

White Paper

Strong 5G Investment Returns Require Essential Strategic Planning

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IN THIS WHITE PAPER

The 5G era is upon us, and the next-generation cellular network technology has the potential to transform business operations and drive revenue growth through a plethora of new mobility-enhanced use cases. Nevertheless, realizing 5G's potential requires more than simply adding a 5G radio to existing devices. Maximizing the technology's benefit and accelerating the time to market and return on investment (ROI) necessitate a strong plan defining the role that 5G, mobility, and connectivity in general will play in the enterprise. This white paper examines the enterprise appetite for 5G-enabled mobile device adoption and advocates for companies to invest now in the development of a robust business strategy for the 5G use cases, regardless of their deployment timeline for physical 5G assets.

Situation Overview

For executives, boards, and IT professionals, 5G has been part of the digital transformation conversation for the past couple of years. Based on the headlines, it is easy to believe that 5G is here and will completely disrupt the way companies operate. Just distribute some 5G-enabled devices in your organization, and all of 5G's benefits start flowing, right? Unfortunately, to do so would be folly as 5G's role in the enterprise is far from "plug-and-play." While 5G represents the potential of immense leaps in performance over today's LTE cellular connectivity, realizing 5G's potential in the enterprise is a complex process that requires a deliberate strategic plan developed with a keen eye to the company's near- and long-term digital aspirations. Developing a strong 5G strategy and achieving a solid return on the investment in 5G will require the careful consideration of a number of different inputs such as new mobile device capital expenditures, investments in software and application development, potential private network infrastructure, and partnerships with the right ecosystem vendors to clearly scope out addressable use cases.

What Is 5G?

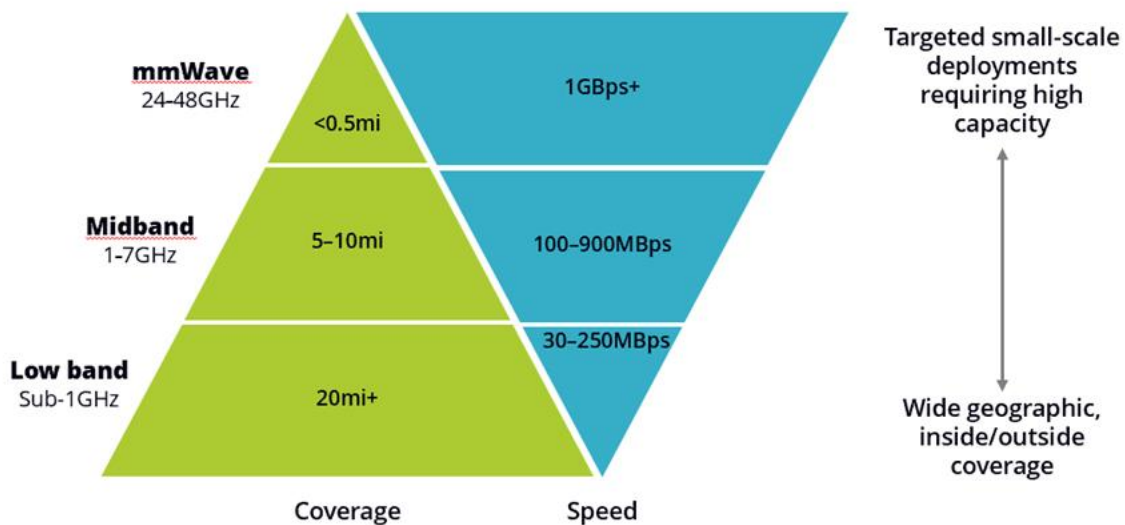
What is 5G and why does it matter to today's business? 5G represents the next stage in cellular-based connectivity and networking, offering up material performance improvements over LTE in the areas of speed, latency, and connection density. Going beyond individual metrics, 5G is expected to provide much more consistent and reliable network connectivity experiences supported by mobile operators' or private 5G network deployments' guaranteed service-level agreements (SLAs).

However, the simplicity in 5G's name belies a much more complex and nuanced technology that requires some foundational understanding. At its simplest, 5G involves a radio and some network components. The radio piece is being deployed across three different swaths of spectrum frequencies – low band, midband, and millimeter wave (mmWave) (see Figure 1) – each of which has distinct benefits and challenges:

- mmWave is enabling the 1GBps+ speeds that are driving the 5G headlines in the United States. However, the high-frequency wavelengths of mmWave are extremely susceptible to environmental interference, such as trees and precipitation, and do not reach indoors with the traditional cell tower deployment model. As a result, current deployment footprints require the installation of additional transmission equipment, known as small cells.
- Low-band 5G frequencies provide the broadest geographic coverage, largely leveraging existing infrastructure, but translate only to a moderate improvement in speed over LTE.
- Midband spectrum for 5G blends coverage and performance, capable of covering entire city footprints with speeds in the range of 100-900MBps.

FIGURE 1

Performance Attributes of 5G Spectrum Bands



Source: IDC, 2020

The other part of 5G adoption that is still in development is a change in network architecture, which is a prerequisite for realizing the low-latency and massive connection density features of 5G. The network design for 5G will begin being commercialized in the latter part of 2020 but may take a year or two to reach significant scale. In addition, the technical specifications for 5G continue to evolve, and upcoming iterations scheduled to be completed in 2020 will include functionality relevant to using 5G in enterprise IoT-based use cases and autonomous vehicle connectivity (referred to as V2X). Nevertheless, the timeline from standards completion to commercialization is anywhere from 12 to 18 months – a timeline that companies need to account for in their 5G planning.

5G Availability

For businesses looking to utilize 5G, the road begins with gaining access to a 5G signal. The availability of 5G varies depending on the country you're in and the spectrum holdings of the various operators in each country. 2019 saw the most notable launches in China, South Korea, and the United States. South Korea launched commercial 5G services in April 2019 and has seen impressive uptake in the consumer space, scaling to nearly 5 million subscribers by the end of the year. China kicked off 5G with a November 1 launch. Europe has seen limited commercial offerings of 5G across cities in Finland, German, Italy, Sweden, and more. Throughout 2019, U.S. operators have launched commercial deployments across the different flavors of 5G, with varying degrees of performance and coverage (see Figure 2).

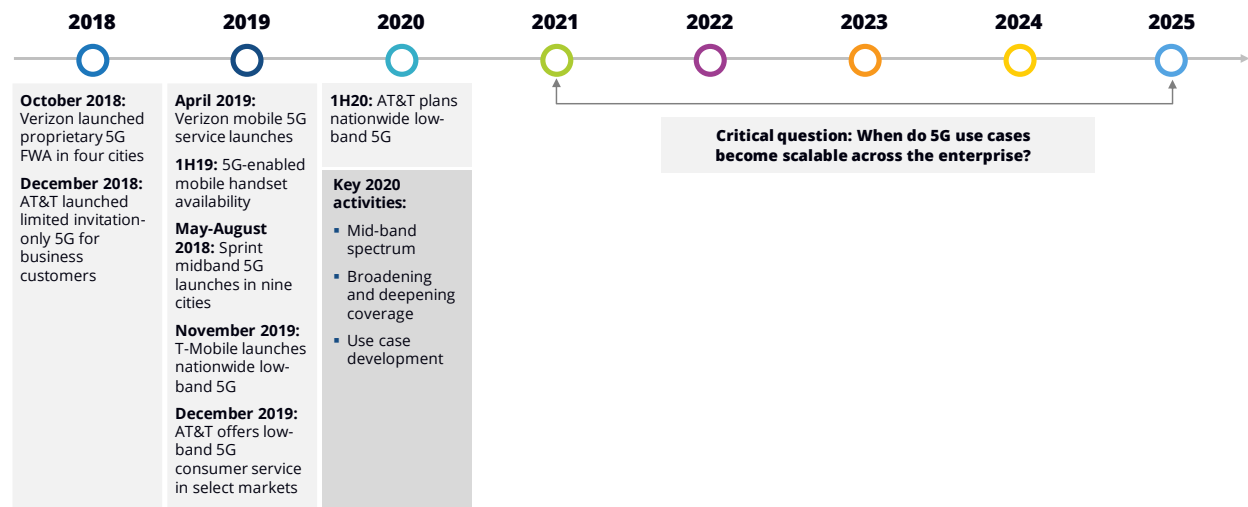
2020 will see the availability of 5G scale even more rapidly, with expansion of coverage in existing deployments and 5G service anticipated in Brazil, Canada, France, Japan, and Spain, to name but a few.

In addition to getting a 5G signal out to the masses, 2020 will see the launch of more and more devices capable of utilizing a 5G signal. Whereas 5G was a feature in just a handful of pricy flagship smartphones in 2019, we expect to see 5G functionality in a greater range of mid-priced smartphones and wider introduction of 5G functionality into tablets, cellular laptops, and MiFi hotspots throughout 2020.

But as we'll examine in a minute, gaining access to a 5G signal and device may be the easiest part of your business' 5G journey.

FIGURE 2

U.S. 5G Deployment Timeline



Source: IDC, 2020

What 5G Means for Business

5G will enable the creation, transmission, and analysis of data on a much larger scale than anything possible today. According to *Worldwide Global DataSphere Forecast, 2019-2023: Consumer Dependence on the Enterprise Widening* (IDC #US44615319, January 2019), data creation will grow from 32.6ZB in 2018 to 102.6ZB by 2023, with nearly 60% of that data being created by businesses. Simply getting that data from the points of origin to where it can be collected, analyzed, manipulated, and used will rely heavily on the massive leaps in capacity that 5G offers. With 5G's faster speeds, employees can access data-intensive resources with minimal wait time and collaborate in a more reliable, seamless fashion.

In addition to data transmission, businesses stand to benefit from 5G's ability to allow other technologies to bypass the cloud-based datacenters to deliver real-time data analytics and artificial intelligence through device-to-device edge computing, thus enabling thousands of employee devices to reach new levels of business insights and automation that can predict and respond to multiple client situations faster than ever before.

Forward-thinking businesses will look at 5G as more than simply an efficiency play. They'll be able to partner with technology vendors across the hardware/software/services ecosystem to leverage the high-speed, low-latency, massive connection environments, with digital innovators aspiring to create new products and services that not only drive efficiency but also generate net-new revenue.

Enterprise Appetite for 5G

It is undeniable that mobile technology has had a transformative impact on modern-day business operations, and a core facet of this transformation has been that mobile connectivity enables businesses, workers, and customers to communicate, collaborate, and transact in real time. In 2020, global enterprises will deploy a vast array of mobile hardware, software, and services that are foundational to overall business strategies, enabling mobile workers across virtually all industries with productivity-enhancing solutions and optimized workflows. As a result, mobile technology suppliers continue to target mobile worker segments with increasingly efficient and capable mobile solutions that rely heavily on connectivity. It cannot be understated that the majority of these mobile technology solutions demand near-ubiquitous connectivity support for workers to leverage and benefit from their full range of capabilities, whether it is Wi-Fi, 4G, or 5G connectivity. Beyond traditional one-to-one mobile device use cases such as email access and phone calls, technology suppliers aim to develop solutions that will equip the next generation of mobile workers with highly secure, specialized, and capable connected devices. Simply put, connectivity support is, and will continue to be, bare-bones table stakes for today's mobile workforce.

The Current State of Enterprise Connectivity

As companies begin to think about enabling mobility in their workforce, they should also pause to take stock of the current forms of connectivity utilized throughout their organization. With few exceptions, most companies operate very much in a blended connectivity environment, leveraging wired assets, supporting on-premises Wi-Fi, and providing cellular service to at least a portion of their workforce. A few may leverage a satellite connection. And some at the forefront of the IoT adoption curve may also be utilizing low-power WAN (LPWAN) technologies. Employing a strategic, as opposed to a tactical, approach to assessing use cases and pairing connectivity in a purposeful manner can reduce redundancies across the stack and lay the groundwork for more integrated back-end management of resources and business process.

Mission-Critical Features

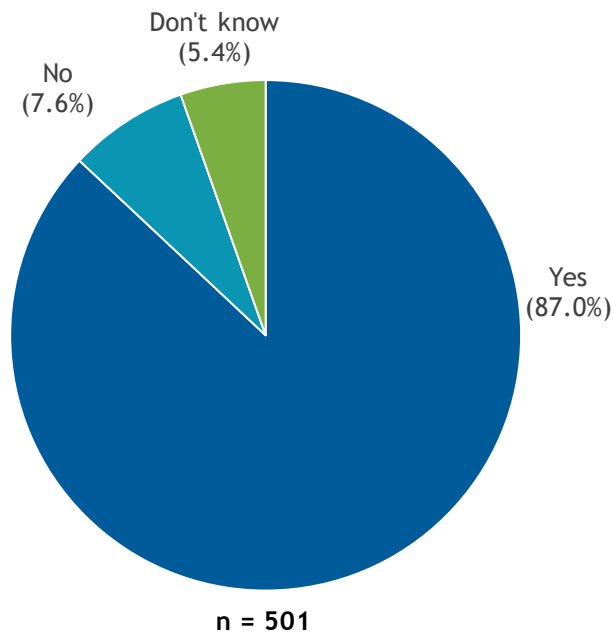
One of the key components to a successful mobile deployment is identifying the critical business features needed to meet the demands of a given role or task. Careful planning is always the first step to a successful deployment of any given technology, and 5G is no exception. The challenge is to differentiate mobile features that fall under general use cases from features that are mission critical, especially in regard to 5G-enabled devices. When it comes to some mission-critical features, such as all-day battery life, durability, high-definition video transmission, or high-speed connectivity, companies need to evaluate their needs with increased levels of scrutiny, as a failure of a mission-critical device or breakdown in workflow can have serious consequences to either business operations or, even worse, worker and customer safety.

For example, a mission-critical mobile device in the hands of a first responder needs enough battery power to make it through the entire workday, and if video presence is a requirement, workers need to be able to rely on the quality of the device's video and connection capabilities. Field workers often require access to large volumes of corporate data when on the job site, and a reliable, high-speed connection can mean the difference between completing their job in a timely manner and getting bogged down with lengthy download times that cause costly delays and diminished customer satisfaction. The demands of the employee and corresponding workflow should always dictate the device or service selected for any given deployment. Figure 3 shows U.S. enterprises' plans to purchase 5G-enabled devices.

FIGURE 3

U.S. Enterprises' Plans to Purchase 5G-Enabled Devices

Q. Does your organization plan to purchase 5G-enabled devices (smartphones, tablets, MiFi, and dongles) for its employees in the next 12-18 months?



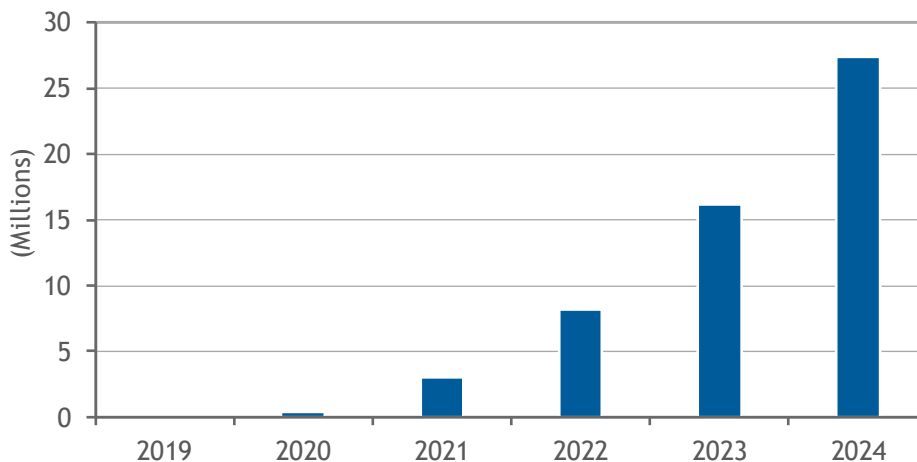
Source: IDC's *U.S. Enterprise Mobility Decision-Maker Survey: Devices*, 2019

Employee Personas

One of the ways a business can help itself identify mission-critical features is to consider what types of workers will benefit the most from a given deployment. In the case of 5G, knowledge workers that typically work onsite or in an office setting will most likely benefit from consistent and reliable Wi-Fi connections within their campus or office. Frontline workers such as field service technicians, retail employees, or transportation workers may very well be in a greater position to benefit from the increased connectivity speed that 5G delivers. In addition, while 5G delivers immensely reduced latency, transmission speeds of 5G can be incredibly valuable to workers who deal with large volumes of data throughout their workflows. The decreased latency and increased volumes mean that real-time video collaboration, status monitoring, and precise location tracking become possible. With 5G, frontline workers in the field will be able to communicate more effectively and with higher degrees of accuracy. Figure 4 shows U.S. 5G business mobile subscribers for 2019-2024.

FIGURE 4

U.S. 5G Business Mobile Subscribers, 2019-2024



Source: IDC, 2020

Why Strategy Is Crucial for 5G ROI

When planning a 5G deployment strategy, it is crucial that organizations have a well-defined business outcome in mind before executing a deployment, as it should be an iterative process governed by value-driven benchmarks.

Thoughtful 5G deployments targeting specific employees and workflows that will benefit the most from the increased speeds and latency that 5G enables is the most sound strategy to follow, as it has the potential to increase the capability and efficiency of a defined set of users while keeping initial 5G investments under control. In the case of 5G, companies must learn to crawl before they can walk and walk before they can run. Racing to the top in the short term will be costly and won't provide measurable differences in general worker productivity across the board.

Key elements to a strong 5G plan include:

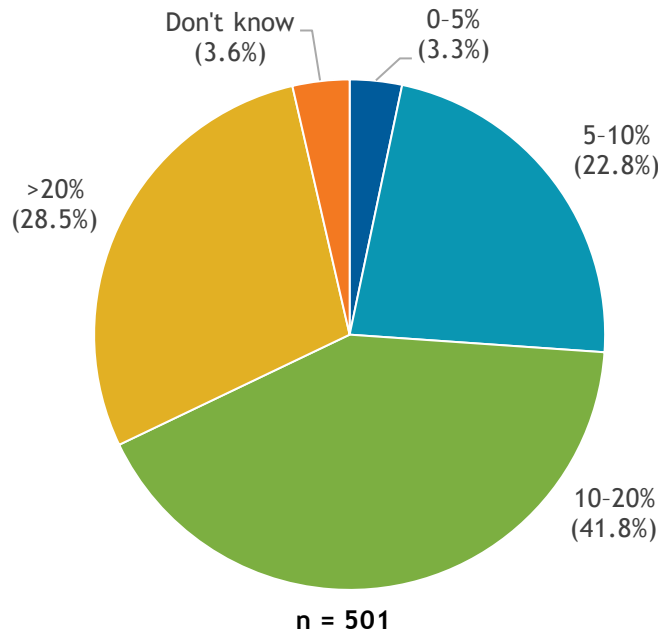
- Specific digital transformation goals
- Well-defined use cases
- Clear understanding of the performance requirements and viability of other connectivity modes (wired, Wi-Fi, LTE, 5G, LPWAN, etc.)
- Predetermined KPIs
- Evaluation methodology for wireless operator 5G offerings and insight into availability

Figure 5 shows the ROI expectations on business operations from 5G.

FIGURE 5

ROI Expectations on Business Operations from 5G

Q. What kind of ROI do you expect 5G to have on your business?



Note: Nearly 42% of businesses are expecting an ambitious 10-20% ROI on their business operations from 5G, while 23% aim to see a 5-10% ROI.

Source: IDC's *U.S. Enterprise Mobility Decision-Maker Survey: Services*, 2019

In addition, the process for developing a responsible, strategic 5G plan that aims to maximize the ROI should incorporate a few key considerations as described in the sections that follow.

Managing Capex

Companies must be prepared to sustainably allocate the costs for deploying 5G-enabled use cases. Not every employee will need 5G's performance, so companies should pursue tiered and selective deployments of 5G devices to employee segments where a benefit can be realized. This avoids a substantial on-off hit to capex and ensures that a material ROI can be realized in a timely fashion.

If a business' 5G aspirations are intended to enable greater mobility across a corporate campus or factory floor, then the capex investment will also need to take into account on-premises hardware to ensure a pervasive indoor/outdoor 5G signal and any upgrades to the corporate network that ensure the 5G use cases function at spec.

Beyond Devices: Software and App Development

Outside of the devices themselves, businesses will likely need to invest in software and apps to adequately leverage 5G's speed, latency, and connection density attributes. Current-state apps will only see minor improvements in functionality when paired with a 5G signal.

Wireless Operator Evaluation

And if a business' use of 5G requires specific performance attributes associated with one of the previously mentioned tiers of 5G spectrum, it will need to carefully evaluate the wireless operators in your market to assess their 5G offerings and deployment timelines. For instance, if a company's 5G aspirations involve equipping field workers far from the corporate campus, the spectrum type and availability will look markedly different than that which can be deployed to boost on-premises efficiencies. Selecting and partnering with a wireless operator can also accelerate the availability of 5G to a business if it is willing to coinvest in pilots or lend its name to showcase 5G uses.

Time to Market

Finally, more advanced features for 5G such as low latency, massive IoT, and network slicing are still in the process of being finalized in terms of the industry standards and commercial availability. Hence if a business' 5G ambitions include these features, its strategic planning and deployment timeline needs to be adjusted accordingly.

Use Case Futureproofing

Perhaps the biggest challenge in developing a strategic 5G deployment plan is attempting to account for future business needs and yet-to-be-imagined technological innovations. Ensuring that 5G vendors can deliver 5G solutions that meet your current needs while retaining the flexibility to grow and adapt as the 5G ecosystem evolves and diversifies is essential to making the most of your investment in 5G. It is important to remember that first- and second-generation 5G devices are largely aligned to work with specific networks and within specific spectrum bands, so any early 5G deployments must incorporate an appropriate refresh cycle to keep pace with future 5G enhancements.

CONCLUSION

5G-enabled mobile devices can garner efficiency gains for employee workflow and performance. However, in order to maximize the impact of 5G for business operations, companies need to work with vendors across the 5G ecosystem (operators, device OEMs, app developers, etc.) to develop a comprehensive strategic plan for utilizing 5G that takes into account both the technology's current state and anticipated new features in the pipeline. A strategic deployment of 5G-enabled devices has the potential to drastically increase worker productivity and optimize mobile-centric workflows. High-speed data connections, whether they are wired or wireless, have had a profound impact on businesses worldwide. 5G is the next evolution of high-speed connectivity, and early adopters stand to benefit with careful consideration and strategic planning.

APPENDIX: 5G INDUSTRY DEVICE USE CASE EXAMINATION

Field Maintenance

A field service technician is dispatched to a job site equipped with a 5G-enabled device. Unfamiliar with or unable to diagnose the problem at hand, the technician begins the resolution workflow by taking high-resolution photographs and video of the defective piece of machinery and sends them to the field service operations manager at headquarters. Once the problem had been diagnosed by offsite professionals at headquarters, a live video conference is initiated with the technician to explain the diagnosis and solution. The service manager then sends the correct schematics and diagrams to the technician in the field, complete with augmented reality-enhanced step-by-step instructions of how to fix the machinery. The technician begins the work, in contact with headquarters as needed, and is able to complete the repair without additional resources being dispatched to the site, which results in reduced downtime for the customer.

Devices Leveraged

- 5G-enabled smartphone or tablet, wearable

Benefits

- Reduced time onsite
- Workflow efficiency and accuracy
- Fewer return visits
- Greater customer satisfaction

Analysis

Key workflows must be well defined prior to the deployment of a 5G-enabled device, and additional supporting collaborative software that enables real-time video communication and augmented reality/virtual reality (AR/VR)-enhanced repair instructions is required. Back-end system integration and asset coordination prior to the hardware deployment are crucial in this scenario. These hardware and software solutions work in tandem while leveraging the connectivity speed and increased data volumes that 5G enables.

Entertainment (Immersive Experiences)

An entertainment venue such as a sporting arena or a performance amphitheater is fully equipped with 5G-enabled infrastructure and connectivity capabilities. Patrons of hosted events are able to leverage these capabilities on their 5G-enabled smartphones and tablets in a number of engaging ways.

Real-time player and team statistics can be accessed at all times, and strategically placed cameras can broadcast high-definition views from the player's perspective or other high-value vantage points such as behind home plate, front row center at a concert, or courtside at a playoff game. Customers with augmented reality (AR) devices enabled with 5G will be able to purchase AR tickets and experience the event from their preferred vantage point in the comfort of their home. Customers at the venue will also be able to access and order vendor concessions from their 5G-enabled devices as well as kiosks distributed throughout the venue. Because of the increased data volume and speed that 5G allows, customers will be able to avoid having to leave the seats that they paid for to wait in long lines to order refreshments or souvenirs. With a few simple clicks and a QR scan, customers can send orders to their vendor of choice, and concessions can be hand delivered to customers in their seats. This saves customers valuable time and allows concession vendors to increase their productivity output by focusing solely on concession production and delivery.

Devices Leveraged

- 5G-enabled smartphone or tablet, wearable

Benefits

- Increased customer engagement
- Additional revenue streams
- Broader customer reach

Analysis

Many of the preceding scenarios not only are hardware driven but also require a robust and reliable 5G network to be in place. Customers will avoid services that are prone to failure or that underperform. Venues may get only one chance to reach a new potential customer, so it is crucial that the underlying infrastructure that enables 5G connectivity be as stable as possible with high performance and built-in redundancies. Additionally, while an immersive 5G entertainment experience relies on customers' 5G-enabled hardware, the interfaces and software that deliver the content will have to be developed and rigorously tested prior to rollout. Again, a poor user experience will severely hinder customer engagement. Application navigation should be simple and responsive and require minimal instruction.

Banking (Digital Identity)

Customers with 5G-enabled devices can leverage 5G connectivity to receive personalized, seamless banking experiences, either in a traditional branch or in a mobile setting. High-speed, low-latency communications with customers' 5G devices can allow customers to be identified in real time when they enter a branch, with personal preferences and past banking history immediately preloaded onto the terminals or mobile, in-branch 5G tablets of tellers and customer service representatives. Communication with customers' 5G devices can also drive customized in-branch marketing that can be seamlessly updated on displays for each customer in the branch. For customers seeking to access banking services outside the traditional branch, 5G-enabled devices and connectivity can improve the performance of bank applications, with high-speed connections enabling a glitch-free user experience.

Application security can also be improved because software can be cloud hosted with software enhancements no longer dependent on a customer's device upgrade habits. When customers encounter problems or are confused, they can access live, on-demand help through high-definition video calls, on-screen augmented reality/virtual reality (AR/VR) inputs, or other streaming media assets, absent the jitter and lags of a slower 4G connection. Though not specific to an individual customer's device, 5G connectivity can also increase access to banking services by facilitating quick deployment of secure mobile and pop-up branches without a substantial infrastructure buildout.

Devices Leveraged

- 5G-enabled smartphone or tablet, wearable

Benefits

- Seamless customer experience
- Increased customer engagement
- Targeted marketing
- Wider access to banking services

Analysis

As with many 5G use cases, the value of the 5G-enabled device accelerates when the device interacts with other systems and databases within the bank's purview. In-branch personalization, reduced wait times, and live, on-demand video assistance are all possible when 5G connectivity stitches artificial intelligence, data analytics, and other technologies together to create a personalized banking experience, which bolsters customer satisfaction and overall engagement with the bank. Customers outside the branch leveraging mobile banking applications will have a smoother user experience with secure, cloud-hosted software supporting more bank services and will be able to access high-quality, personalized video chat for assistance with problem resolution, task completion, or banking advice.

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