5G IS POISED TO DISRUPT COMMUNICATION AND USHER IN NEW BUSINESS PARADIGMS

Abstract

5G stands for the fifth generation of cellular communication technology. Starting with 1G, each generation has taken mobile technology to the next level. 5G promises to be much more superior than all its predecessors and provide a quantum leap in benefits and application.

This white paper discusses the advantages of 5G technology and major business applications. It talks about how 5G is being used in farming and education and its applicability in the IoT space. The white paper also discusses the barriers to widespread adoption of 5G and the role of APIs for business success.

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Introduction

5G is the latest mobile network technology set to disrupt the entire world. With higher speeds, greater reliability, and enhanced availability, 5G has the power to connect all devices and machines. With 5G, almost all devices from a light bulb in our home to cars and planes will be accessible using IoT. A combination of IoT and 5G can change the way businesses offer solutions to their consumers.

Advantages of 5G Technology

Building on the capabilities of earlier technologies from 1G to 4G, 5G offers several advantages.

Extremely high bandwidth communications	Low network latency	High device and connection density	Advanced network architecture
5G has been designed to support demands for fast data transfer, offering throughput speeds of up to 10Gbps. This is a significant improvement over the 1 Gbps theoretical maximum speed of 4G connections. As IoT devices get smarter, this additional bandwidth will be essential for collecting and actioning data from remote sensors.	With 5G connectivity, precision-based communication will be a reality. At 1 ms, 5G latency is 100 times lower than 4G, enabling real-time networking and communication. Real-time communication is essential to act on incoming IoT data quickly and efficiently, and provide near-instant feedback and direction to connected systems.	Connection density is the ability to support the successful delivery of a message of a certain size within a certain time, even in space-constrained locations like a football stadium. Cellular network congestion is a serious problem, particularly as IoT deployments increase in size and complexity. With ten times more power than 4G, 5G networks are expected to support up to one million devices per square kilometer, drastically improving connection density.	5G network technologies allow communication providers to take advantage of software-defined networking capabilities. Using network slicing, operators can create multiple virtual networks for their clients, served over the same physical infrastructure.

Business Opportunities for 5G

Increased throughput, bandwidth, speed, and density will allow enterprises to design and deploy increasingly complex IoT systems. 5G will be essential to enable businesses to build the next generation applications that drive new efficiencies and better serve their clients' needs.

The superior technological advancements of 5G provide opportunities in three major business applications:

Enhanced mobile broadband

The most well-publicized application of 5G is the enhanced mobile broadband experience. Both business and consumer users will notice a significant boost in performance that allows them to do more on the move.

5G mobile technology will allow developers to build new immersive experiences such as virtual reality (VR) and augmented reality (AR). Faster, more uniform data rates, lower latency, and lower cost-per-bit will encourage user adoption and improve stickiness.

Mission-critical communications

The low latency and enhanced resilience of 5G networks make them an attractive option for mission-critical communications. By achieving virtual-zero latency, businesses will have a network capable of supporting real-time monitoring and optimization for production operations or to enable remote control of critical infrastructure, vehicles, and medical procedures.

Massive IoT

As systems get smarter, businesses are deploying more IoT smart sensors. 5G addresses concerns about density and throughput, ensuring smart factories can get smarter. Organizations will now have the network infrastructure needed to build innovative and mission-critical processes and systems.

5G can scale down in data rates, power, and mobility – providing extremely lean and low-cost connectivity solutions. By lowering barriers to entry, 5G will allow more enterprises to join the Industry 4.0 revolution.

Current Adoption of 5G

As a relatively new technology combination, 5G with IoT is being used for some novel applications. Some of the most anticipated use cases are in the areas of homes and workspaces, advanced healthcare, interactive experiences, and intelligent infrastructure.

5G technology was launched not long ago and is already being used in multiple business sectors for unanticipated use cases.
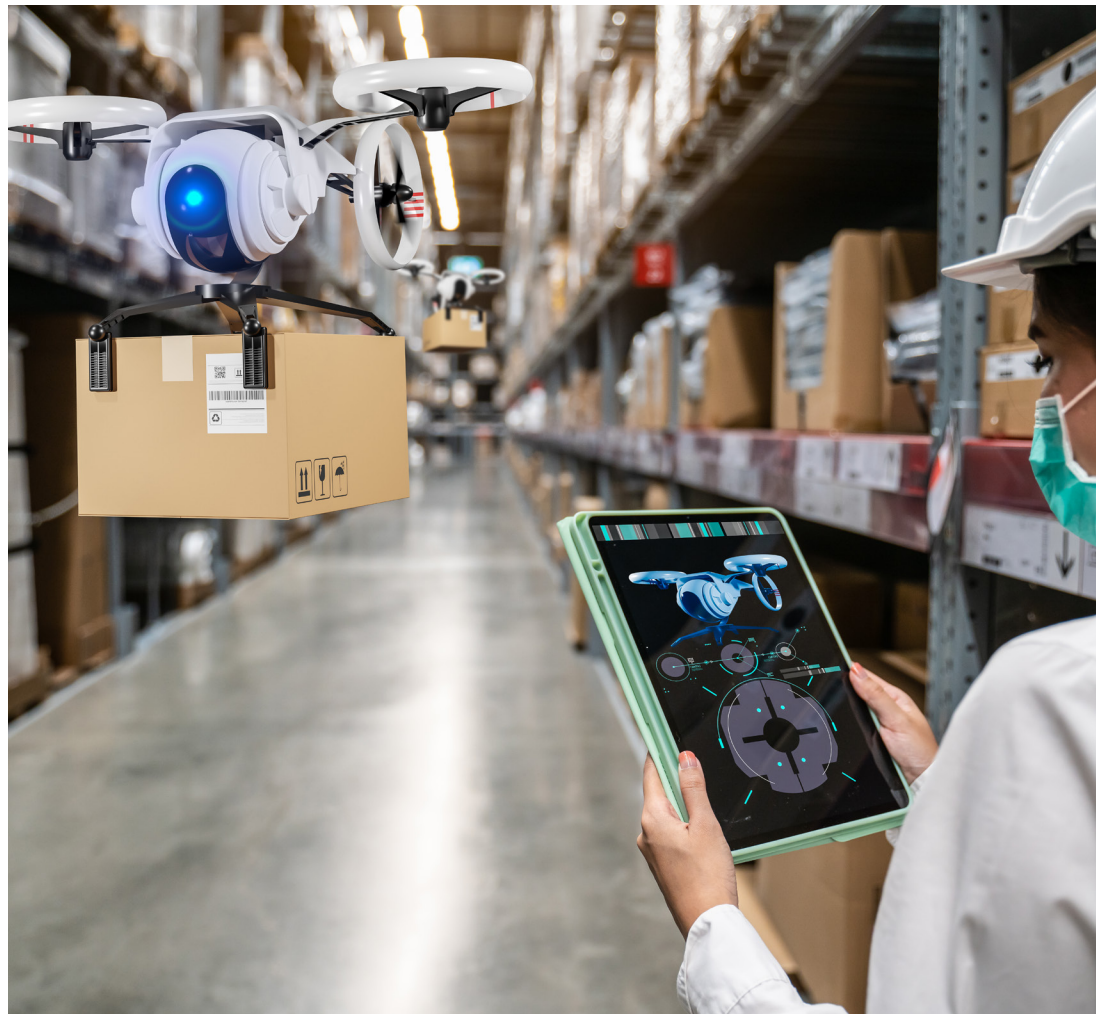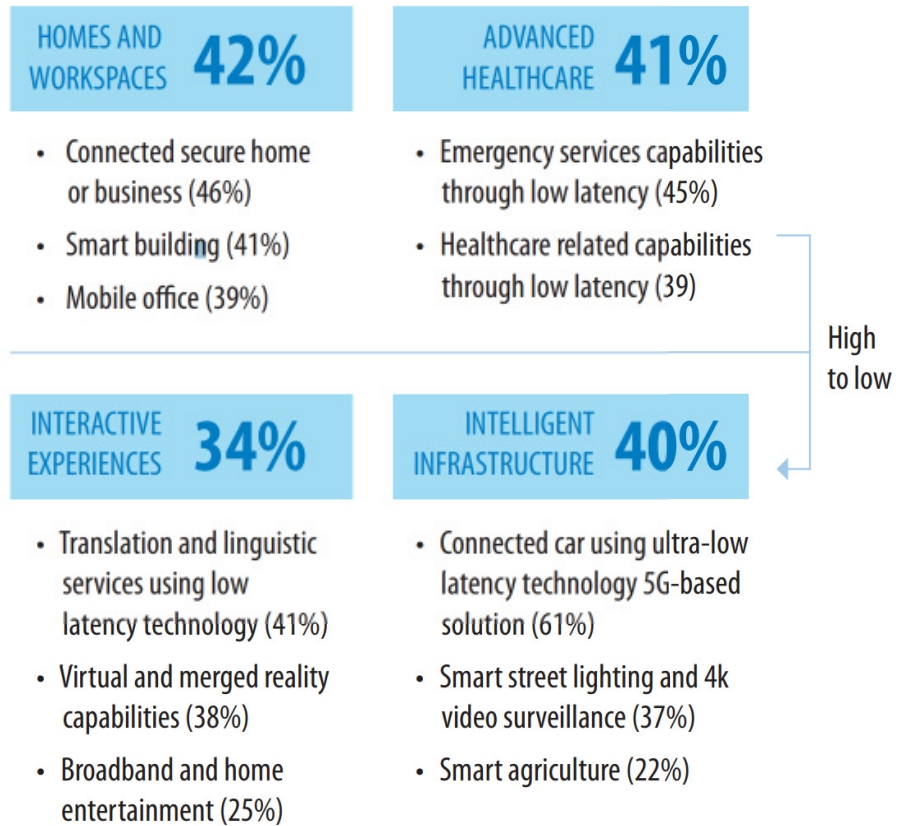
Farming

Farmers have started deploying drones to monitor their properties and to provide real-time inputs on their crops and cattle. 5G connectivity allows them to collect and process data from sensors mounted on the drones quickly and effectively. Analytics applications derive insights from the collected image and contextual data, empowering farmers to make smarter decisions that maximize efficiency and profit margins.

Education

The ability to deliver more data at greater speed allows educators to build more immersive learning materials. Using augmented reality (AR) and virtual reality (VR) technologies, it becomes possible to deploy absorbing experiences for learners in a way that basic reading and listening cannot. By employing IoT, the learning process can become increasingly two-way too. Developers can collect data about how AR/VR experiences are used over 5G and apply those insights to improve content and training outcomes.

Figure 2. Most anticipated use cases

HOMES AND WORKSPACES 42%
- Connected secure home or business (46%)
- Smart building (41%)
- Mobile office (39%)

ADVANCED HEALTHCARE 41%
- Emergency services capabilities through low latency (45%)
- Healthcare related capabilities through low latency (39)

High to low

INTERACTIVE EXPERIENCES 34%
- Translation and linguistic services using low latency technology (41%)
- Virtual and merged reality capabilities (38%)
- Broadband and home entertainment (25%)

INTELLIGENT INFRASTRUCTURE 40%
- Connected car using ultra-low latency technology 5G-based solution (61%)
- Smart street lighting and 4k video surveillance (37%)
- Smart agriculture (22%)

Other Areas for 5G Application

The potential applications for 5G and IoT are virtually limitless. We can expect to see many use cases that apply technology to create highly personalized services.

Manufacturing

By deploying a 5G-powered mobile private network, any business that operates physical assets will be able to build a digital twin. This virtualized representation acts like a full-scale model of their entire premises. With the ability to integrate real-time data collected from IoT sensors, businesses can see exactly what is happening on the production floor. They also have the tools and insights to make strategic changes faster to reduce risk and improve operating standards and safety.

Insurance

Using 5G and IoT, the insurance industry could:

- Collect live data from IoT sensors installed in a policyholder's car

- Transfer information to and from the vehicle to improve insights in real-time or to provide feedback to the driver, encouraging them to improve their driving

- Collate sensor data to tailor policies and offers to the customer

- Aggregate data across accounts to refine the product portfolio and identify new opportunities

Similar techniques can be employed in property insurance using smart home monitoring, and health insurance using wearables and fitness trackers.

Ultimately, the customer will be the biggest beneficiary of IoT and 5G. Businesses will be able to build a differentiated experience that better meets the needs of the individual. In doing so, the service becomes more sticky, keeping the client engaged for longer.

Challenges in 5G Adoption

There are some immediate challenges facing the adoption of 5G + IoT technology.

Lack of standards

As 5G is still at an early stage, industry standards are still being defined and developed. The progress is encouraging and adoption is improving. However there is a small risk that, without the right advice, businesses may need to revisit their deployments at some point in the future to make them compliant with the standards.

Connecting legacy internal applications

Some businesses will struggle to connect their existing internal application infrastructure to support the high rate of 5G digital communications. A lack of transparency and well-defined standards can make it difficult to ensure APIs and internal applications are properly secured when exposed externally.

Regional regulations

5G solutions tend to be global in nature but they are still subject to the same regional data protection regulations. As businesses evolve their connected IoT solutions they must also pay attention to local regulatory factors such as data, device security, identity management, data ownership, and insurance. Businesses must keep up with regulatory changes and compliance even after deployment.

Defining a business case for investment

5G and IoT will quickly change the volumes of data entering a business network. This data will need to be monitored and acted upon. This will require significant investment to re-architect the ecosystem to handle such volumes and take the action necessary while adhering to all applicable regulations. Establishing a business case to justify internal disruption and cost will require additional validation before it is allowed to proceed.

Data quality

The future of business services will be increasingly open, with data being shared between multiple partners involved in service/product delivery. In addition to maintaining security and privacy, IoT adopters will also have to develop methods to maintain the quality of data passing through their systems. Otherwise, they will find decision-making and automated activities compromised by faulty intelligence.

API Cloud to Leverage 5G and IoT

The corporate world is rapidly evolving from systems that exist solely in-house to an externally facing ecosystem model. These ecosystem platforms will connect internal and external applications and devices on demand, using the increased performance of 5G to achieve digital scale. In practice, digital ecosystems will bring together multiple organizations from a range of verticals to deliver a single solution or product. The process will be similar to the concept of a traditional supply chain but extending far beyond materials and manufacturing.

5G and IoT simplify the process of data sharing between ecosystem partners. Businesses will need dedicated internal resources to make sense of their data and unlock the full value of the insights derived. Simply connecting devices and sharing data will not be enough – extracting data, driving analytics, and generating real-time feedback is where the real value will be found.

With the improved throughput of 5G, API data analytics can be applied at the moment of capture helping achieve the real-time value needed for data-driven businesses. Businesses will need strong API and API analytics functions hosted in the cloud. At the same time, they will have to move towards composable IT, allowing their applications to speak a common language through an API native architecture.

As the ecosystem matures, there will be more self-service API implementations enabling developers or apps themselves to discover and implement interfaces with almost zero manual intervention. The eventual goal will be to enable automatic communication between system-to-device and device-to-device.

Over time, the API cloud will become something of a marketplace with multiple parties contributing towards building mutually beneficial solutions. With stakeholders working together, innovation of 5G and IoT will continue to accelerate. By developing collaborative frameworks, it will become possible to build double-sided business models that are ready to remain competitive and relevant, even as the market undergoes disruption.

Future Outlook

5G and IoT are inextricably connected and are the technologies of the future – particularly as businesses have already deployed smart systems that leverage at least some of the potential of the two technologies. The future will be increasingly collaborative, with partner organizations using shared APIs in the cloud to transfer data and generate actionable insights faster than ever before.

For businesses, this will be a period of significant investment as they ready their systems for a composable future, capable of handling a hundredfold increase in data. They will almost certainly need to realign, or even redesign, their processes to take advantage of this new, fast-moving flow of actionable insights.

Applying insights will benefit customers too. Truly personalized services become a reality as IoT generates millions of data points to better understand the needs of the individual. With 5G connectivity, businesses will have the ability to deliver those services immediately and on demand.

Conclusion

5G is the mobile communication network of tomorrow. Within a short time of its release, 5G is already demonstrating the power it provides to businesses. From new applications in the farming and education sectors to possibilities in the insurance and manufacturing sectors, 5G promises to bring a paradigm shift in the way enterprises consume and use technology.

In addition to never before speeds of data delivery, 5G + IoT will deliver unprecedented volumes of data to enterprises. This will empower businesses to harvest powerful and actionable insights to deliver truly personalized experiences to their clients.

To harness the true power of 5G + IoT, several other aspects of the ecosystem need to accelerate their readiness. Standards must be defined for seamless data interchange between enterprises. API cloud marketplaces will need to evolve to promote automatic communication between systems and devices. Further, businesses will need to invest significantly to leverage the power of 5G.

Finally, 5G will allow businesses to put the consumer at the center of their focus and planning. With high-speed delivery and deep insights into user behavior, 5G + IoT will enable hyper-personalization along with real-time delivery.

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