-ai/> (accessed Aug. 30, 2024).

[43]*Ibm.com*, 2014. <https://cloud.ibm.com/docs/secure-enterprise?topic=secure-enterprise-best-practices-projects> (accessed Aug. 30, 2024).

[44]“Internal Communication Tools and Best Practices,” *Streaming Video Blog*, Jun. 27, 2018. <https://blog.video.ibm.com/streaming-video-tips/internal-communication-tools-best-practices/>

[45]“What Is Process Improvement | IBM,” *www.ibm.com*, Jun. 21, 2024. <https://www.ibm.com/think/topics/process-improvement>