

QA TESTING GUIDE

Testing Your E-Commerce Ahead of Black Friday & Cyber Monday





Table of Contents

1. INTRODUCTION	3
<hr/>	
2. BLACK FRIDAY + CYBER MONDAY SALES RESULTS	4-6
Black Friday & Cyber Monday in 2020	4-5
Black Friday & Cyber Monday in 2021	5-6
3. TESTING COVERAGE	6
<hr/>	
Browser Coverage and Recommendations	6-8
Selecting the Right Devices for your E-commerce	9-11
Operating System Adoption Data	12-15
Putting it All Together	15
4. TYPES OF TESTING	16
<hr/>	
Functionality Testing	16
Compatibility Testing	17
Test Automation	18
Accessibility Testing	19-20



1. Introduction

Launching a successful e-commerce platform is challenging. Consumers are spending more money than ever before online and with that comes greater expectations for the overall user experience.

Over the past 13 years, we've tested hundreds of mobile applications and e-commerce websites for dozens of companies that sell millions of products every year around the world. In this guide, we'll share some of our knowledge about e-commerce testing and all the aspects you need to take into consideration prior to launching your e-commerce.

If you are someone who is interested in learning more about e-commerce and what it takes in terms of quality to have a platform that functions across different devices and platforms, we hope that this guide will give you a better understanding of the different types of testing, overall sales numbers, and the importance of having a solid e-commerce platform that can stand up to the holiday shopping season.

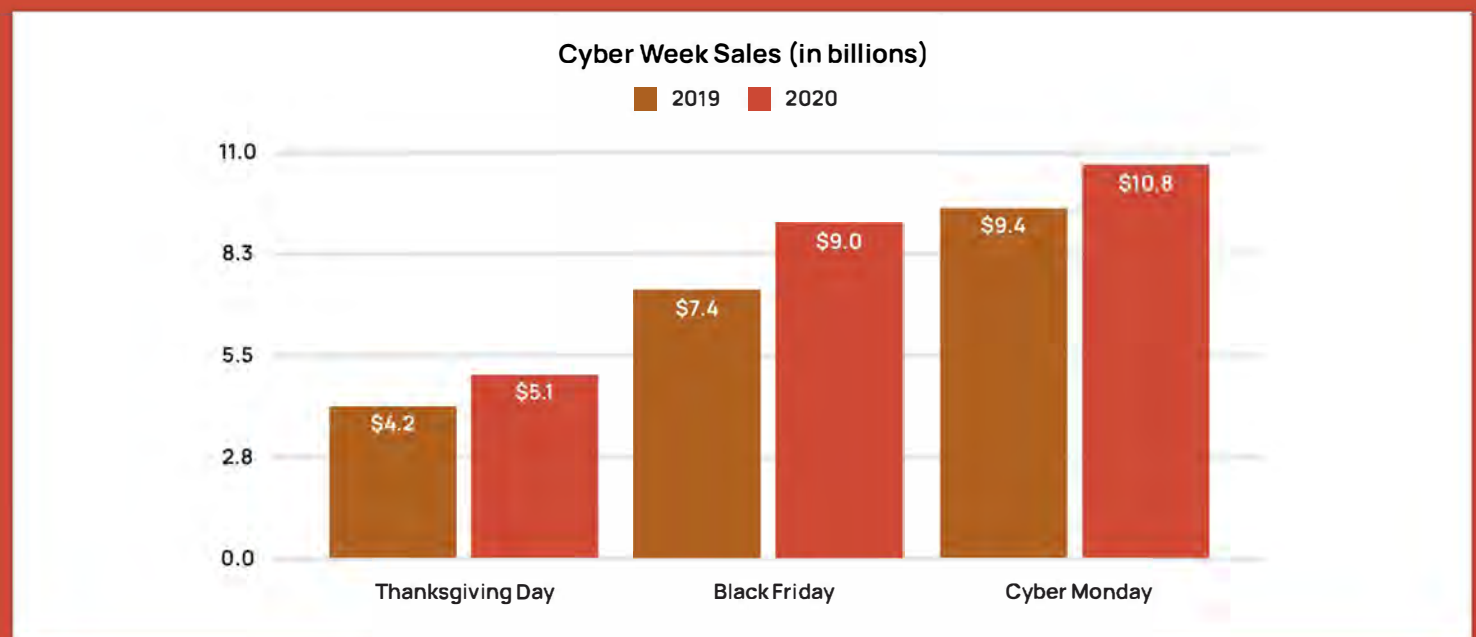
2.1. Black Friday & Cyber Monday in 2020

Black Friday and Cyber Monday in 2020 marked the beginning of a new era. Many changes to shopping occurred in 2020, and Black Friday/Cyber Monday deals were moved almost entirely online due to COVID-19.

As a result of functioning primarily online, these deals were able to start earlier and last even longer than in the past. Stores actually closed for the holiday instead of encouraging in person shopping. Buying online and picking up in the store or via curbside pickup became a new norm, and helped prevent shipping delays for consumers.

These mainly online deals allowed for other companies and businesses to join in on the deals as well. Consumers spent \$9 billion on the web the day after Thanksgiving, up 21.6% year over year, according to data from **Adobe Analytics**. On Black Friday, Adobe found consumers spent \$6.3 million per minute online, or \$27.50 per person, on average. Spending on smartphones surged 25.3% year over year to reach \$3.6 billion, representing 40% of total e-commerce spending.

Cyber Monday also proved lucrative, as holiday shoppers spent a combined \$10.8 billion on Cyber Monday, up 15.1% from a year ago, setting a record for the largest U.S. online shopping day ever, according to Adobe.



Compared to the previous year, pre-pandemic 2019, the drop in in-person shopping was quite pronounced, foot traffic dropped 55% YoY . Retailers used this opportunity to launch their deals earlier than in years past, and 52% of shoppers took advantage of these early deals. In 2020, retailers also encouraged shoppers to shop online and pick-up in stores. 50% of shoppers said they planned to use curbside or pickup options more than the previous year.

While brick and mortar retailers found ways to work around the pandemic by capitalizing with online shoppers, the online retailer Shopify also saw a 76% increase of global holiday shoppers. Between Black Friday and Cyber Monday, Shopify collectively made \$5.1 billion dollars in sales.

What about the internet's most famous online retailer? Amazon also saw an increase in online spending during their Amazon Prime days on June 21 and 22nd of 2021. While they made \$11.19 billion in 2021, this number is not nearly as impressive as the last few years with only a 7.6% increase. However, Amazon continues to see a year over year increase in online spending, and also saw a 50 million increase in global Prime Membership enrollment versus 2020.



\$11.19 billion

Amazon Prime Day
earnings in 2021

2.2. Black Friday & Cyber Monday in 2021



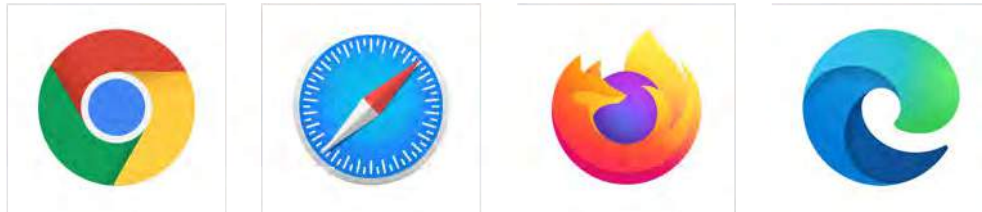
In 2021, it's projected that more companies will be launching their sales earlier and running them longer. Retailers are making this move due to the success of previous years cyber sales deals; however, some retailers are making this decision to combat the supply chain issues that have cropped up in 2021. With worries about deliveries being made on time and cargo processing delays, many supply chain executives are encouraging consumers to prepare and order early to beat the holiday rush.

Nevertheless, American buying strength continues to increase. Business Insider reports that most of this spending comes from goods versus services, and there are no signs of that slowing down. As the economy begins to recover, online retailers will continue to see a rise in consumer spending.

BlackFriday.com projects that online sales will grow 20% YoY and reach around \$17 billion based on a survey completed earlier this year. The survey reveals that while consumers are interested in the best deals during holiday shopping events, they do not plan to decrease their spending any time soon. That, coupled with family gatherings making a return later this year along with an inevitable renewed interest in home goods, decor, and fashion should bode well for a healthy amount of sales and strong demand going into Black Friday.

It is safe to say that consumer demand and engagement will remain as strong as ever this Black Friday + Cyber Monday and your e-commerce should be prepared to take it in strides. By choosing to perform rigorous testing ahead of time, you can identify and remediate many of the common bottlenecks e-commerce platforms experience when faced with a high volume of unique users across different platforms and devices. Visit our blog to learn more about Black Friday & Cyber Monday engagement statistics.

3.1. Browser Coverage and Recommendations



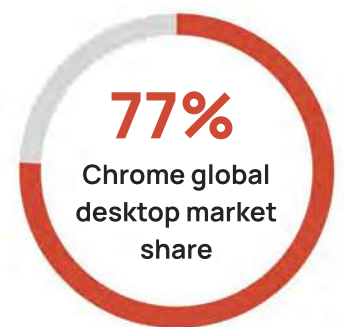
If you choose to launch your e-commerce as an exclusively web-based platform, you'll want to verify that the user experience is identical regardless of which browser a user chooses to access the site with. Some of the most popular browsers such as Chrome, Safari, Firefox, MS Edge, and Opera each have their own frameworks which might not guarantee cross-browser compatibility right out of the box.

The first step to understanding which browsers are best to support is to examine the number of users which are actively using each browser.

► **Google Chrome** - According to statistics compiled by **Kinsta.com**, Google Chrome continues to dominate as the number one browser; occupying just over 77% of the global browser market share on desktop. This is reinforced by data from **backlinko.com** which places Chrome as the primary browser of 2.65 billion internet users and reporting that it occupies a global market share of 63.58% in 2021.

When it comes to mobile internet users, the Chrome app for phones has a slightly lower market share of 62.48% and the Chrome app for tablets has the fewest when compared to desktop and phone; occupying only 42.5%.

As made evident, Chrome should be prioritized when developing a test plan for an e-commerce website. With as significant of a market share as it possesses, you do not want to neglect where a majority of your users will likely be.



2.65 billion
Users of Chrome as primary browser



23.78%

Safari mobile
browser market
share

844 million

Users of Safari browser
in 2021

42%

of Safari users are on tablet
devices, when compared to
desktop and phone

► **Safari** - Next up is Apple's Safari browser and per backlinko.com browser statistics it makes up around 9.7% of desktop browsers and 23.78% of mobile browser market share. This is in large part due to the popularity of Apple's iPhone devices where Safari is the default browser and until iOS 14 was released, was incapable of altering its default browser to that of a third party such as Chrome or Firefox. Even then, most users will opt to preserve its default usage in favor of a consistent and easier experience.

Of the estimated 844 million people using Safari in 2021, the majority appear to be on tablet devices which occupy just over 42% when compared to desktop and phone, which hold 9.7% and 23.78% market share respectively. This is due in part to the popularity of iPad devices which hold a significant market share in Apple's ecosystem.

If you plan to reach users with iOS devices, it is essential that Safari is prioritized when developing a test plan for an e-commerce website or application that runs within a MoWeb environment.

► **Firefox** - Despite trailing in global market share, there remains a sizable audience using Firefox to access the web across desktop and mobile devices. According to statistics gathered by backlinko.com, Firefox attracts an estimated 153 million users which equates to a total market share of 3.29% in 2021.

The majority of Firefox users are present on desktop, totaling approximately 7.17% of platform market share while mobile and tablet trail behind with only 0.51% and 0.20% respectively.

A conclusion that can be drawn from this data is that while Firefox should be considered while developing a test plan for an e-commerce website, it is a much lower priority browser to test on mobile devices than it is on desktop.



3.29%

Firefox browser
market share in
2021

153 million

Users of Firefox browser
in 2021



3.4%

Edge browser
worldwide
market share

158 million

Users of Edge browser
globally

7.1% growth

In Edge browser users
from 2019 -2021

► **Microsoft Edge** - Internet Explorer may no longer be relevant but Microsoft Edge holds a lead over Mozilla Firefox with a 3.4% worldwide browser market share, equating to estimated 158 million users globally.

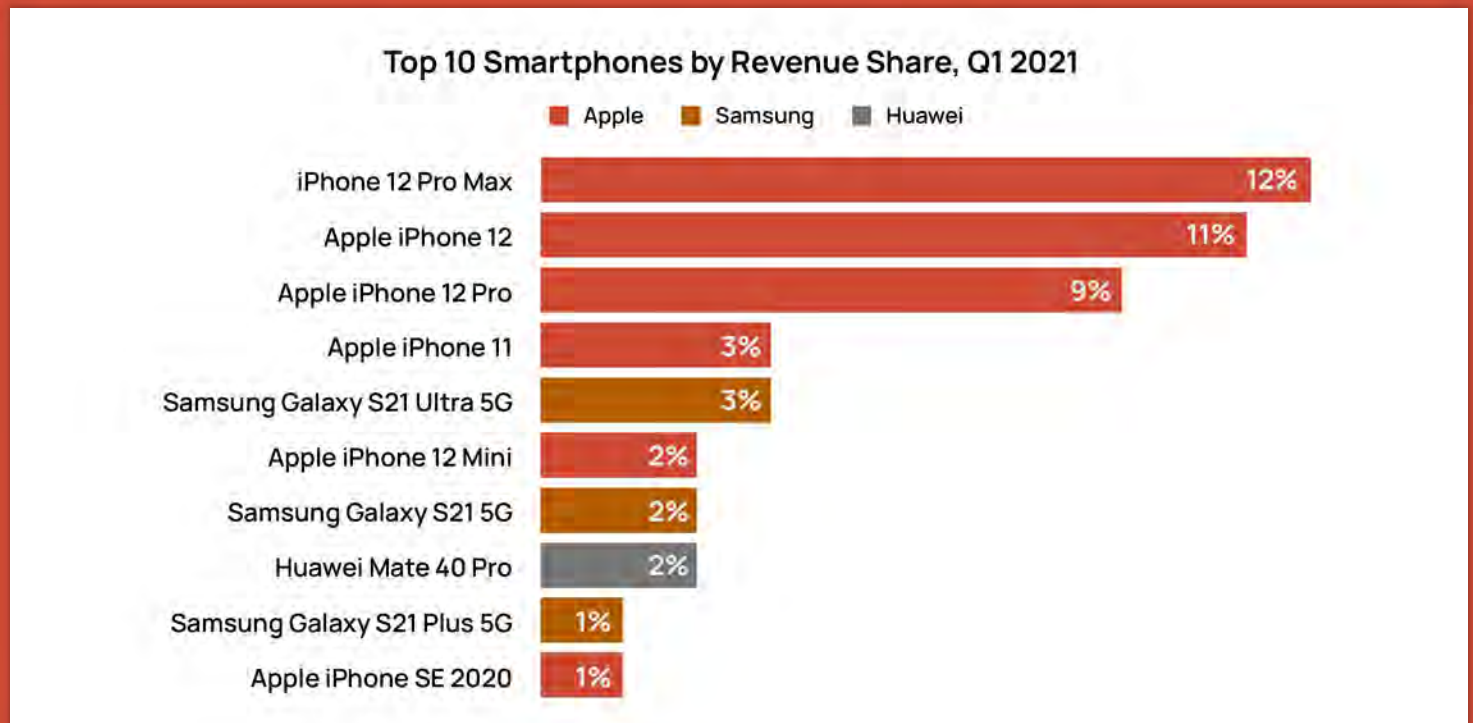
Just last year, Microsoft Edge underwent a relaunch that replaced its existing engine with one based on the open source platform Chromium, allowing Edge to be released on macOS devices as well as work on older versions of Windows. This most likely contributed to its exponential growth on desktop in the past few years which, according to backlinko.com, took it from just shy of 1% in 2019 all the way to 8.1% in 2021.

Microsoft Edge can be a great secondary browser to test in tandem with Chrome since it is the default browser for Windows devices. Considering it is now built on Chromium, it should be a similar experience to the Chrome browser and offer some of the same compatibility for websites and extensions but is worth checking out regardless.

3.2. Selecting the Right Devices for your E-Commerce

Obtaining a better understanding of the most popular mobile devices in 2021 can help inform more effective device coverage while designing a test plan for an e-commerce platform.

2021 Global Smartphone Sales - According to **Counterpoint Research**, global smartphone revenue surpassed the \$100 billion mark for the first time in Q1 2021, with iPhone 12 Pro Max and iPhone 12 being the most popular smartphones at 12% and 11% revenue share respectively.



2021 Global Smartphone Shipments - Combined global smartphone shipments surpassed 354.9 million units in Q1 2021 and 323.1 million units in Q2 2021. In both cases, it was led by units from brands fitting into the category of “Other” which likely is an aggregate of manufacturers which aren’t as commonly found in the US market. If you plan to target markets outside of the US, it is worth reviewing which are the most popular devices within this category.

Aside from these, Q1 results were led by Samsung which held 22% of smartphone shipments, followed by Apple at 17%, and Xiaomi at 14%. Q2 results also put Samsung at the top with 18% of units shipped, only this time Apple was surpassed by Xiaomi by a slim-margin of 1%.

2021 Global Smartphone Shipments (in millions)			2021 Global Smartphone Shipments Market Share (%)		
Brands	Q1 2021	Q2 2021	Brands	Q1 2021	Q2 2021
Samsung	76.6	57.9	Samsung	22%	18%
Apple	59.5	48.9	Apple	14%	16%
Xiaomi	48.5	52.5	Xiaomi	17%	15%
OPPO	38.0	33.6	OPPO	11%	10%
vivo	35.5	32.5	vivo	10%	10%
Others	95.8	97.7	Others	26%	31%
Total	354.9	323.1			

Obtaining a better understanding of the most popular mobile devices in 2021 can help inform more effective device coverage while designing a test plan for an e-commerce platform.

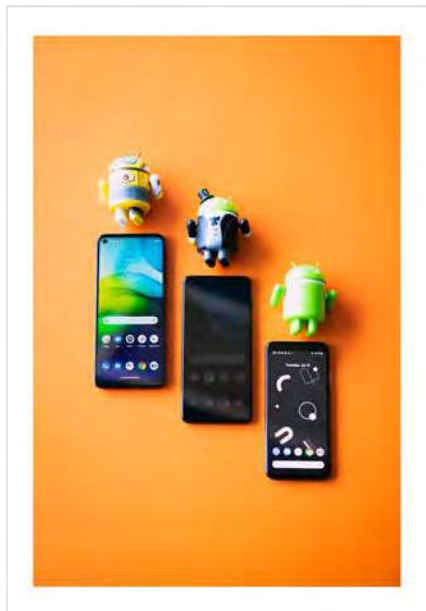
Which devices should I plan to test on? - Leveraging this data, we can make a decision on which devices to include in our test plan. If it is not possible to test on each specific device, the next best thing would be to locate a device that has a similar screen size and OS version and use that instead.



- ▶ *Apple iPhone 12 family* - These devices are likely to have the larger install base when compared to the newest iPhone 13 devices meaning more users are actively using these devices. By supporting all four, you will cover a range of display sizes (5.4inch to 6.7 inch) and OS versions (14.1 - 15.1)
- ▶ *Apple iPhone 13 family* - These are the latest released versions of iPhone as of November 2021 and should be considered since its market share will grow considerably throughout 2022. By supporting all four, you will cover a range of display sizes (5.4 inch to 6.7 inch) but only two OS versions (15.0 - 15.1)

► *Apple iPhone 7 / 8* - As of the time of writing, iPhone 7 & 8 are some of the most popular iPhone devices and according to **Device Atlas** rank #1 and #2 respectively for the most popular iPhones by web usage. By supporting these devices, you will cover a single screen size (4.7 inch) but a wide range of OS versions (10.0.1 - 15.1)

► *Apple iPhone XR* - Also considered to be one of the most popular iPhone devices ever released after a tremendous amount of YoY growth in 2020, taking it from a popularity rank of #14 all the way to a rank of #4. By supporting this device, you will cover a single screen size (6.1 inch) but a range of OS versions (12.0 - 15.1)



► *Samsung Galaxy S21 / S20 family* - These are the latest released versions of Samsung's flagship Android phone series and occupy a sizable amount of the Android device user base. By supporting this device, you will not only cover a range of screen sizes (6.2 - 6.9) and OS versions (Android 10 - 12 presently) but also be able to utilize the Native internet browser in your test coverage.

► *Samsung Galaxy S10* - Similar to the S20 / S21 family, the Galaxy S10 is a popular Android phone and maintains a solid user base to this day. By supporting this device, you will cover two screen sizes (6.1inch & 6.4inch) and a range of operating systems (9.0 to 11.0). The Native browser will also be available to utilize in your test coverage.



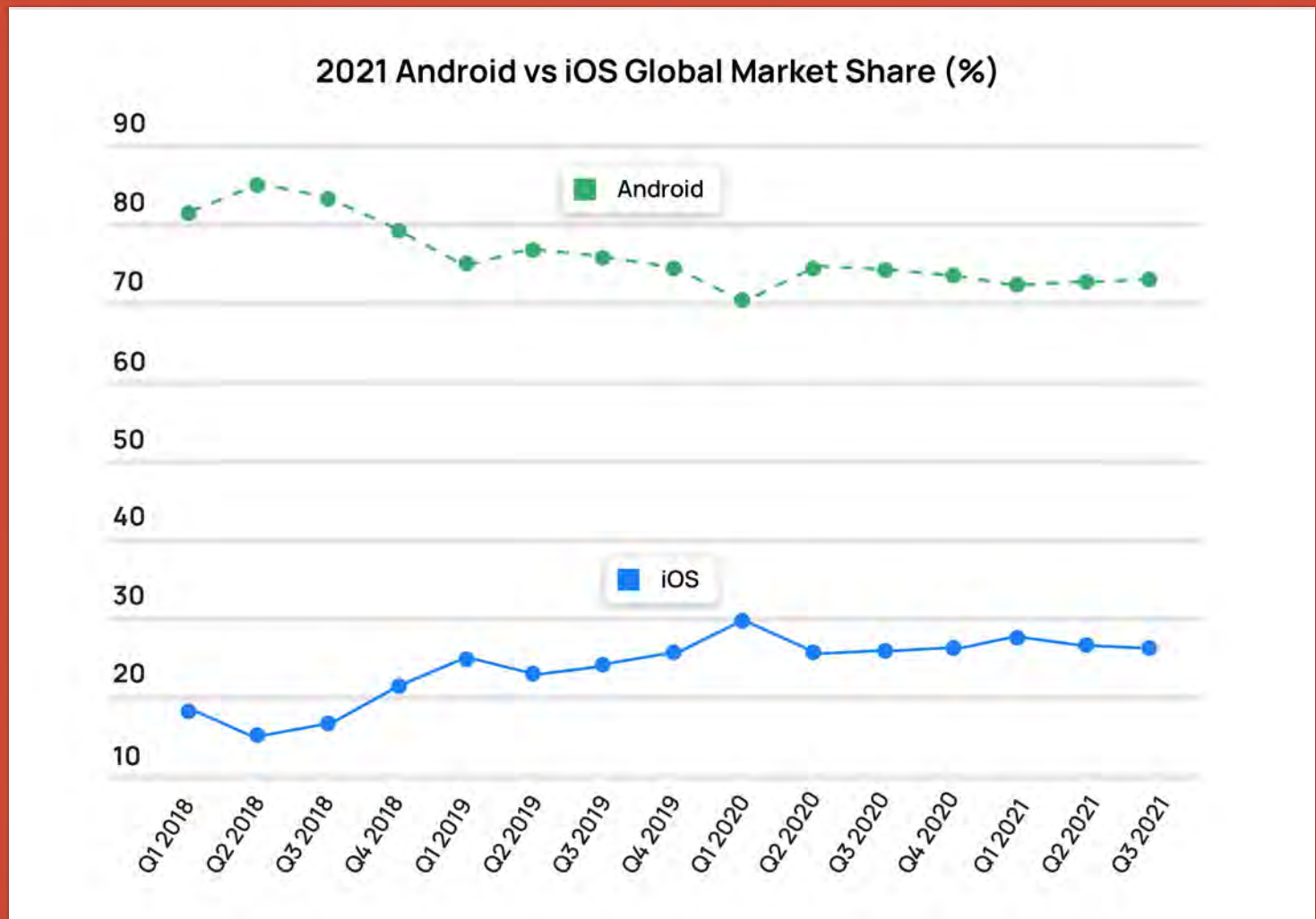
► *Google Pixel 5* - This can be a great device to select to verify that your e-commerce platform performs well in a stock Android OS experience. By supporting this device, you will cover a single screen size (6.0 inch) and two operating systems (11.0 - 12.0 presently)

Each year we cover device usage statistics and compile a list of the most popular devices that we recommend supporting for testing. Head on over to our QA blog to learn more.

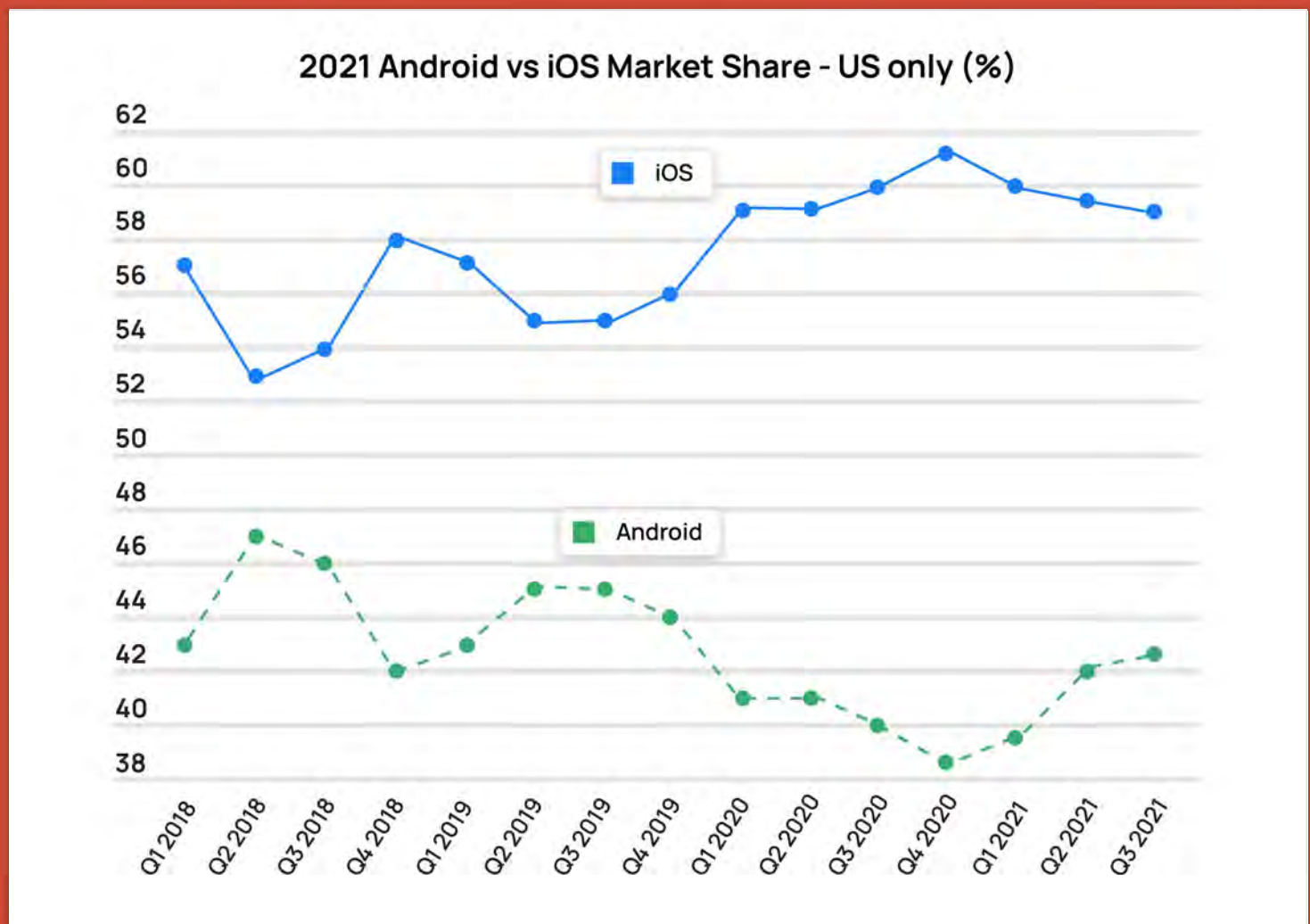
3.3. Operating System Adoption Data

While it is important to cover testing for both Android and iOS operating systems, targeting specific operating system versions based on usage statistics can help you narrow down the scope of the device coverage in your test plan. For example, checking the quality of your e-commerce platform on an Android OS such as 7.0 or older will not yield as much of a return on investment as the same time spent on newer OS versions.

2021 Android vs iOS Global Market Share - Based on data collected by **Business of Apps**, global market share of OS platforms has remained relatively stable since Q2 2020. We can observe that iOS devices are experiencing some growth in global markets but Android remains at top; making up just over 72% of the total market share.

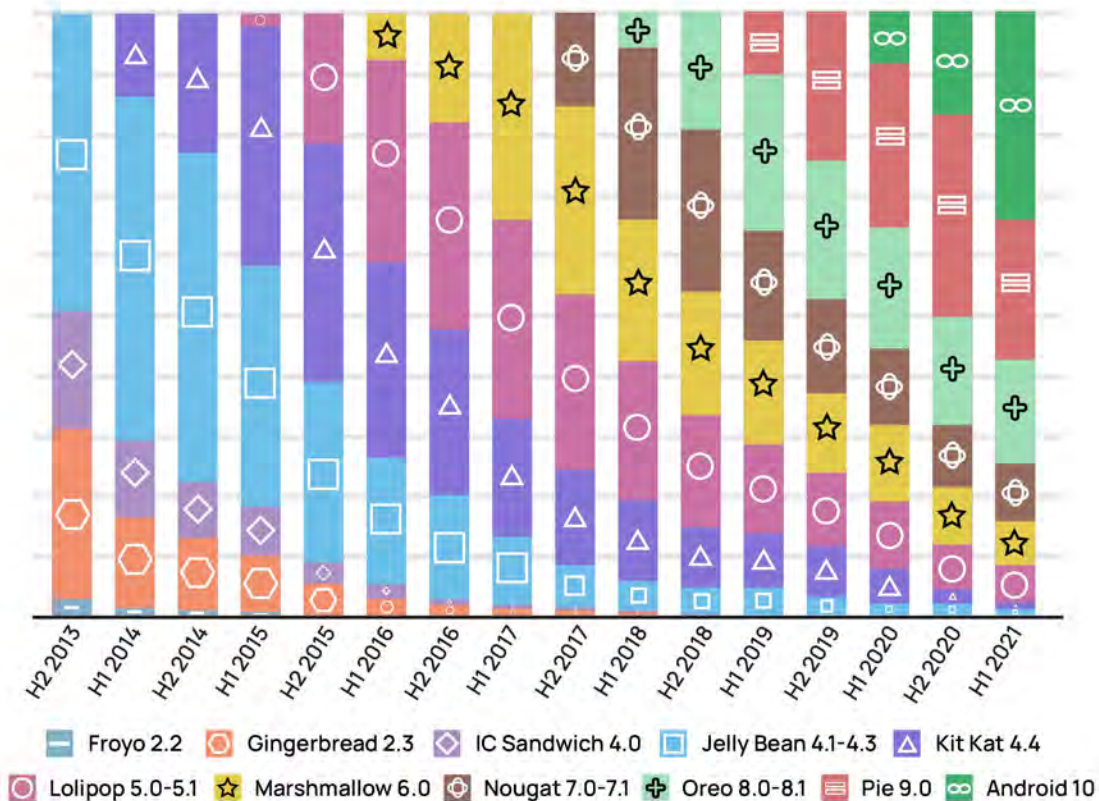


2021 Android vs iOS Market Share (US only) - When looking specifically at the US market, mobile operating system adoption is dominated by the iOS platform, which saw a tremendous amount of growth in 2020 before falling sharply at the start of 2021 and leveling out in Q3 to around 57% vs Android's 43%.



Android OS Version Global Market Share - Data from **Business of Apps** sourced directly from **Google** reveals that the market share of older versions of Android tends to decline on a curve over the course of each quarter, as older devices become obsolete or consumers upgrade their device to the latest available version of Android. As of H1 2021, Android 10 is the leading OS version - occupying just over 37% of the global Android OS market share. While this data does not reflect Android 11 adoption, we can assume that since it had only been released as of September 2020 that its present market share will be smaller than that of older OS versions.

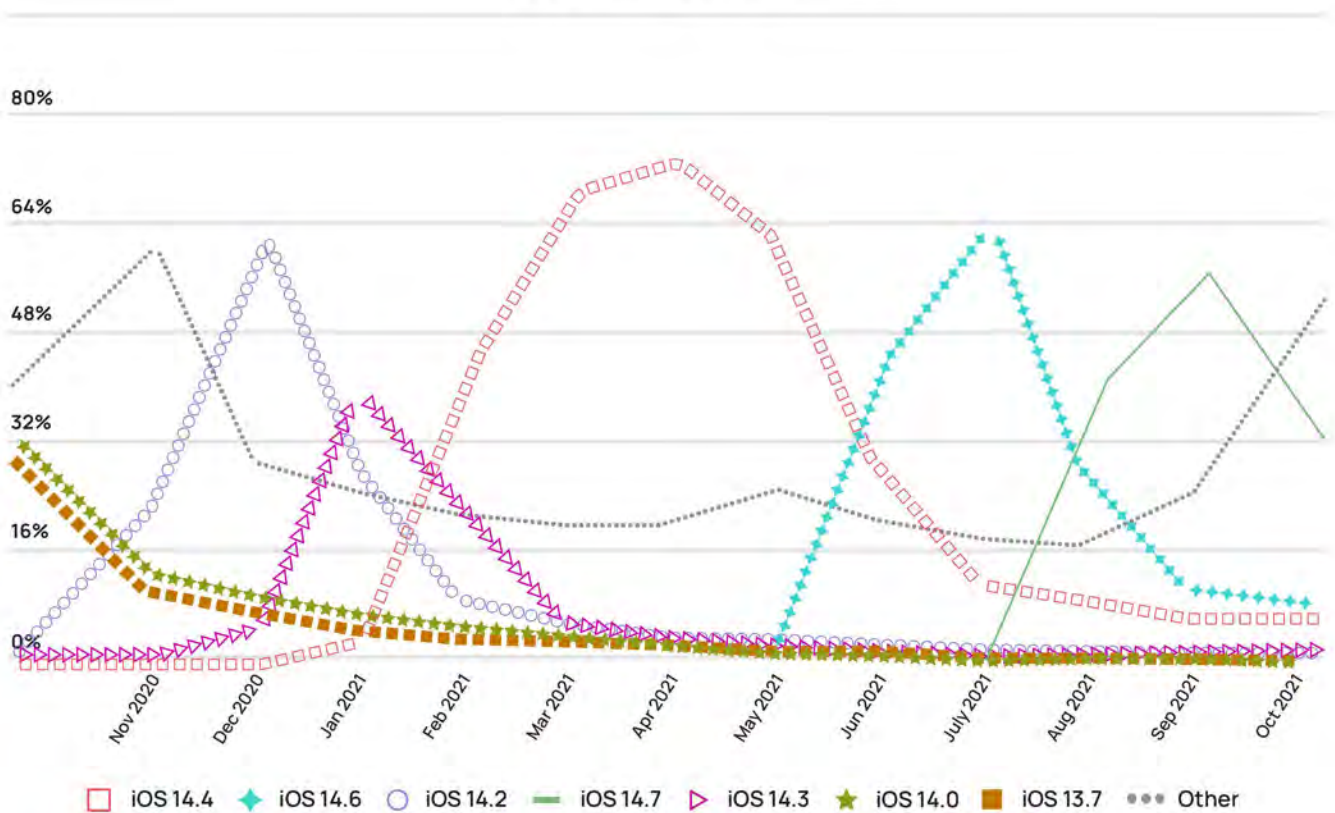
Android OS Version Global Market Share (%)



iOS Version Global Market Share - Per statistics sourced from [statcounter.com](https://www.statcounter.com) representing iOS mobile and tablet operating system global market share, it can be observed that each OS version has a similar trajectory upon release. The 'Other' OS version likely includes iOS 15 as well and is the latest to begin to increase in user adoption after its release in September 2021.

With that said, iOS 15 adoption has been slower than that of iOS 14, which saw a massive 40.51% user adoption within its second week of release and was announced by Apple in December of 2020 that 81% of iPhones introduced within the last four years were now running the OS version.

Mobile & Tablet iOS Version Market Share Worldwide
Oct 2020 - Oct 2021



3.4. Putting it All Together

A successful test plan begins with selecting the right devices to ensure the quality of your e-commerce platform is consistent across as many **browsers**, **devices**, and **operating systems** as possible.

In the previous sections, we took a look at which browsers, devices, and operating systems are the most popular as well as made some recommendations as to which to prioritize and include in your test plan.

If you need further assistance or have any questions on how to guarantee comprehensive device coverage, **please visit our website at plusqa.com** and get in touch with us.

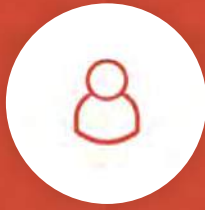
4.1. Functionality Testing

You can break down the different areas of an e-commerce as follows:



Product:

Product Detail Page
Product Grid Page
Search
Product Configuration



User Account:

User Profile
Login/Logout
Forgot Password



Cart:

Checkout
Guest
Registered User
Wishlist



Static Pages:

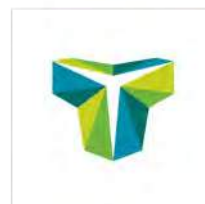
Company Information
General Static Pages

Developing a functional test plan - Before beginning manual testing, having a solid plan that can easily be shared with your team is a good first step in the QA process. Being able to describe to the rest of your team how testing will be executed by components and over what period of time will be essential for your team members.

Once you know the specific browsers and devices to test, you can begin planning how you will execute your manual testing. Although browser compatibility and functionality testing are often considered separate steps, they actually function better when executed simultaneously. During your test planning, it's important to keep in mind the interactions each user will have with an e-commerce platform so that you're sure to find and have access to any bugs before your customer does.

After you've mapped out the architecture and components that need testing on an e-commerce site, you can organize the structure you'd like your test cases to take. Test cases can be written based on using whatever tools work best for your specific needs, but Jira or Pivotal Tracker both offer excellent options to use.

Organization of your test cases will largely depend upon the scope of your tests, but will also be influenced by the size of your team; many times, smaller groups of testers will find spreadsheets to be sufficient organizational tools, but larger teams requiring a more robust system may find value investing in solutions such as Xray, TestLodge, or TestRail.





4.2. Compatibility Testing

Analyzing and understanding your target audience is critical to providing the highest quality product, and is key to knowing what and how you will be testing. Testing across the multiple browsers and operating systems that your target audience will likely use is necessary when you test an e-commerce website or any mobile application on iOS or Android.

There are two elements you should consider in the test planning phase:

First, you need to decide which tools will most appropriately work for your team--some tools may not offer the ability to capture data that may be important to your unique project, so a careful consideration of what your needs are as a team is necessary. Make sure that you work with the product manager and developers to decide which custom fields and labels you should use in your bug tracking tools.

Second, you will need to consider how you will approach browser testing: you can test on real devices with a few internal team members, go through a cloud-based solution, or simply hire a testing partner.

No matter what tools you choose to manage your test cases, or how you approach browser testing, these decisions should always be made early on in the process to ensure the quality of testing and successful communication with the team throughout the entire project life cycle.

4.3. Test Automation

Creating your test strategy will be based on the size and the duration of the project, but even if you are working on a smaller website, planning is crucial for you and the rest of the team.

In most cases, teams rely heavily on manual testing since many companies view test automation as a highly technical, complex solution that requires resources or skills they lack. However, while test automation can be complex, it can be extremely helpful in the long run, under the right circumstances. Knowing when to use manual or automated testing will help to create your test strategy.



For instance, manual testing is recommended when testing new application functionality that will change frequently, as automation testing isn't well-suited to respond to frequent revisions; long regression test runs, however, greatly benefit from automation.

For some scenarios and test types, there is no substitute for manual testing--manual testing is too versatile, intuitive, and responsive to be completely replaced by automated testing, and is preferred when testing for user experience and accessibility.

In order to understand how frequently and when tests should be automated, let's highlight some areas where manual testing should instead be used:

- ▶ **Look and feel:** Testing the user experience, the look and feel, the usability of an app, or accessibility standards can only be done through manual testing, as these areas require human intuition and experience
- ▶ **First test run and changing functionality:** Manual testing can handle new and changed components much better than automation, since manual testing is more adaptable and does not require refactoring
- ▶ **Complex Functionality:** The return on investment in automating testing for complex scenarios and functionality may not be worth it, and so manual testing sometimes makes more sense

Build a list of requirements before you automate - Before automating, it's important to build an exhaustive set of requirements or user stories with your team. This set will help determine which functionality features should be automated, and which should be left to manual testing.

4.4. Accessibility Testing

Have you ever looked at how accessible your application is? Imagine the disappointment of a customer who comes to your website, tries to select a product, and is not able to. Even worse, imagine that same customer finally selecting a product but being unable to checkout. This imaginary customer represents hundreds of thousands of real-world customers who are protected under Section 255 of the Communications Act, requiring telecommunications products and services to be accessible to people with disabilities. **Accessibility is a requirement, not an option.**

Although large corporations have made an effort to make their websites and e-commerce applications more user-friendly in recent years, a large number of websites are still not accessible for those with disabilities. This can lead to legal issues for the brand and also prevent them from selling products to millions of users around the world.

In the United States alone, more than 8 million people have difficulty seeing, more than 7 million experience difficulty hearing, and close to 20 million people have a physical difficulty; not being accessible will notably reduce the number of users being able to access your website or to navigate your mobile application. In order to be compliant, organizations are encouraged to use the WCAG 2.1 guidelines and decide what conformance levels you want to follow (A, AA, AAA)

When it comes to being accessible, it's important to consider that you want your e-commerce website and/or mobile application to align with the four main guideline categories of WCAG 2.1:

Perceivable - Include Text Alternatives and Time-based Media; make sure the application is Adaptive and has Distinguishable fonts/colors.

Operable - Keyboard Accessible, utilize Enough Time (giving users the time they require to complete tasks), considerations for Seizures and Physical Reactions, Navigable, and Input Modalities.

Understandable - Readable, Predictable, Input Assistance.

Robust - Compatible (website's content and back-end coding need to be compatible with assistive technologies)

61 million

Adults in the US
live with a
disability

15%

of the world
population has
a disability

26%

of all Adults in
the US have a
disability

While accessibility testing can be executed by testers who do not necessarily have a disability, it is recommended to work with an accessibility testing expert who experiences a disability first-hand. A tester with a disability can provide more intuitive feedback around the usability of an application as well as execute the functional tests. In our experience, UX researchers and designers get quality feedback from testers with disabilities and can implement changes prior to launching a new app to the world.

Each year we cover Accessibility topics and create a comprehensive guide to help you learn more about Accessibility Testing. Visit our QA blog to learn more.

5. Conclusion

There is no better time to be launching a new e-commerce platform and we hope that the content of this guide can help you be more successful with testing ahead of the holiday shopping season.

First, we took a look at Black Friday & Cyber Monday sales data from 2020 as well as projections for 2021 to provide some perspective on just how much consumer traffic an e-commerce platform can expect during a sales event and emphasize how important it is to test thoroughly ahead of time.

We also reviewed some key usage statistics from previous years to consider when selecting which browsers, devices, and operating systems to include while developing a test plan. Gaining more insight about where your consumers are accessing the web or interacting with applications can help better inform where to spend your time testing and validating the quality of your e-commerce platform.

Finally, we reviewed the different types of testing that can be conducted on an e-commerce platform, as well as the advantages and disadvantages of each. Not every e-commerce is made the same so it is important that you pick a test approach that is most suitable for the platform architecture and user experience. No matter which you choose, accessibility should be prioritized as all users deserve to be able to engage with e-commerce regardless of their physical, visual, or cognitive ability.

Ultimately, choosing the right testing partner for test automation, manual testing and accessibility testing will help you have a successful launch and strong conversion rate.



PLUS QA is the trusted testing partner for some of the largest brands and agencies in the world.

Our broad experience, technical expertise, and on-site team of testers and physical devices allow us to easily and efficiently work as an extension of our clients' teams — improving user experience at every touchpoint, and helping leading companies, in a variety of industries, consistently deliver the highest quality products and services.

PLUS QA is also a certified minority-owned business by the National Minority Supplier Development Council (NMSDC). Companies at all levels are seeing the importance of doing business with certified MBEs and working with us helps them reach their supplier diversity goals.

If you need help with testing an e-commerce platform, please don't hesitate to get in touch.

Schedule a call today.

(503) 929-9263

testlab@plusqa.com

www.plusqa.com



Sources:

1. "A Record-Breaking Cyber Week 2020: Online Shopping Steals the Show." Adobe Blog, <https://blog.adobe.com/en/publish/2020/12/01/cyber-week-online-shopping.html#gs.fv62Il>.
2. Staff, BlackFriday.com. "Black Friday History and Statistics." BlackFriday.com, BlackFriday.com, 29 Oct. 2021, <https://blackfriday.com/news/black-friday-history>.
3. Ellyatt, Holly. "Supply Chain Chaos Is Already Hitting Global Growth. and It's about to Get Worse." CNBC, CNBC, 19 Oct. 2021, <https://www.cnbc.com/2021/10/18/supply-chain-chaos-is-hitting-global-growth-and-could-get-worse.html>.
4. Fox, Fox. "Holiday Shopping in October: Why Supply Chain Experts Say You Need to Shop Now, Not Later." CBS News, CBS Interactive, 19 Oct. 2021, <https://www.cbsnews.com/essentials/supply-chain-issues-holiday-shopping-shipping-delays-2021-10-19/>.
5. Hoffower, Hillary. "Americans Are Buying More Stuff than Ever before, and It's Jamming up the Supply Chain." Business Insider, Business Insider, 18 Oct. 2021, <https://www.businessinsider.com/americans-spending-goods-versus-experiences-supply-chain-crisis-2021-10>.
6. McGrath, Kristin. "Black Friday Predictions for 2021." BlackFriday.com, BlackFriday.com, 22 July 2021, <https://blackfriday.com/news/black-friday-predictions>.
7. McGrath, Kristin. "Top Shopping Trends for 2021." Offers.com, Offers.com, 23 Mar. 2021, <https://www.offers.com/blog/post/state-of-retail-survey-q1-2021/>.
8. "Global Desktop Browser Market Share for 2021." Kinsta®, 7 Oct. 2021, <https://kinsta.com/browser-market-share/>.
Dean, Brian.
9. "Google Chrome Statistics for 2021." Backlinko, 8 Mar. 2021, <https://backlinko.com/chrome-users>.
Mishra, Varun.
10. "iPhone 12 Series Captures 1/3 of Smartphone Revenues - Best Selling Models." Counterpoint Research, 21 May 2021, <https://www.counterpointresearch.com/best-selling-models-q1-2021/>.
11. "The Most Popular Iphones of 2020." DeviceAtlas, 12 Apr. 2021, <https://deviceatlas.com/blog/most-popular-iphones>.
12. "Android Statistics (2021)." Business of Apps, 3 June 2021, <https://www.businessofapps.com/data/android-statistics/>.
13. "Mobile & Tablet IOS Version Market Share Worldwide." StatCounter Global Stats, 2021, <https://gs.statcounter.com/os-version-market-share/ios/mobile-tablet/worldwide>.