Software Quality Assurance
in the **Telecom Industry**

How critical software quality assurance is
for the telecom industry

Gaurav Mathur

Abstract

This whitepaper deliberates on how critical software quality assurance is for the telecom industry. It provides an industry overview of the increased demand for high-quality telecom services over the last years. It highlights the use cases of telecom applications and the challenges in testing telecom applications. It further reflects on how telecom companies can leverage quality assurance and testing platforms. The paper discusses telecom automation in software quality assurance. It additionally provides insights into no-code automation in telecom QA testing and crucial factors that telcos need to consider before automating.

Introduction

The evolution of technology has resulted in a significant shift in how the telecom industry operates and provides services to its customers. The sector has gone through stages of development to adapt to new trends. While digital transformation was already a strategic priority for this industry, COVID-19 emphasized its significance and demonstrated its benefits. It is more critical to enhance the customer experience by providing a seamless, digital omnichannel experience now. It can be accomplished by providing a much-needed upgrade to the existing siloed, decoupled business system infrastructure: a replacement. Telcos must restructure and realign their business strategies in light of new technologies such as virtual reality (VR), Internet of Things (IoT), and augmented reality (AR), among others.
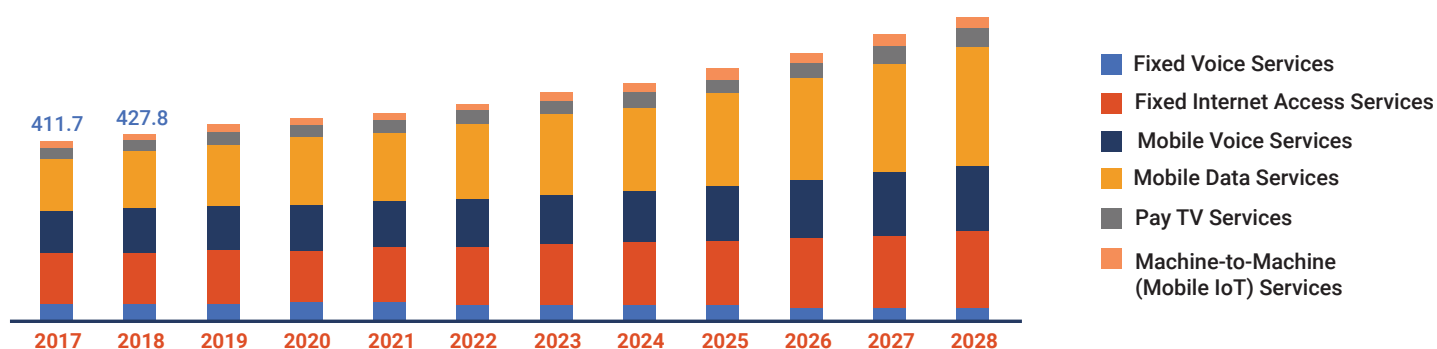
Industry overview

The telecom sector is one of the world's fastest-growing sectors and incorporates companies that enable global communication. Wired and wireless telecom carriers, communication hardware manufacturers, and satellite telecom resellers are among its segments. Other extensively utilized services include the internet, television, and networking for businesses and households.

Industry Statistics

A study by Grand View Research suggests that the global market size of telecom services was evaluated to be worth USD 1.74 trillion in the year 2019, which is further expected to increase at 5.0% of the Compound Annual Growth Rate (CAGR) from 2020 to 2027.

North America telecom services market size, by service type, 2017-2028 (USD Billion)

Legend:
- Fixed Voice Services
- Fixed Internet Access Services
- Mobile Voice Services
- Mobile Data Services
- Pay TV Services
- Machine-to-Machine (Mobile IoT) Services

Source: www.grandviewresearch.com

As per research by Statista, the 5G network infrastructure revenue was estimated to reach 19.13 billion USD in 2019. It is expected to rise to 23.25 billion USD in 2022 globally from 5G network infrastructure.

By 2025, the total data volume generated by connected IoT devices is expected to reach 79.4 zettabytes (ZB). 5G subscriptions are forecasted to increase from 2019 to 2027 globally.

The number of 5G mobile subscriptions globally is forecasted to reach 3 billion by 2025, with including overall increase in subscriptions by 600 million from 2023 to 2025.

Details: Worldwide; 2020   Source: Statista 2022
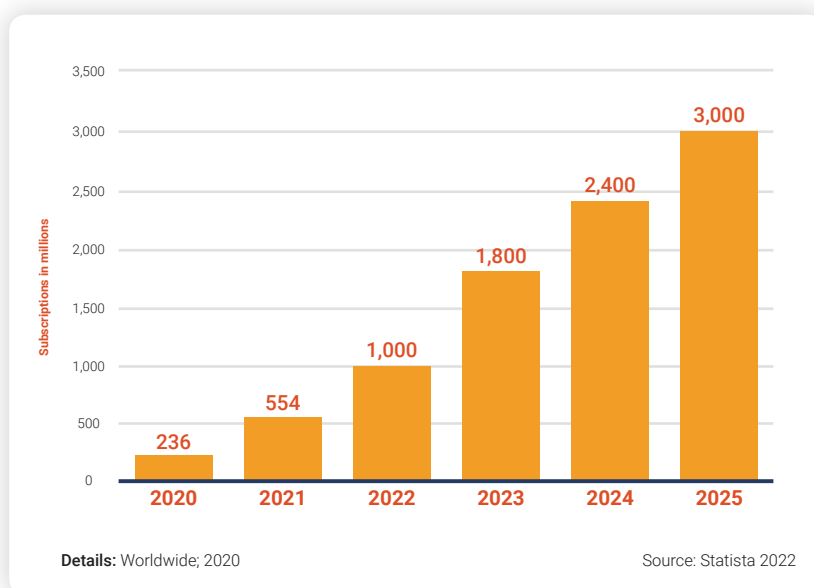
5G connectivity is anticipated to be the driving factor of market growth for IoTin the upcoming years, as the latest technology will connect devices and machines with higher data speeds, increased availability, and ultra-low latency, among other advantages.

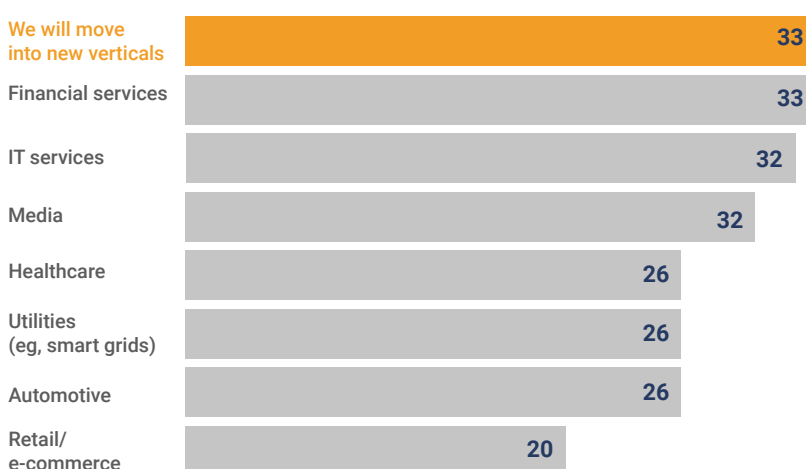**Details:** Worldwide; 2018 to 2020   Source: Statista 2022
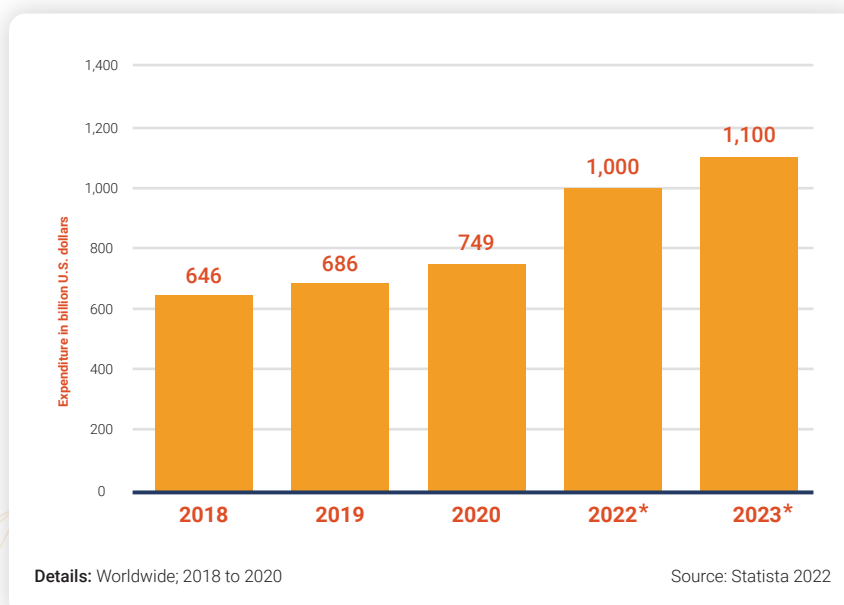
Connected cars, in 2023, are expected to form the largest base installed of 5G IoT endpoints globally, with more than 19 million installed endpoints. Outdoor surveillance cameras and fleet telematics devices are also significant parts of the 5G IoT endpoint installed base.

Research states that most industry players are planning to move into adjacent industries such as financial services, IT services, media, or utilities to explore new prospects and revenue streams. Some leading telecom companies have established well-funded digital business units for R&D to develop new services. Most corporations are still in the early phases of devising their digital-services portfolios, while others have supplied a limited package of services for years. Typically, such offerings entail partnerships with third parties who provide expertise to supplement the telcos' strong customer relationships and reach. A significant example is partnerships in the media via partnerships with companies like Netflix, Spotify, and Deezer.

Exhibit 3

Some companies are planning an imminent move into adjacent businesses.

% of respondents, n=104

We will move into new verticals	33
Financial services	33
IT services	32
Media	32
Healthcare	26
Utilities (eg, smart grids)	26
Automotive	26
Retail/ e-commerce	20

McKinsey&Company | Source: McKinsey TMT Extranet Survey, 2014

Various types of Telecom Applications

In today's connected world, telecommunications plays a critical role in establishing telecom connectivity for businesses and individuals by facilitating the interconnectivity of devices with and without wires.

Mobile Wallets

Mobile wallets assist telecom customers with online top-ups, managing autopay options, facilitating utility bill payments, and enabling rapid recharges, among other functions. Mobile wallets happen to be an efficient solution for telecom providers and customers alike nowadays, as they allow seamless money receipt, transfer, and payment on the go.

CRM application:

These apps are holistic platforms for telecom companies and their customers to obtain information. CRM applications assist telecom staff in resolving customer issues and managing tickets/questions. Additionally, it aids in driving sales, orders, and other workflows.

Retailer application:

Retailer applications assist telecom firms in engaging with their customers, comprehending their requirements, and resolving consumer complaints. Businesses can use retailer apps to promote sales and special offers, send push notifications, notify customers about telecom plans and special offers, display pricing lists, and facilitate and display product reviews, among other functions.

Sales support application:

Sales support apps enable sales representatives to quickly access information about sales policies, offers, advantages, features, and goods. Telecom sales teams can soon resolve client issues with sales support apps.

Disaster management applications:

Disaster management apps assist in secure telecom business continuity. These apps list all-important emergency contacts that clients may reach directly from the app by tapping on them. This software also lists existing regulations for emergencies, which lets telecom personnel know if they are following the rules and taking the appropriate action.

Data collecting apps enable telecom professionals to enter data directly into the application instead of the traditional method of entering data into a spreadsheet and then transferring it to a central database.

Vendor application:

Vendor applications facilitate communication with dealers, distributors, third-party equipment dealers, and service providers. Vendor applications mediate between customers and telecom firms and between customers and third-party dealers/providers.

Signals monitoring applications:

They help monitor cell tower signals on mobile apps categorized by regions, cities, and territories. This app's signal strength and quality data allow telecoms to make informed decisions about service enhancements and acquisitions.

Software Quality

As a result, it is critical to avoid outages, security risks, and billing issues that undermine the customer's trust. To prevent such problems in the future, telecom companies must invest time and resources in strengthening their quality assurance and testing processes.

Common Telecom Applications Challenges

- Telecoms continue to encounter significant demand on their networks, most prevalent due to the work from home scenario amidst the pandemic. This has led to network failures and server outages resulting in customer dissatisfaction.

- Customers continue to experience issues due to increased frauds and cyber-attacks across networks and growing risks of client data exposure.

- Inadequate integration with third-party applications such as payment gateways results in transactional issues in many telecom apps.

- Customers encounter challenges with content recommendations provided while searching for relevant information on telecom applications.

- Misconfigured underlying layers of mobile telecom applications exhibit software malfunctions adding to the ongoing customer frustration.

Telecommunications need to deploy software quality assurance and testing to ensure all applications' seamless functioning, provide an excellent user experience, and fix the issues mentioned above.

Importance of Software Quality Assurance for Telecoms

Customers increasingly expect instant personalized services in real-time due to the increasing digitalization of services. The "here and now" feeling is at its zenith.

Nevertheless, how telecom firms manage their information technology is overly complex, impeding digital maturity. Their outdated monolithic systems do not provide consumers with an innovative and seamless experience.

According to a survey by TM Forum, the number one impediment to digital transformation is 'inflexible legacy IT systems.'

Therefore, ensuring business continuity while converting disconnected and segregated customer channels to omnichannel systems is the matter at focus.

The digital transformation of a Business Support System (BSS), on which the telecom industry relies, is not a one-time event; it is a protracted and continuous process that requires constant monitoring from all sides.

Software quality assurance and testing ensure that all those business-critical systems and procedures perform as intended. The most frequently tested processes in the telecommunications business are as follows:

- Customer Relationship Management(CRM)
- Enterprise Resource Planning (ERP)
- Network management
- Enterprise Application Integration(EAI)
- Order and fraud management
- Customer issues
- Billing
- Revenue assurance
- Provisioning
- Mediation
- Data warehousing

How can telecom companies leverage Software Quality Assurance and Testing?

Telcos adapted monolithic core IT systems that are challenging for quality assurance teams. Testers must anticipate end-user behavior and align it with the business domain's needs. It necessitates developing strategies that incorporate the product within budget and time constraints to the maximum possible extent.

Furthermore, due to this complicated network of legacy systems and processes, the majority of telecom companies have separate teams working and testing various business domains. It results in segregated testing teams that cannot communicate effectively and work collaboratively.

These teams are primarily responsible for testing the functionality of the system that is part of the business processes; however, they do not test business processes from the end user's standpoint. This approach comprises the omnichannel customer experience and the business continuity, potentially leading to catastrophic financial losses.

How will Software Quality Assurance benefit Telecoms?

Increased client satisfaction

The telecom industry's performance is based on customer service delivery. With new players entering the market and competing for customers' attention through competitive offerings and pricing, telecom companies must ensure that they deliver great customer experiences. The quality assurance and testing specialists evaluate the backend architecture and ensure that it is robust enough for high volumes of calls and messages. Additionally, they inspect the front-end interface for usability and responsiveness and the IVR systems to guarantee that the customer's issue is resolved fast.

Delivering a high-value outcome

The telecom industry relies on Operation Support Systems (OSS) and Business Support Systems (BSS) to meet all customers' demands. Thus, these systems must operate at optimum efficiency at all times. Due to increased competition from other competitors, telecoms will need to upgrade their existing systems. The quality assurance and testing team verify that data migration from legacy systems is seamless. They assist telecom operators with the digital transformation as they innovate. Furthermore, they evaluate the software and system to ensure that these function properly.

❙ Efficient Billing Management

There have been many cases of operators being penalized for overbilling. Bill management is a common issue countered by telecom companies. Some companies continue to use legacy billing systems that do not integrate well with the modern infrastructure. It results in billing issues. With the evolution of the telecom industry, the billing system is becoming more complex, requiring integration across multiple technological and application stacks. Operators update or revamp their billing systems to keep up with the complexity. Quality assurance and testing are critical in such scenarios as they help manage and maintain the system appropriately by fixing bugs and ensuring billing accuracy.

❙ Network security

The telecom industry is on the edge of digital transformation even while maintaining conventional communication standards. With the emergence of technologies such as the blockchain and Internet of Things and a high volume of data being transferred, telecoms must be equipped for new network security risks. The quality assurance teams have been diligent in testing for security vulnerabilities in the new assets. Moreover, they also take preventative measures to ensure secure data sharing, prevent unauthorized access, and safeguard the network against significant threats.

What is Telecom Automation in terms of Software Quality Assurance?

With the complex infrastructure in the telecommunications industry and the broad scope of the business, manual testing mounts up and becomes unmanageable. As the transformation is already a long and complicated process, all activities that can expedite this procedure must be undertaken.

Automating quality assurance and testing a software replacement is a logical first step. Automating software testing improves efficiency, agility, and test coverage. These factors result in a shorter test cycle while also enhancing the quality of the digital ecosystem of a business, thereby reducing time-to-market.

A telecommunications corporation may make portions of its broadband service diagnostic platform accessible online to identify and resolve issues. The system's software quality assurance and integrations are crucial for customer satisfaction and retention. However, if bugs are not detected and fixed on time, the business's reputation might get affected. On the other hand, automation would enable faster diagnosis and resolution, reducing customer churn.

However, most test automation tools are created with a "programming mindset." It means that the tools that claim to be codeless require testers to have some knowledge of code.

The challenge is that code-based automation does not address the communication challenges faced by telecom testing teams. In this case, it worsens the issue. It is due to the availability of a limited number of specialists with programming skills capable of building automation. Such a scenario develops a dependency between the developers and testers, adding another level of complexity.

Telecoms must first identify a system that enables communication amongst testing teams to design effective end-to-end software QA and testing. On the other hand, due to their business-centric and collaborative nature, no-code automation systems are better for telecoms.

No-code Automation in Telecom QA Testing

More people can collaborate and work together to build automation by eliminating programming knowledge from the dynamics by leveraging their diverse skill sets in data, testing, application development, and business.

It creates a more accessible automation option from the business owner's perspective. It also results in a change from a technology-centric strategy based on frameworks, technologies, and atomic objects requiring code to operate more towards a business task-centric approach focused on understanding business rules, processes, and applications.
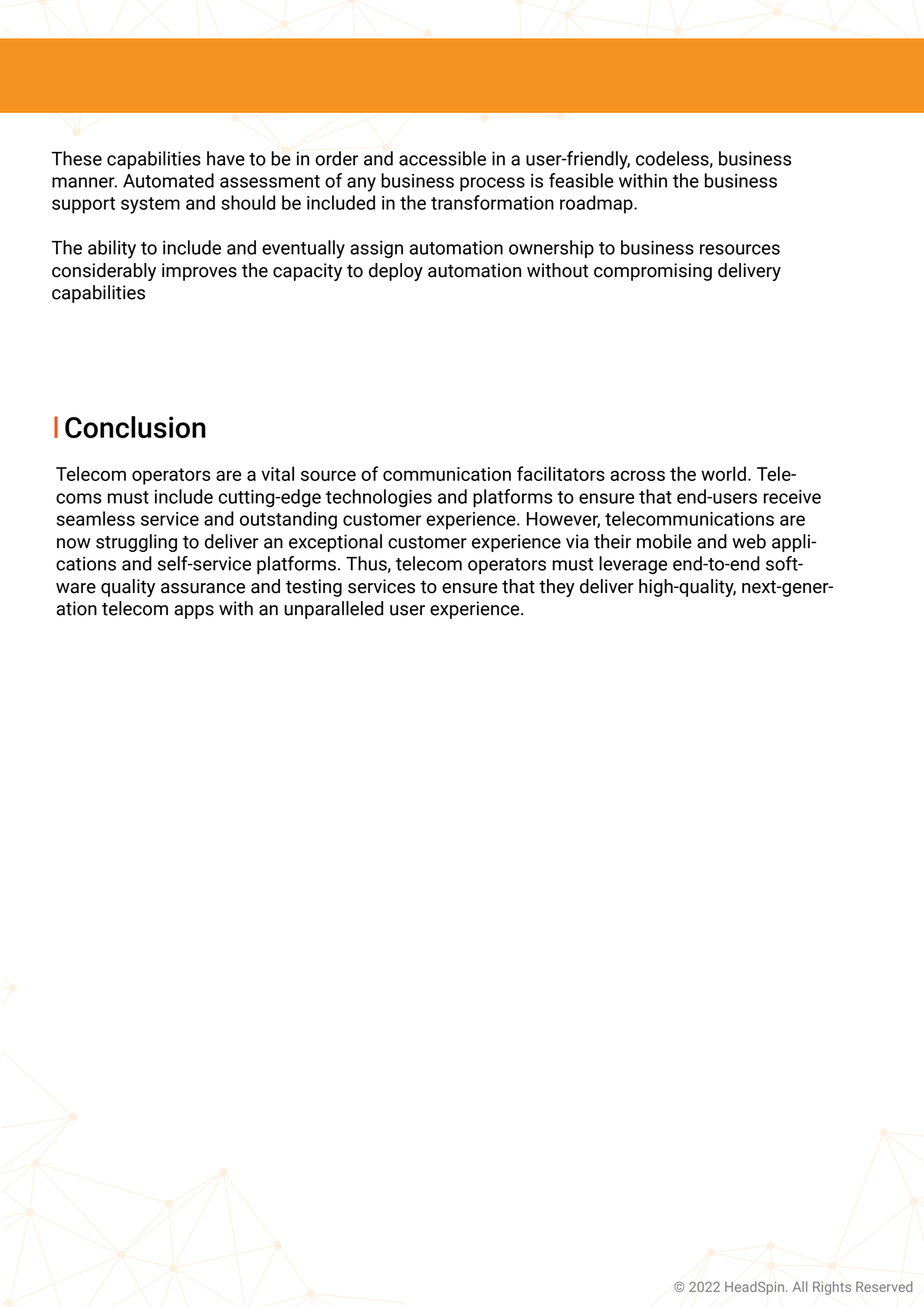
Essentially, this new approach reshapes the requirements of skills and competence in the context of automation. Additional skill sets and roles become accessible and essential for automation to be successful. Additionally, it enables automation without relying entirely on developer resources.

This is a critical differentiation, as the skills required for code-based automation are the primary hurdles to enterprises implementing effective, scalable, and operational automation.

Factors that telecoms need to consider before automating

The decision to take a business-centric approach to automation should not imply a trade-off in automation capabilities. When evaluating automation alternatives, effort must be made to assure the validity of the following:

- Accurate cross-functional coverage: The organization's business verticals (Sales, manu facturing, resource management, warehouse, and logistics.)
- Coverage end-to-end: This is particularly true for telcos, given the varied application ecosystem.
- Cross-technology support: This includes web-based, desktop-based, virtual, and legacy applications.
- Advanced data segregation, processing, and transformation capabilities.

These capabilities have to be in order and accessible in a user-friendly, codeless, business manner. Automated assessment of any business process is feasible within the business support system and should be included in the transformation roadmap.

The ability to include and eventually assign automation ownership to business resources considerably improves the capacity to deploy automation without compromising delivery capabilities

Conclusion

Telecom operators are a vital source of communication facilitators across the world. Telecoms must include cutting-edge technologies and platforms to ensure that end-users receive seamless service and outstanding customer experience. However, telecommunications are now struggling to deliver an exceptional customer experience via their mobile and web applications and self-service platforms. Thus, telecom operators must leverage end-to-end software quality assurance and testing services to ensure that they deliver high-quality, next-generation telecom apps with an unparalleled user experience.