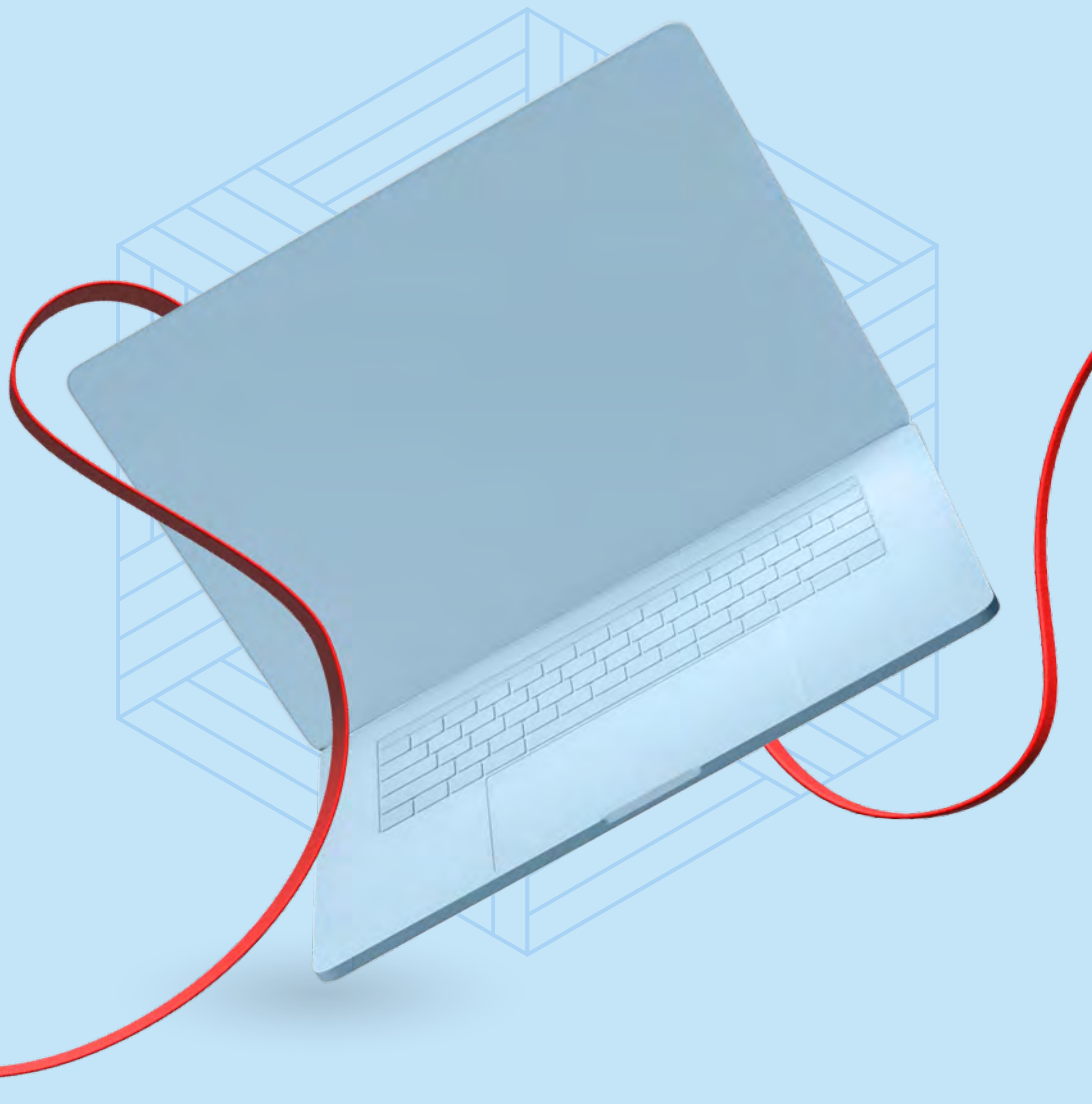


2023

State of Digital Quality

APPLAUSE^o



Contents

- 03** Executive Summary
- 04** Methodology
- 05** Functional Testing
- 11** Accessibility Testing
- 17** Localization Testing
- 22** Customer Journey Testing
- 25** Payment Testing
- 29** Conclusion



Executive summary

For the second year, Applause analyzed a representative sample of our testing data to identify and analyze the most common flaws in digital experiences and map out how companies can stop them from reaching end users. We evaluated experiences across more than 16,000 individual mobile devices, 1,000 unique desktops and 500 OS versions to assess endless combinations of networks, browsers, payment instruments and integrations worldwide. We hold unique insight into the state of digital quality based on our work with companies in diverse industries and regions, from varying technological maturity levels, who are creating a wide range of application types.

This year we included additional data about the most frequently tested devices, configurations and payment instruments in different locales and industries, as well as the average number of configurations tested. We also shared observations on the core capabilities, practices and processes in place at organizations at different levels of commitment to digital quality.

Some highlights from this year's report:

- ➔ Digital quality is an intersectional discipline. Functionality, localization, accessibility, payments, customer experience and UX bleed into one another. Assess different components of an app or digital experience holistically, not just in isolation, to truly understand customer encounters with your brand. With Applause testers uncovering more than 200,000 defects last year, it's clear that development organizations have a long way to go in the pursuit of excellence.
- ➔ Applause's 2023 accessibility and inclusive design survey found that 43% of respondents rated accessibility as a top priority for their organization. Nearly three quarters — 72% — reported that their company has a dedicated accessibility expert on staff. Product designers and engineers are building accessibility into products and code sooner and more often than in the past.
- ➔ As more personalized experiences become the norm, organizations must assess functionality and UX across more device combinations, configurations, workflows and dimensions. Test matrices — and applications themselves — are becoming more complex and harder to manage.
- ➔ Training and testing the AI and machine learning (ML) engines that support greater personalization requires specialized data and knowledge that many businesses don't have — and struggle to find. Applause's AI and Voice survey found that 86% of respondents have concerns about bias in AI that companies must address to maintain customers' trust and loyalty.
- ➔ Though companies take many different approaches to digital quality and progress along different paths, we've observed some commonalities that correspond to different stages of commitment to — and development of — digital excellence. Rather than formal maturity models, we offer some simple frameworks that organizations may use to benchmark the structure, efficiency, effectiveness and scalability of their digital quality efforts across varying dimensions. While cultures, processes and maturity levels are dynamic and there's not always clear demarcation where one stage ends and another begins, an honest look at the status quo can spotlight which efforts will deliver the greatest impact to digital quality.

Methodology

We analyzed results from a representative sample of closed test cycles executed between January 1, 2022 and December 31, 2022. A test cycle is how Applause defines each unique set of tests: a client sends us testing parameters — builds, scope, coverage, etc. — and we create a test cycle that includes the specific test cases and scenarios to be tested.

We analyzed data across industries, testing categories and regions spanning more than 200,000 bugs, tens of thousands of devices, and thousands of device/OS/browser combinations. Testing included websites, apps, IoT devices, mobile web and mobile apps in real-world scenarios.

Device coverage

The figures in this report reflect tests across the following scope worldwide:

Mobile Devices

Mobile makes	167
Mobile models	2,296
Mobile OSes	21
Mobile OS versions	396
Mobile web browsers	36
Mobile carriers	573

Media

Set-top/streaming devices	181
Gaming consoles	35
Smart TVs	2,270
TV providers	65
ISPs	164

Desktop

Desktop web browsers	35
Desktop OSes	10
Desktop OS versions	202

Payment Methods

Credit/debit cards	3,224
E-Wallets	48
Mobile wallets	87
Alternate payments	83

Home

Smart home devices	84
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Functional testing

Ask a developer, a QA engineer and user whether an app works and you may get three very different answers. Ultimately, however, individual users determine whether each app works well enough for them to adopt it. Starting with the basics — from making sure users can download and install an app, through validating more complex workflows and integrations, including APIs, IoT and Bluetooth connections — organizations must ensure basic functionality before releasing an app to customers... which doesn't always begin to address UX concerns.

While functional tests themselves are often not difficult, conducting the number of tests required in the necessary timeframe, across the spectrum of devices and OS configurations needed, poses a challenge for many QA and development teams. In addition, teams often prioritize testing over developing testing strategy or doing the routine work that makes testing more efficient

and effective in the long run. Raise your hand if you've ever put off test suite maintenance, released while testing was in progress, pulled in help from other departments to complete testing, or released with risk because there was no time.



The data set

A representative sample of functional tests.



38,920
test cycles



70+
industries



153
countries



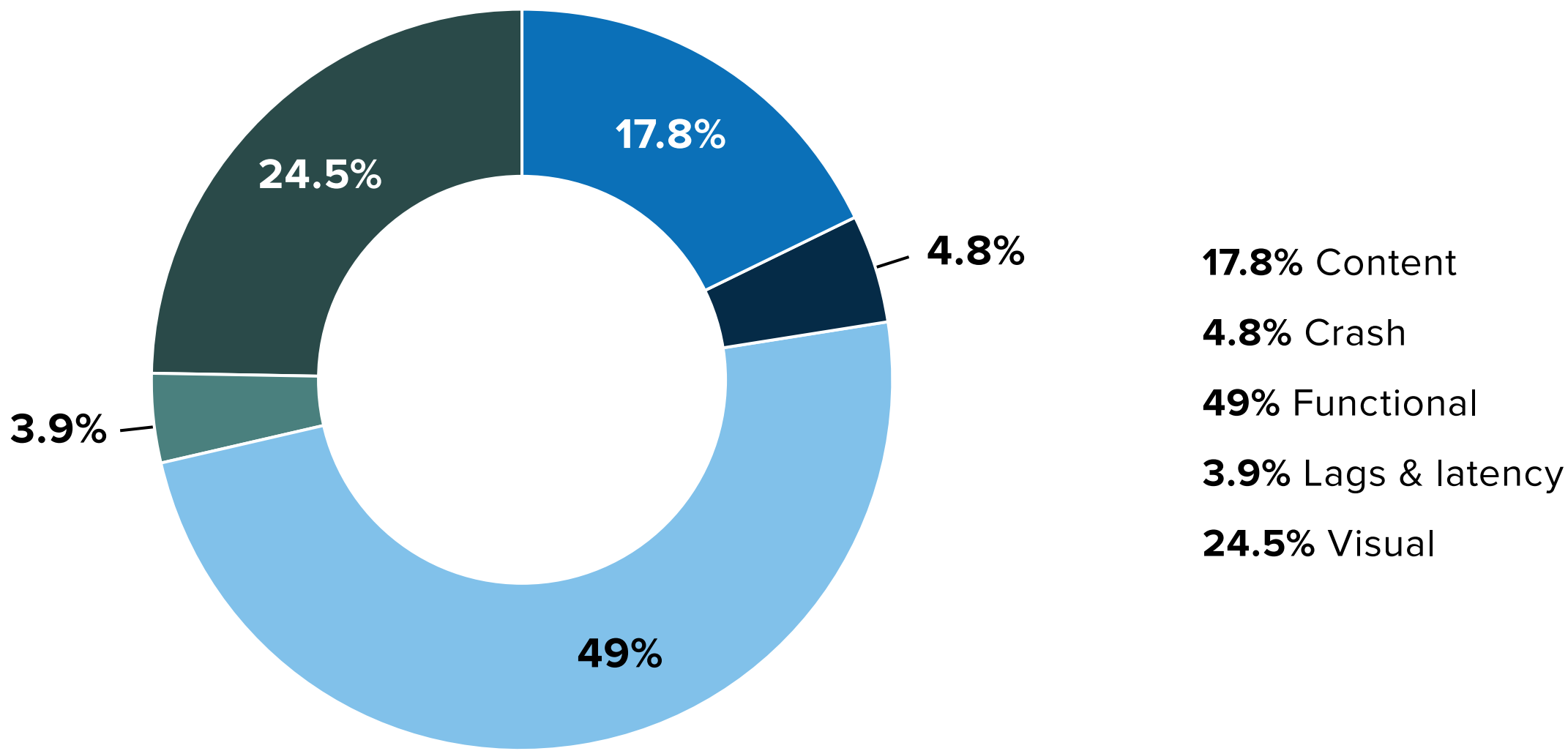
173,725
bugs

Bug type definitions

Bug Type	User Experience
Content	“This doesn’t read right” Typos, grammatical issues
Crash	“The app shut down” App closes or quits unexpectedly
Functional (workflow errors)	“This doesn’t work right” Buttons don’t respond when clicked, searches return incorrect results
Lags and latency	“This is taking too long” Sluggish performance, freezes
Visual	“This doesn’t look right” Misaligned content or page elements, content doesn’t fit an area

Bug type breakdown

See the prevalence of each type of bug across the data we analyzed:



The composition of bug types identified remains the same as last year. Functional, visual and content defects continue to comprise over 90% of all bugs found. While crashes are the most critical flaw, they continue to plague apps with no sign of year-over-year improvement.

For functional testing device coverage comparisons and the most popular devices tested, please see [Appendix A](#).

How one fintech ensures innovation and excellence

An Applause global fintech customer with a leading financial trading platform was challenged to maintain quality, innovation and personnel management. Hundreds of apps needed to function seamlessly within the high-stakes platform, yet the firm was struggling to release new features while maintaining massive regression testing suites. In addition, all testers had to be highly trained in financial trading.

The fintech teamed with Applause to oversee comprehensive delivery and engagement management, recruiting a highly skilled team of over 50 testers from over 70 countries with financial services experience to work across 18 engineering teams. Applause owns the QA function at the fintech partner and provides best practices and guidance on test strategies. The fintech has prevented lost revenue by minimizing bugs escaping to production, has deeper insight into common functional issues and has a QA team at the ready that can scale as needed.

Functional testing framework: core capabilities and practices

In our interactions with clients around the globe, Applause sees a wide range of approaches to digital quality. Our new frameworks detail the stages we commonly observe as companies progress to digital excellence, complete with examples of the types of organizational capabilities and activities that characterize each stage. While most companies and teams mix practices from different stages in the following table, a single stage typically defines the business's prevailing approach to quality.

Though it may seem like there's no clear demarcation between levels, those who are closest to the process will at some point recognize that the shift from one point to the next has occurred.

The framework can serve as a valuable starting point for understanding your organization's progress along its digital quality journey and how to level up to reap the competitive advantages associated with improved quality and usability.

If your organization is in the process of establishing or enhancing systems to ensure quality, use this report as a guide to develop plans that cover the most common devices, emerging forms of payment, and key considerations around accessibility and localization, as these are trends Applause sees organizations embrace as they improve quality and UX.



Functional testing framework



Digital quality emergence:

Lack of formal systems, processes and documentation — while individuals may have their own methods and documentation, the organization has no consistent methodology or approach to quality.

Examples of typical testing activities and processes:

- Conducting reactive testing after development
- Running tests without documenting test cases or test run results; or documenting poorly
- Running test cases inconsistently
- Skipping test case documentation or writing test cases in ways that make them difficult to follow or reproduce
- Practicing some exploratory testing and dogfooding
- Using disparate environments for development, testing and production



Digital quality essentials:

Early stages of defining and documenting processes and procedures; establishing some consistency and structure around test efforts. Teams may have their own unique processes, efforts may still be siloed.

Examples of typical testing activities and processes:

- Documenting test cases for feature-based tests
- Ensuring test cases are written clearly
- Defining a device coverage matrix
- Maintaining a known issues/bug backlog list
- Testing releases pre-production
- Conducting unit, smoke and regression testing for major app components or workflows
- Performing exploratory testing for new features/app changes
- Recording test run results
- Automating frequently executed/ rarely changed tests



Digital quality expansion:

The organization has a clear process in place and uses a broad range of testing types. Some reporting is in place. Focus on coverage, scalability and efficiency across the organization.

Examples of typical testing activities and processes:

- Maintaining a defined device coverage matrix based on data about website/app usage
- Conducting regression testing for all workflows
- Testing user acceptance and UX for new features/app changes
- Leveraging test automation for repetitive tests; reviewing and updating automation scripts regularly
- Documenting test cases/suites for all features
- Measuring quality KPIs with data and reporting



Digital quality excellence:

Quality is embedded in the company's DNA and built into all products and experiences from end to end with testing and feedback throughout the SDLC.

Examples of typical testing activities and processes:

- Testing throughout the SDLC, including in-sprint testing in pre-production
- Incorporating the voice of the customer into product design
- Delivering exceptional UX and experiences across all touchpoints
- Maintaining a strong test case management process
- Automating all repetitive tests that humans can't do better
- Reviewing and refining testing processes regularly
- Proactively balancing manual functional, exploratory and automated testing; documenting when to use each test type
- Exploring new testing processes to boost quality, efficiency and coverage
- Driving innovation throughout the SDLC
- Using reports to analyze trends and identify areas for improvement

Functional testing recommendations

Proactively examine how well your testing practices serve your organization, and most importantly, your end users and clients. To truly improve, you need to understand your current state, which may be siloed or inconsistent across different teams, products, groups and even individual team members. Find what's working and replicate that — as well as what's not working and needs to be addressed. If your organization has achieved excellence, think about what you need to do to maintain that position and how you can serve as an exemplar for other teams and businesses.

Exceptional quality doesn't just require time for testing; it demands time for managing testing strategy as well as capturing and evaluating data. Build in time for developers and testers to document processes, review with teams, and regularly update to ensure they still work and that everyone's following those processes. Organizations that don't invest in the foundational elements of a quality program, including documenting processes, managing test cases and recording test run results, will spend

unnecessary time bringing new team members up to speed, trying to establish what tests were run and how, and hopelessly backtracking to find when and how a defect slipped through, with no preventative measures in place to keep the breakdown in systems from recurring.

Recognize that achieving excellence doesn't mean the work is done. Ideally, as your QA practices improve, you'll uncover problems earlier in the development cycle, when they're easier and less expensive to fix, rather than when they reach production. If you're not finding defects during testing, that's great — but that doesn't mean you should stop testing. It only takes one defect to reach production to damage the customer experience, and, depending on severity, impact revenue. Excellence is a constantly moving target as new technologies and innovations come to market. While you may be highly automated and mature with some apps, to maintain competitive advantage, you'll likely have to develop new features that your customers demand. It's crucial to maintain your investment in quality. The ability to quickly adapt and scale depends on maintaining the capabilities you've built. Guard them fiercely to reduce risk and maintain your competitive advantage.



The role of test automation

It's impossible to automate all aspects of QA. An effective test automation strategy, however, is a crucial component on the journey to DevOps and exceptional digital quality. Unfortunately, too many organizations struggle to establish, maintain and expand test automation to take full advantage of this method of testing. When a team understands the purpose, objectives and limitations of automation, it's possible to develop a strategy that scales easily and frees up human testers for tasks automation simply can't handle.

Teams that dedicate the time and effort necessary to defining a strategy, selecting and implementing tools, and developing a library of automation scripts give themselves improved coverage, as well as relief from monotony.

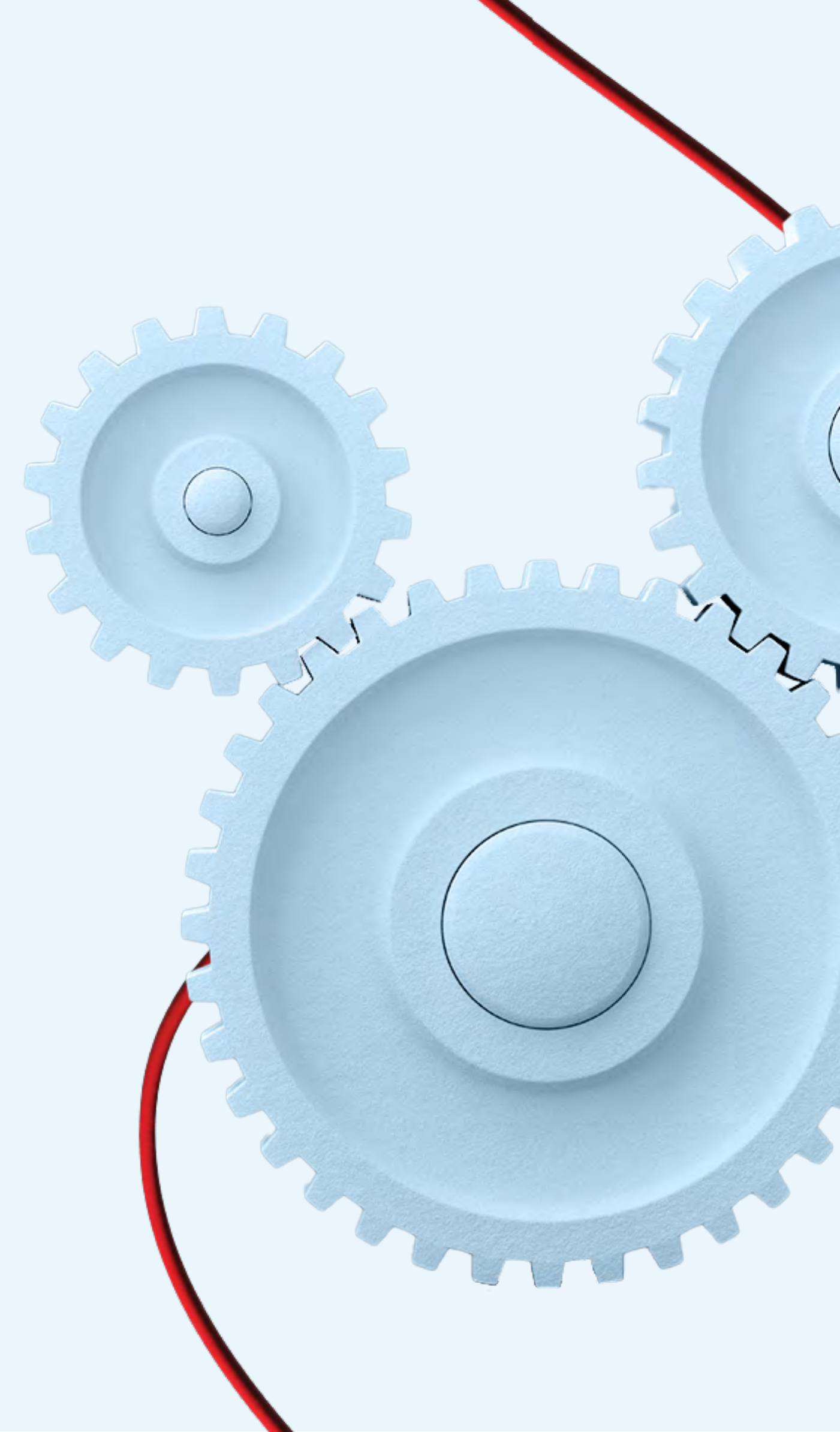
Frequently run tests with repeatable steps and an expected outcome offer the greatest return on the investment in automation. Tests that require complicated setup are also strong candidates for automation, as an error setting up a test can be costly in terms of tester time and can cause releases to slip. However, automated tests that create false positives and break regularly cause problems for teams, rather than reducing burden.

In addition, the approach your team takes to automation, such as scripted tests versus low code/no-code solutions, influences which tests are the best candidates for automation. Choose carefully before automating.

Top 5 tests to automate

Our recommendations for the top 5 tests to automate fall into the categories below and are frequently repeated and easily scripted:

1. Unit Tests
2. Regression Tests
3. Smoke Tests
4. Integration Tests
5. Performance Tests



Accessibility testing

The World Health Organization’s latest estimate is that one in six people, or 16% of the global population, lives with some form of disability.¹ In addition, many people experience temporary disabilities due to injury, illness and aging at some point in their lives. Further estimates suggest that friends and family of persons with disabilities (PWD) account for an approximate 3.3 billion potential consumers who act based on their connection to PWD.² Leading global enterprises across all industries have realized that digital experiences that people with disabilities can navigate easily often create a better UX for all of their customers. In addition, some accessibility fixes, like addressing missing or unclear labels, enable automation engineers to build more automation and move faster.

It’s clear that a focus on accessibility helps everyone, and as organizations commit to more inclusive design and better digital accessibility, the bar gets higher for businesses everywhere, from all sectors. While innovation helps enable an expanded total addressable market, the fact

remains that organizations must meet global accessibility compliance in accordance with national accessibility laws around the world, as not doing so creates legal exposure. In fact, in 2022, in the U.S. alone, there were 2,387 web accessibility lawsuits filed, which includes an increase of 143% in companies that received multiple lawsuits year over year.³



The data set

A representative sample of accessibility tests.



1,273
test cycles



23
industries



17
countries



30,541
bugs

¹ “Disability and health.” World Health Organization, March 7, 2023.
² “2020 Global Economics of Disability.” Return on Disability Group, September 1, 2020.
³ “2022 Website Accessibility Lawsuit Recap.” Accessibility.com, 2023.

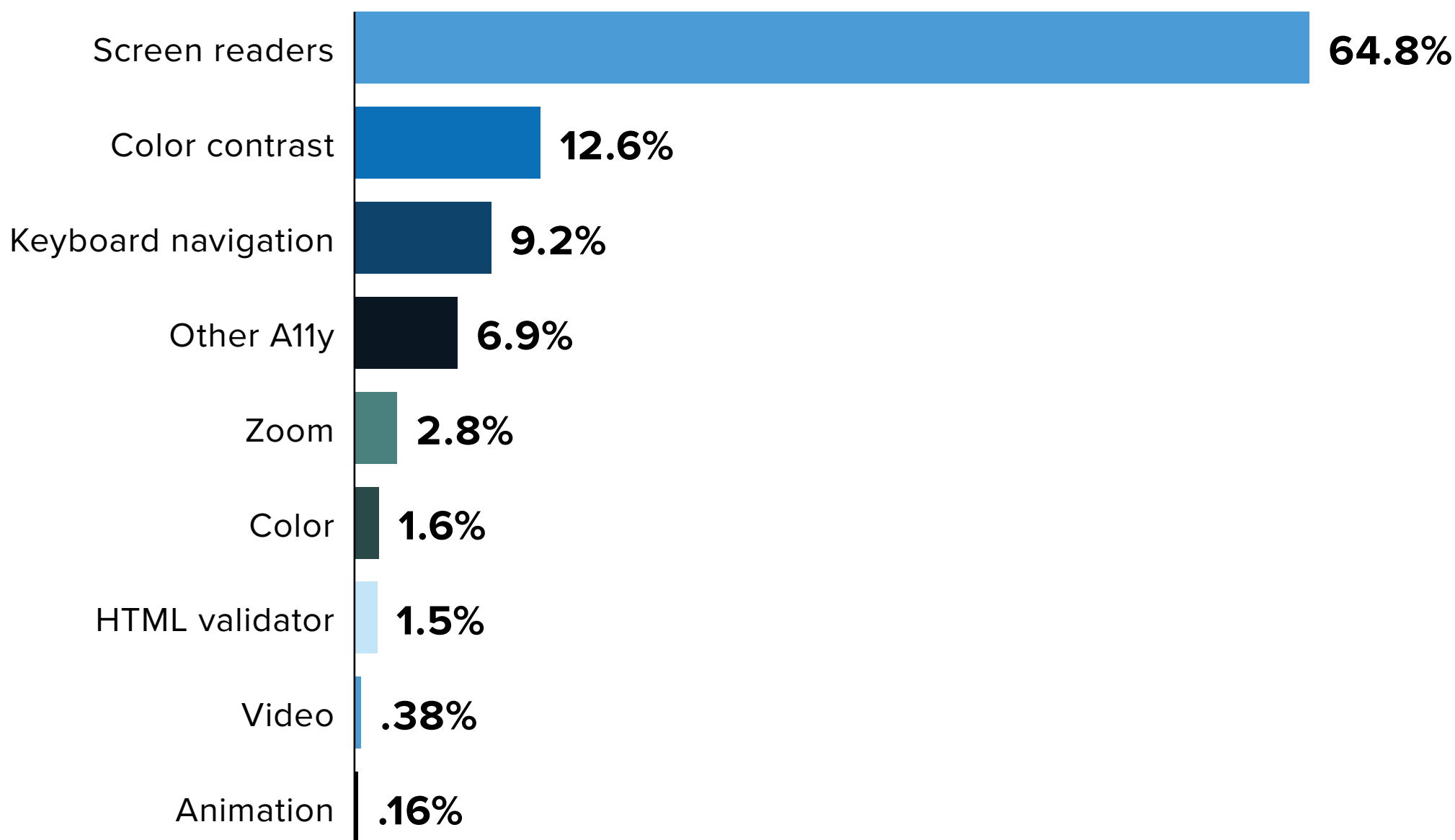
Bug type definitions

Bug Type	User Experience
Animation	“I don’t know what’s happening on the screen” A user can’t see content that moves, such as animation telling users to perform an action
Color	“This doesn’t make sense” Users can’t identify information communicated only through color
Color contrast	“This all looks the same” Insufficient color contrast ratio
HTML validator	“This page seems like something is missing” Issues in HTML code that do not impact the keyboard navigation and screen reader behavior
Keyboard navigation	“I can’t use my keyboard to navigate” People using alternative keyboards or speech input devices as keyboard emulators cannot navigate a page

Bug Type	User Experience
Screen readers	“My screen reader isn’t working” Readable text for screen readers is missing
Other A11y	“This isn’t working for me” Poor user experience for PWD
Video	“I can’t tell what’s going on in this video” Missing closed captions or audio descriptions
Zoom	“I can’t see what I need to” Text gets cut off when a user zooms in beyond a certain point

Bug type breakdown

See the prevalence of each type of bug across the data we analyzed:



Screen reader defects continue to make up the vast majority of all accessibility errors. Bug type distributions remained consistent, typically fluctuating less than 2% +/- from last year.

For accessibility device coverage comparisons and the most popular devices tested, please see [Appendix B](#).

Creating a culture of inclusivity

A leading video conferencing solution provider made a significant commitment to make its video conferencing application collaborative, accessible and inclusive of all people with varying abilities and backgrounds. It embraced a shift left to bring inclusive design and innovation earlier in the SDLC. Its focus went beyond simply meeting WCAG standards: It wanted to stimulate innovation in its organization that would derive from involving the most diverse population it could, emblematic of its users around the world.

As it developed its empathy-based approach to inclusive design, it rallied team members to become ambassadors and help spread the word throughout the organization. The company got management buy-in, and as momentum continued, the company partnered with Applause to provide education sessions including PWD demonstrating their interactions with the conferencing platform to broaden awareness of the overall empathy-based inclusive design program. To keep up momentum, it built a repository, an accessiwiki, that serves as a resource employees can use to get a wide range of information around accessibility — from WCAG standards explained to internal initiatives, inclusive design basics and more.

Accessibility framework: core capabilities and practices

Assumes that many/most of the elements from the corresponding stage of the functional testing framework are in place.

While accessibility typically starts with conformance and compliance, once organizations embrace empathy-based design and development, the user experience improves dramatically. Our customers who have adapted to focus on inclusive design report that this shift creates a cycle of ongoing innovation that benefits all users, not just PWD.



Accessibility testing framework



Digital quality emergence:

Limited understanding of applicable laws and regulatory requirements. Lack of formal systems, processes and documentation, no consistent methodology or approach to accessibility or inclusivity.

Examples of typical accessibility testing activities and processes:

- Identifying some accessibility issues; resolving or remediating high-priority A11y issues that are identified
- Assessing conformance to WCAG and/or locally applicable regulations once or infrequently
- Emphasizing risk mitigation; making changes in response to customer complaints or threats of legal action
- Relying solely on automated tools



Digital quality essentials:

Early stages of defining and documenting processes and procedures; establishing some consistency and structure around accessibility.

Examples of typical accessibility testing activities, resources and processes:

- Designating an owner of the accessibility program and identifying organizational champions
- Performing periodic assessments and automated checks to ensure conformance to WCAG and compliance with locally applicable regulations
- Offering training on accessibility best practices and inclusive design
- Providing developers and/or product owners access to PWD
- Conducting design reviews and in-sprint testing to identify problems earlier in the SDLC
- Engaging PWD to perform usability tests and provide feedback



Digital quality expansion:

The organization has a clear process for ensuring accessibility in place and uses various testing types. Some reporting is in place. Focus on coverage, scalability and efficiency across the organization.

Examples of typical accessibility testing activities, resources and processes:

- Documenting best practices and checking them during development
- Maintaining a knowledge base and offering training on best practices
- Holding empathy-based design and development workshops with PWD
- Incorporating input from PWD into the design and development process; benchmarking to understand the validity of customer criticisms around accessibility and usability
- Providing attestation (VPATS)



Digital quality excellence:

The organization prioritizes inclusivity at all levels; testing and feedback from PWD occur throughout the SDLC

Examples of typical accessibility testing activities, inclusive design resources and processes:

- Creating a Center of Excellence with guidance on design and development best practices
- Requiring ongoing, mandatory training on accessibility best practices and inclusive design
- Following inclusive hiring practices and developing a diverse workforce
- Going beyond attestation and demonstrating thought leadership in inclusive design and product development
- Incorporating accessibility into the company's contracting and procurement process
- Using analytics to drive priorities and continuous improvement

Accessibility testing recommendations

Know which local and regional laws govern your business and make sure you're in compliance. It happens: We meet with customers who simply don't know that they're violating the law. Even if you're located outside of Europe, for example, the European Accessibility Act will have strict penalties for companies doing business in the EU that fail to comply. In addition, certain industries may be subject to additional regulatory requirements, like the Twenty-First Century Communications and Video Accessibility Act for media and telecommunications providers.

Find allies in the organization who are passionate about accessibility to serve as ambassadors and drive awareness; get an executive sponsor. Time and time again, customers describe this scenario to their account teams at Applause: One person in the organization champions accessibility. They seek out like-minded colleagues and start sharing ideas. They start making some changes that pay off. They get an executive sponsor on board. Leadership starts understanding and embracing the value of inclusive design. The grass-roots,

bottom-up efforts combine with top-down support and then: Awareness. Training. Input from PWD into the design process. Empathy. Inclusion. A better UX for all.

Prioritize screen readers. Websites must be accessibly designed in order for screen readers to provide the full experience of the web page to the user. This complex and widely-used assistive technology does much more than simply read a wide variety of text combinations. Screen readers can be used to spell and find specific words, announce cursor location, locate specifically colored text, indicate an active choice on a website menu and much more. There's a lot that can go wrong, but getting this one element right would solve nearly two-thirds of the accessibility issues our testers uncover. In addition, correctly building page titles, headings, anchor tags and site maps improve accessibility and, at the same time, improve search engine optimization.

“When people talk about quality code, it's much more than just speed and availability and all of the things that developers would think. If your code is not accessible, how can someone describe it as high quality?”

Heather Hepburn, *Accessibility Lead*



Localization testing

Entering new markets requires much more than simple language translations — to get new customers on board, your apps need to reflect an understanding of the local language, values, preferences and processes. Seemingly small errors, like missing translations, incorrect country and region names or workflows that don't align with local customs can cause customers to abandon transactions and put the business at risk.

Almost half of the world's people identify one of 10 languages as their native tongue... but that number doesn't factor in regional differences and dialects.⁴

⁴["The 10 Most Spoken Languages In The World."](#) James Lane, Babbel Magazine. February 9, 2023.



The data set

A representative sample of tests evaluating localization.



345
test cycles



11
industries



87
countries



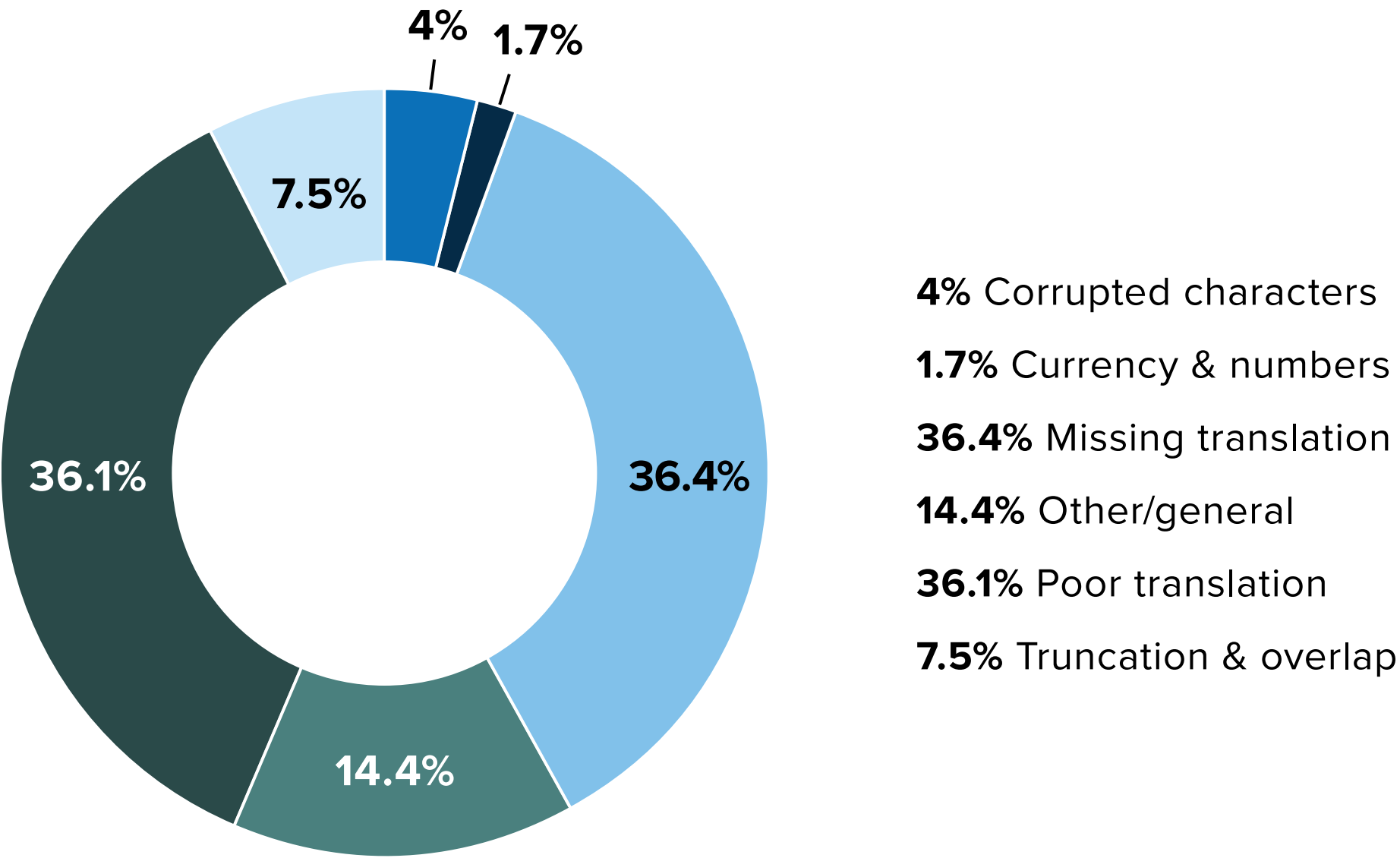
8,120
bugs

Bug type definitions

Bug Type	User Experience
Corrupted characters	“This doesn’t look right, where are the accent marks?”
Currency and number format	“That date seems wrong for the holiday they’re promoting”
Missing translation	“I’m not sure what this says, there’s no translation”
Other/general	“That photo is offensive, this brand doesn’t understand me”
Poor translation	“I don’t think that’s the right word here”
Truncation & overlap	“The text on this button is cut off”

Bug type breakdown

See the prevalence of each type of bug across the data we analyzed:



For localization device coverage comparisons, please see [Appendix C](#).

Localization framework: core capabilities and practices

Assumes that many/most of the elements from the corresponding stage of the functional testing framework are in place.

Localization encompasses far more than just translation. When done right, it builds credibility (and can improve search engine optimization). When done poorly, it can alienate potential customers, spark regional site blockages and boycotts and trigger other ugly consequences. Speaking your customer's language is a necessity for global brands: In one study, nearly 90% of non-English speaking consumers stated they are more likely to purchase a product from brands with multilingual support systems and knowledge bases and 75% said they would become repeat customers if a brand offers multilingual customer care.⁵

90% of non-English speaking consumers stated they are more likely to purchase a product from brands with multilingual support systems and knowledge bases.

⁵"Survey of 8,709 Consumers in 29 Countries Finds that 76% Prefer Purchasing Products with Information in their Own Language." CSA Research, July 7, 2020.



Localization testing framework

Digital quality emergence:

Lack of formal systems, processes and documentation, no consistent methodology or approach to translation or localization.

Examples of typical localization activities and processes:

- Translating some high-priority content without validating that translations are contextually correct

Digital quality essentials:

Early stages of defining and documenting processes and procedures; establishing some consistency and structure around localization.

Examples of typical localization activities and processes:

- Ensuring all content that should be localized is accurately translated
- Verifying that all currencies, dates, symbols and measurements are converted to the appropriate units and formats
- Validating that forms work correctly
- Localizing content for the business's top markets

Digital quality expansion:

The organization has a clear process for ensuring accurate localization and uses various testing types to validate. Some reporting is in place. Focus on coverage, scalability and efficiency.

Examples of typical localization activities and processes:

- Using native speakers in market to validate translations and idioms
- Ensuring that visual elements fit translations
- Validating that imagery and colors are culturally appropriate
- Aligning workflows with expected processes
- Putting a process in place to resolve conflicts and update assets
- Validating strings pre-production
- Maintaining a glossary of preferred translations for key words and phrases
- Using a minimum of double-blind support to validate translations, not including the content creator
- Localizing applications for all markets where the business operates

Digital quality excellence:

Awareness of cultural differences and commitment to respecting the norms in different markets serves as a competitive differentiator.

Examples of typical localization activities and processes:

- Leveraging cultural values and norms to create relevant offerings
- Differentiating between distinct dialects, such as Portuguese vs. Brazilian Portuguese
- Providing a channel for customers to report any issues
- Having a process to manage issues
- Assessing how customer journeys vary across markets
- Factoring in accessibility concerns, such as whether screen readers work for right to left languages
- Demonstrating geopolitical awareness; correcting errors that can damage earnings or reputation
- Localizing in native languages; factoring in regional variations to find solutions that works for all stakeholders

Localization testing recommendations

Maintain a translation glossary for frequently used terms and company-specific language.

Save time with a resource that developers can refer to as they localize apps; update and expand as you enter new markets or localize additional features, products and websites. Be consistent. For example, if the chatbot on your website offers service options in French, make sure the language you're using to describe products and processes there aligns with the terminology in the French version of your app — and document that preferred phrasing in your glossary.

Double-check accuracy and nuance with double-blind validation. Translators and testers each bring their own background and linguistic preferences to the tasks at hand. Those can influence how they interpret various translations. If there's disagreement on a particular meaning or translation, it's best to understand and resolve it before releasing your website or app to customers.

Include customer support and post-purchase experiences in your localization efforts.

Don't let your quickstart guide or installation instructions become a foreign language fail. Commit to supporting your customers in their local languages throughout the full experience with your brand.



Navigating local preferences

One GPS firm was having difficulty providing a consistent in-car experience. To find out how its product worked in a car in Paris, two employees from the company's German office connected with an Applause tester, a Paris native who knew the language and the city very well. The Parisian drove the team around for several hours to test the navigation, carefully listening to the voice giving the directions. The tester found significant issues in translations for the most common routes to local points of interest. The GPS company was able to correct the problems before launching in Paris.

Customer journey testing

Our customers use many dimensions to assess digital quality, including a range of metrics directly from customers. Customer sentiment and feedback, customer satisfaction research, retention and churn rates, the number of customer support requests... it's impossible to evaluate the customer experience without input from real or potential customers.

You need to understand and evaluate all the interactions customers have with your organization: myriad complex sets of transactions and tasks that often meander across varying channels, both online and in store. Not all organizations have the specialized skills and resources necessary to conduct thorough UX research covering all customer journeys, both physical and digital, from end to end. And as they expand into new markets, even those organizations that do have dedicated UX research teams may have difficulty quickly sourcing research participants.

While solid functional testing and payment testing efforts can uncover a wide range of

Types of customer journey friction

Customer journey friction typically falls into one of four categories (or combines some of these elements):

1. Functional errors
2. Payment issues
3. Poor UX
4. Insufficient operational readiness

problems, they don't get to the heart of UX issues or problems with operational readiness, such as lack of instruction on how to proceed with curbside pickup once an order is ready. Customer journey testing is essential to root out and rectify these types of problems.



Using AI, voice and chatbots to enhance the customer experience

As AI and voice take on ever-expanding roles in personalization and customer support, the quest to hire staff with more specialized and in-demand skill sets becomes even more intense. Applause's 2023 AI and Voice survey found that of more than 5,000 respondents worldwide, 92% typically expect companies to have chatbots on their apps or websites so they do not need to call for support. If customers do have to call, 86% always or sometimes expect to be greeted by an IVR system when they call.

In addition, consumers are concerned about bias in AI due to poor or insufficient training data: 86% of survey respondents indicated some level of concern. While only 19% stated they were very concerned about bias, 41% indicated that their level of concern depended on the situation and use case. Respondents expressed similar sentiment around whether AI technology should be regulated, with the majority (53%) saying regulation should depend on its use.

With customer concerns and expectations in mind, organizations must have a strategy in place to incorporate chatbots, IVR and AI into customer touchpoints in ways that streamline and enhance the overall experience. Thorough testing and adequate ML training are crucial parts of that equation.



Customer journey testing recommendations

If you don't have the bandwidth or resources to test end-to-end journeys, use data to pinpoint where you're losing customers, then focus there. If users are abandoning a loan application on your website, you know to look at the application form, flow and information you're requesting. If customers are downloading your app for a free trial but they aren't converting to paid subscribers, you've got a different problem than if they're subscribing, then canceling. Look at the data you have available to determine which elements of the customer journey demand attention, then test to understand how you can improve and optimize. If you lack data, you need to focus effort on deliberate journey mapping to understand the various paths your customers take so you can then research – and refine – their journeys.

Recognize that UX and customer journey testing require ongoing effort. These aren't one-time assessments – they're ongoing evaluations to understand customer perceptions, inform the product development process and guide market strategy as consumer preferences

shift and evolve. Revisit as you add new features, make substantial changes to workflows and enter new markets. Find the cadence that makes the most sense for each of your digital products, properties and omnichannel experiences.

Whether your customer journeys are strictly physical, entirely digital or a hybrid of both, you need real-world insight into your customers' experiences and obstacles.



Payment testing

Without thorough payment testing processes in place, organizations can’t confidently ensure customer transactions work as intended. As digital wallets, alternative payment methods, and options like buy now, pay later (BNPL) become more popular, payment testing must adapt and evolve to cover these new payment instruments and paths to purchase. Testing with dummy cards just won’t cut it — real-world testing with live payment instruments is the only way to guarantee transactions work properly for every customer, every time.

Popularity of different payment methods in 2022

BNPL users: 360 million⁶

Digital wallet users: 3.4 billion⁷

⁶“Buy now pay later users to reach over 900 million globally by 2027, driven by low cost of credit.” Juniper Research, August 8, 2022.

⁷“Digital wallet users to exceed 5.2 billion globally by 2026, as digitisation accelerates cashless transition.” Juniper Research, August 2, 2022.



The data set

A representative sample of payment testing data for digital payment methods.



1,582
test cycles



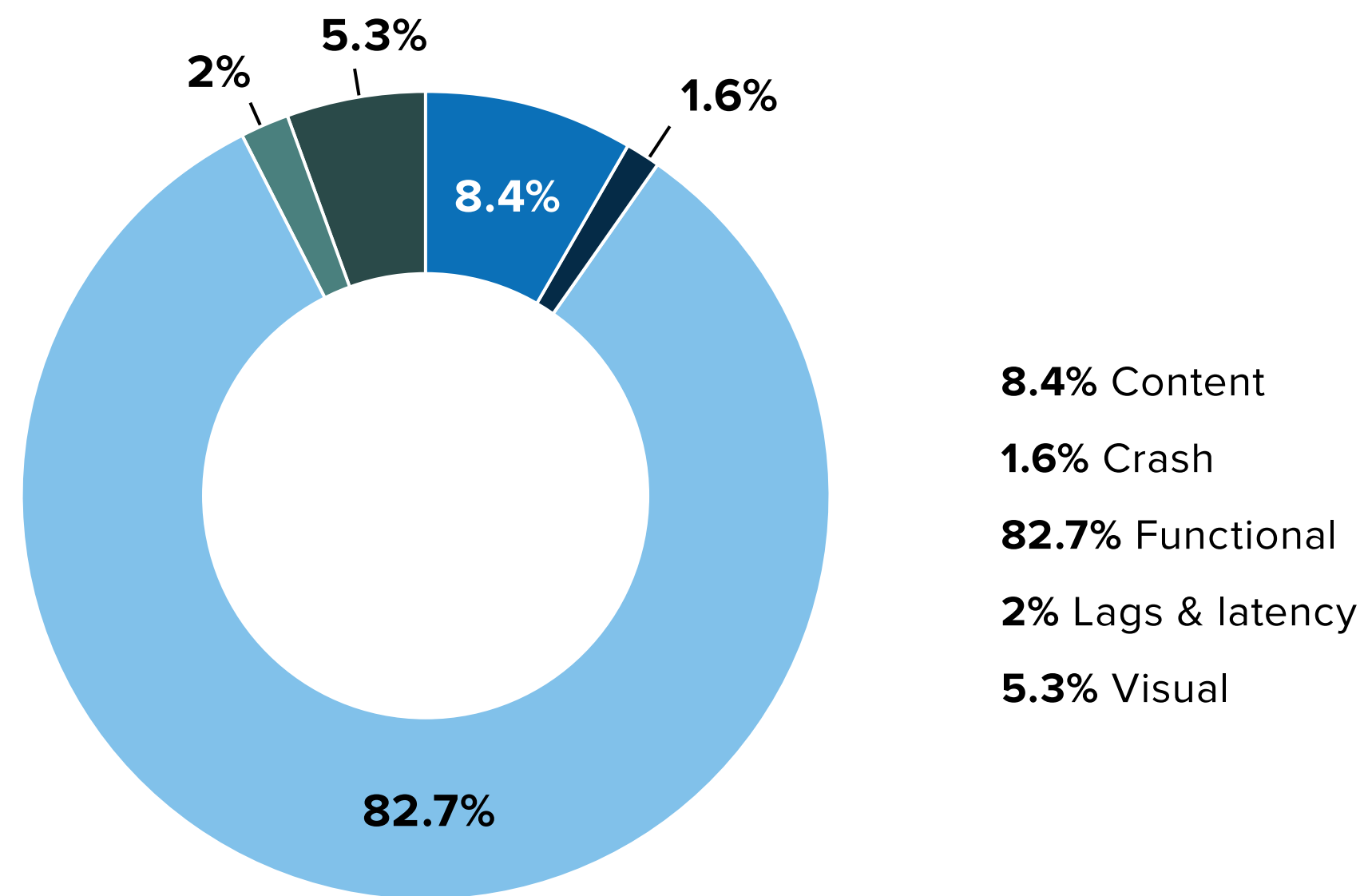
103
countries



5,847
bugs

Bug type breakdown

See the prevalence of each type of bug across the data we analyzed:



The prevalence of each type of payment bug remained remarkably consistent with last year, varying less than 1% from year to year. With a whopping 80% of all payment bugs classified as functional bugs or workflow errors, without corrective action, transactions will fail, delivering a serious hit to revenue.

For payment device coverage comparisons, please see [Appendix D](#).

Payment testing framework: core capabilities and practices

Assumes that many/most of the elements from the corresponding stage of the functional testing framework are in place.

Every payment transaction incorporates a series of handoffs. Connections between hardware, software, payment processors, banks, card networks and digital wallets all hold the potential for things to go wrong. And then there are the transactions that never happen because customers can't use their preferred payment methods, loyalty points, coupons, or BNPL. Without a comprehensive and consistent approach to payment testing in place, businesses leave money on the table.

Payment testing framework



Digital quality emergence:

Lack of formal systems, processes and documentation, no consistent methodology or approach to payment testing.

Examples of typical payment testing activities and processes:

- Testing with dummy cards and accounts
- Dogfooding; testing with friends and family



Digital quality essentials:

Early stages of defining and documenting processes and procedures; establishing some consistency and structure around payment testing.

Examples of typical payment testing activities and processes:

- Validating that transactions work using live payment instruments: testing both purchases and returns
- Defining a payment instrument coverage matrix, including at least the 5-10 most popular payment instruments in market
- Testing when changing payment gateways; validating code for new gateways or payment processors
- Verifying code for launches in new countries



Digital quality expansion:

The organization has a clear process in place to ensure the full range of payment activities work properly and uses various testing types to assess functionality and UX. Some reporting is in place. Focus on coverage, scalability and efficiency across the organization.

Examples of typical payment testing activities and processes:

- Creating a payment instrument coverage matrix based on data about website/app usage, local user preferences
- Validating new payment methods prior to launch
- Collecting and acting on UX feedback
- Conducting payment instrument regression testing for all features, including product returns and customer service interactions
- Testing payments using specific devices, banks and BIN combinations



Digital quality excellence:

The organization thoroughly tests end-to-end payment workflows and UX, including a wide variety of payment instruments, and understands the variations in preferred payment instruments and workflows across markets.

Examples of typical payment testing activities and processes:

- Conducting ongoing testing for loyalty programs, promotional offers, and options like BNPL
- Testing negative/unavailable payment instruments (soft or hard decline, blocked, expired)
- Performing wallet cycling testing with multiple payments in different balance states
- Live testing one-of-a-kind payments which require holder presence

For card issuers, networks & fintechs:

- Verifying purchase states live directly with the bank

For merchants:

- Verifying purchase results live directly with the bank

Payment testing recommendations

Test with real payment instruments to capture intelligence you simply can't get from dummy cards. Without real payment instruments, you can't validate information in more complex flows like multifactor authentication, how a charge appears on a credit card statement or whether certain payment methods or BINs aren't working properly.

Use data to drive decisions about which payment methods and instruments to offer or accept in different markets. As new digital wallets, cryptocurrencies, BNPL partners and alternate payment providers emerge, deepen your understanding of your customers' preferred payment methods in each market where you operate to determine whether you should add them into the mix.

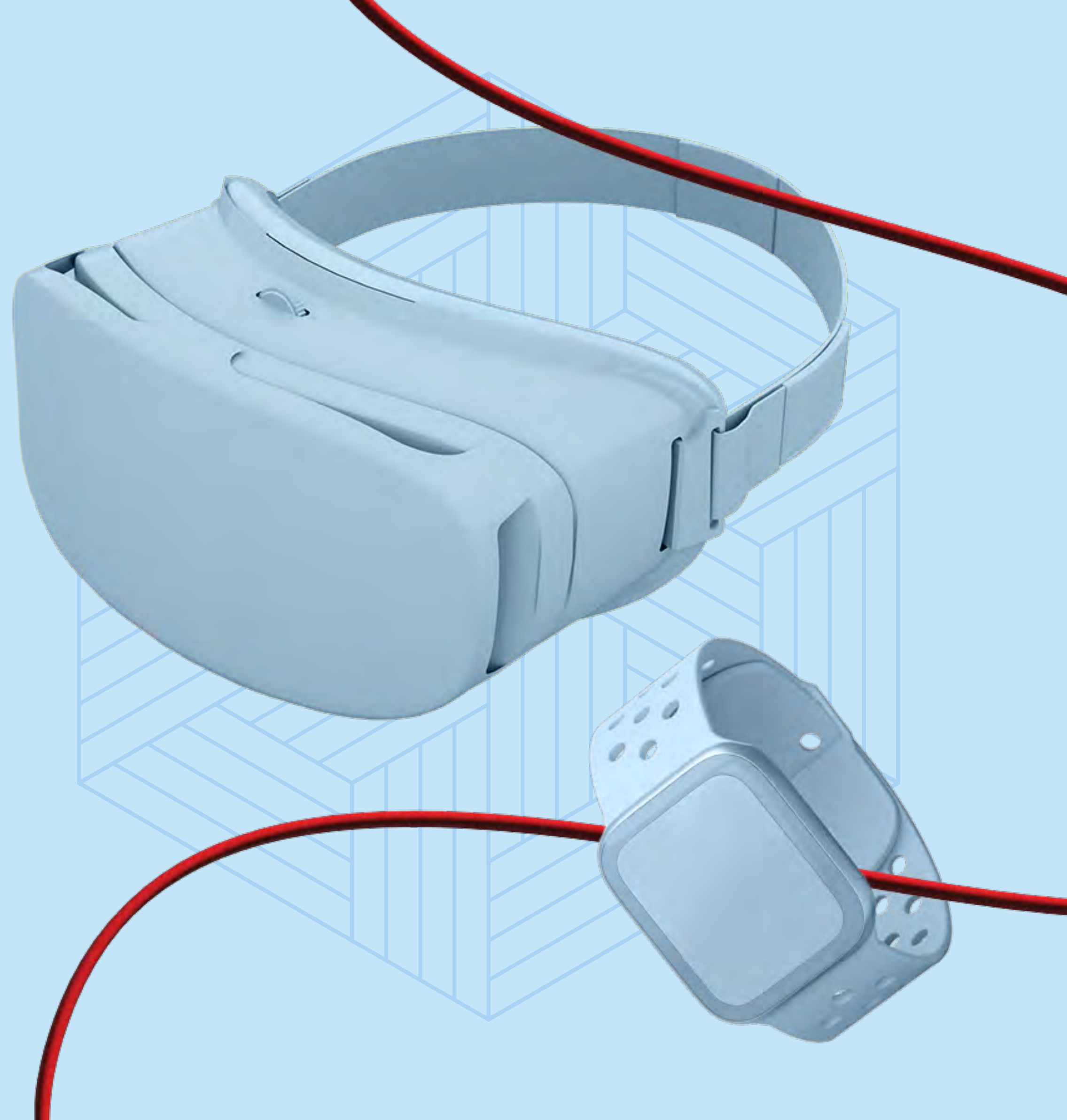
Build in the appropriate amount of time to test certain types of transactions. BNPL, recurring transfers, subscription renewals, loyalty programs and scheduled payouts are just a few categories of transactions that can take more time to test. For example, if a BNPL

transaction requires multiple payments over a month-long period, you need to ensure all the payments process correctly. What happens if an auto transfer is scheduled for the 31st day of each month and a month only has 30 days? Or the credit card on file expires before an automatic renewal payment goes through? Give your teams the time needed to thoroughly evaluate these scenarios.



What's next in digital quality?

Use this report as a benchmark to better understand the gaps in your organization's capabilities and processes and map out a plan to improve your digital quality, regardless of your company's current state. With the current market volatility, importance of global reach and need to maximize ROI on digital investments, there's no getting around the facts: digital quality is an intersectional discipline that calls not just for testing, but for clear testing strategy, documentation, test suite maintenance, research and analysis. With the right lens and focus on digital, you'll see the incremental investment in the form of ROI as you look at customer retention, increased revenue, reduced time to market and other KPIs.



How do your company's digital experiences compare?

What role does quality play throughout the SDLC at your organization? Please share your own stories of creating digital quality for your customers, and tell us what you'd like to see covered in next year's report. We look forward to hearing from you.

View our companion reports at StateOfDigitalQuality.com.

Contact us at feedback@stateofdigitalquality.com.

Acknowledgements

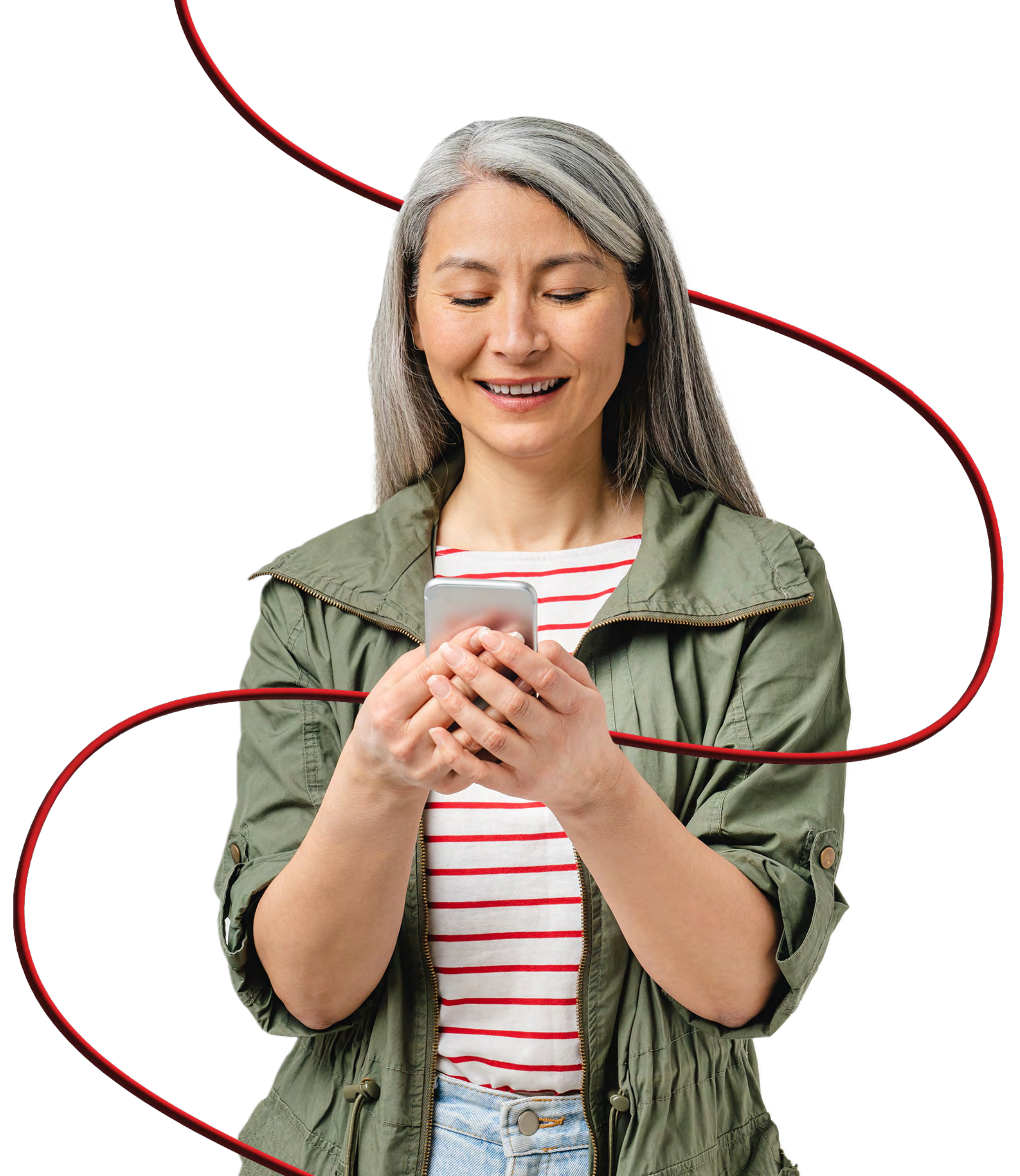
Thank you to the business leaders, community members and subject matter experts who shared their time, knowledge and insight to shape this report.

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Appendix A: Functional testing data

Average device coverage comparison across industries

In this table, a configuration refers to a unique browser and OS combination (desktop) or device and OS combination (mobile & tablets)

Industry	Test cycles	Average number of desktop configurations tested per cycle	Mobile & tablet configurations tested per cycle	Credit & debit cards tested per cycle	E-wallets tested per cycle	Mobile wallets tested per cycle
ALL	37,117	9.2	14.8	4.8	1.8	2.6
Retail	23.10%	9.3	13.8	4.4	2.5	4.5
Media & Telco	37%	8.8	16.1	7.8	1.6	1.9
Finance	16.40%	8.7	12.4	3	1.3	2.2
Health & Wellness	1.80%	12.3	16.3	8.8	N/A	N/A
Travel & Hospitality	9.70%	9.6	14.3	3.1	1.5	1.9
B2B Software	11.90%	11.9	14.4	1	1	N/A

Average device coverage comparison across regions

Some test cycles span multiple regions. The data below includes only tests conducted in the stated region.

Region	Test cycles	Average number of desktop configurations tested	Mobile & tablet configurations	Credit & debit cards	E-wallets	Mobile wallets
Africa	5,404	3.2	5.3	4.3	1.2	1.5
Asia	18,303	4.7	7.8	5.5	1.4	1.7
Europe	23,874	6.1	9.9	4.5	1.3	1.9
Oceania	4,982	2.2	2.8	2.6	1.1	1.2
North America	22,422	5.3	8.1	4.3	1.4	1.8
South America & LATAM	1,577	6.1	11.3	7.7	1.3	2.4

Most popular device configurations tested

While these were the configurations Applause tested most in each region, it’s vital to review and prioritize your customer data and preferences to develop your test plan per build or release. Also, consider OS adoption rates in your plan – for example, iOS users upgrade OSes far more frequently than Android users. Determine what portion of testing resources you want to allocate to current versus older OS versions.

Region	Desktops	Mobile & tablet
Africa	1. Windows 10 64-bit, Chrome 2. Windows 10, Chrome 3. Windows 11, Chrome 4. Windows 10 Professional 64 bit, Chrome 5. Windows 10 64-bit, Firefox	1. Huawei Mate 20 Lite, Android 10 2. Samsung Galaxy J7, Android 9.0 (Pie) 3. Tecno Spark 4, Android 10 4. Xiaomi Redmi 7A, Android 10 5. Samsung Galaxy S22 5G, Android 12
Asia	1. Windows 10, Chrome 2. Windows 10 64-bit, Chrome 3. Windows 11, Chrome 4. Windows 10, Firefox 5. Windows 11 Home, Chrome	1. Samsung Galaxy S10, Android 12 2. Samsung Galaxy S9, Android 10 3. Xiaomi Redmi Note 7, Android 10 4. OnePlus 6T, Android 11 5. Apple iPhone 8, iOS 15.5
Europe	1. Windows 10, Chrome 2. Windows 10 64-bit, Chrome 3. Windows 10, Firefox 4. Windows 11, Chrome 5. Windows 10 64-bit, Firefox	1. Samsung Galaxy S9, Android 10 2. Samsung Galaxy S10 Plus, Android 12 3. Samsung Galaxy S21 5G, Android 12 4. Samsung Galaxy S8, Android 9.0 (Pie) 5. Apple iPhone 11, iOS 15.5

Most popular device configurations tested (continued)

Region	Desktops	Mobile & tablet
Oceania	1. Windows 10, Chrome 2. Windows 10 64-bit, Chrome 3. Windows 10 Home, Chrome 4. Windows 10 64-bit, Firefox 5. Windows 11, Chrome	1. Samsung Galaxy A20, Android 11 2. Huawei Mate 20 Pro, Android 10 3. Samsung Galaxy Note 9, Android 10 4. Apple iPhone 8, iOS 15.2 5. Apple iPhone 11, iOS 15.0.2
North America	1. Windows 10 64-bit, Chrome 2. Windows 10, Chrome 3. Windows 11, Chrome 4. Windows 11 Home, Chrome 5. Windows 10, Firefox	1. Samsung Galaxy S9, Android 10 2. Samsung Galaxy S9+, Android 10 3. Samsung Galaxy S10+, Android 10 4. Samsung Galaxy S21 Ultra 5G, Android 12 4. Samsung Galaxy S20 FE, Android 12
South America & LATAM	1. Windows 10 64-bit, Chrome 2. Windows 10, Chrome 3. Windows 11, Chrome 4. Windows 10, Firefox 5. Windows 10 Professional 64 bit, Chrome	1. Samsung Galaxy S9+, Android 10 2. Samsung Galaxy S20 FE, Android 12 3. Samsung, Galaxy S9, Android 10 4. Xiaomi Poco X3 NFC, Android 11 5. Google Pixel 3 XL, Android 12

Appendix B: Accessibility testing data

As companies work to comply with local regulations and conform to industry- and region-specific requirements, in-market testing on the most common devices, browsers and networks is a crucial component in delivering fully accessible experiences for all users.

Average device coverage comparison across industries

In this table, a configuration refers to a unique combination of browser, OS and screen reader.

Industry	Test cycles	Average number of desktop configurations tested	Average number of mobile & tablet configurations tested
ALL	1,273	3.4	3.1
Retail	39.40%	3.6	2.4
Media & Telco	12%	2.5	3.4
Finance	12.90%	3.9	4.1
Health & Wellness	6.50%	3.7	5.9
Travel & Hospitality	15.60%	2.7	2.9
B2B Software	13.60%	2.8	3.1

Average device coverage comparison across regions

In this table, a configuration refers to a unique browser and OS combination or device and OS combination.

Region	Test cycles	Average number of desktop configurations tested	Average number of mobile & tablet configurations tested
Asia	586	2.3	2.7
Europe	609	2	1.7
Oceania	102	1.5	1.4
North America	538	2.4	2.2
South America & LATAM	44	2.9	2.3

Most popular device configurations tested

Region	Desktops	Mobile & tablet
Asia	1. Windows 10, Chrome 2. Windows 10, Firefox 3. Windows 10 64-bit, Chrome 4. Mac OS, Big Sur 11.6, Safari 5. Mac OS, Big Sur 11.5.2, Safari	1. OnePlus 7, Android 11 2. Apple iPhone SE (2020), iOS 15.3.1 3. Apple iPhone 11, iOS 15.4 4. Motorola One Fusion Plus, Android 11 4. Apple iPhone 11, iOS 15.4, Safari 4. Apple iPhone 13 Pro Max, iOS 15.0.2
Europe	1. Windows 10, Chrome 2. Windows 10, Firefox 3. Windows 10 64-bit, Chrome 4. Windows 7, Firefox 5. Windows 11, Chrome	1. Apple iPhone SE (2020), iOS 15.1 2. Google Pixel 2, Android 9.0 (Pie) 3. Apple iPhone SE (2020), iOS 14.5.1 4. Apple, iPhone X, iOS 15.0.2 5. Samsung Galaxy Note 9, Android 10

Most popular device configurations tested (continued)

Region	Desktops	Mobile & tablet
North America	1. Windows 10, Chrome 2. Windows 10, Firefox 3. Windows 10 64-bit, Chrome 4. Windows 11, Chrome 5. Windows 11 Home, Chrome	1. Samsung Galaxy S10, Android 11 2. Apple iPhone SE (2020), iOS 15.0.2 3. Samsung Galaxy A32, Android 11 4. Apple iPhone 8 Plus, iOS 14 5. Apple iPhone XR, iOS 14.8
Oceania	1. Windows 10 64-bit, Chrome 2. Windows 10 64-bit, Firefox 3. Windows 10, Firefox 4. macOS Catalina 10.15.4, Safari 5. macOS Monterey 12.2.1, Safari	1. Xiaomi Mi A1 (5X), Android 9.0 (Pie) 2. Xiaomi, Mi A1 (5X), Android 9.0 (Pie), Chrome 3. Apple iPhone 6S, iOS 15.4.1 4. Oppo Find X3 Lite 5. Apple iPhone 6S, iOS 15.4.1, Safari
South America & LATAM	1. Windows 10 64-bit, Firefox 2. Windows 10, Chrome 3. Windows 10 64-bit, Internet Explorer 11 4. Windows 10 64-bit, Chrome 4. Windows 10, Firefox	1. Huawei Y5 lite, Android 8.1 2. Nokia 6, Android 9.0 (Pie) 3. Apple iPhone 11 Pro, iOS 14.4.2, Safari 4. Apple iPhone SE (2016), iOS 13.1.2

Appendix C: Localization testing data

Average device coverage comparison across industries

In this table, a configuration refers to a unique browser and OS combination or device and OS combination.

Industry	Test cycles	Average number of desktop configurations tested	Average number of mobile & tablet configurations tested
All	273	11	27.2
Retail	43.80%	13.6	17.2
Media & Telco	25.20%	11.4	14.3
Finance	4.80%	4.8	8
Betting & Gaming	23.30%	14.9	80.5
Travel & Hospitality	2.90%	0	14.1

Average device coverage comparison across regions

Some test cycles span multiple regions. The data below includes only tests conducted in the stated region.

Region	Test cycles	Average number of desktop configurations tested	Average number of mobile & tablet configurations tested
Africa	5.20%	1.8	10.7
Asia	25.80%	5.2	10
Europe	41.40%	9.6	18.4
North America	14.40%	7.6	11.1
Oceania	5.80%	1.7	2.7
South America & LATAM	7.40%	5.1	15.9

Appendix D: Payment testing data

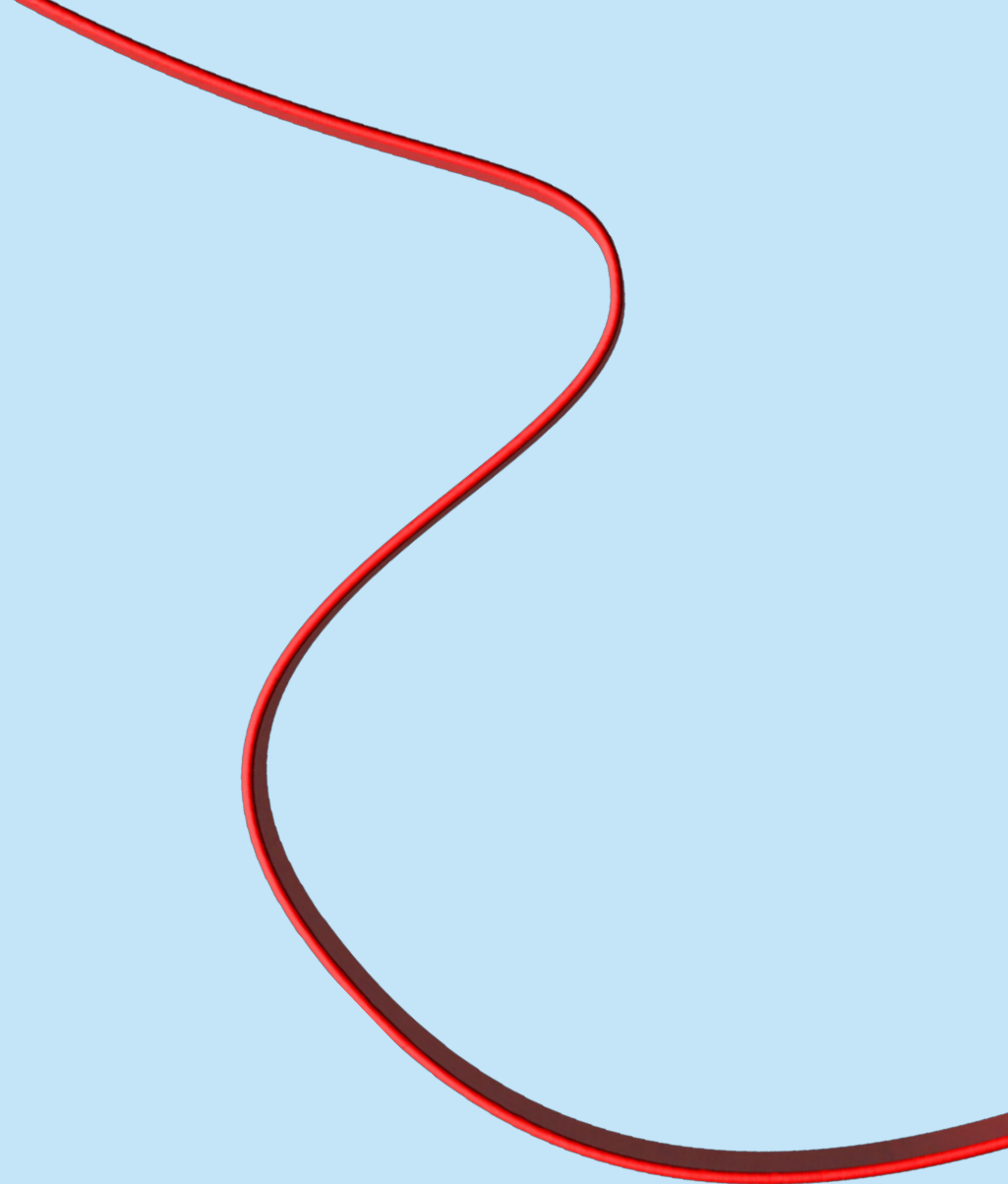
Average number of payment methods tested across regions

Region	Test cycles	Average number of alternate payments tested	Average number of mobile wallets tested	Average number of e-wallets tested
Africa	4.10%	1.3	1.6	1.2
Asia	21.60%	2.3	1.8	1.5
Europe	36.50%	1.7	1.4	1.7
North America	21.00%	1.5	1.8	1.4
Oceania	5.10%	1	1.2	1.1
South America & LATAM	11.70%	1.5	2.1	1.4

Most popular payment methods tested

Region	Alternate payments	Mobile wallets	E-wallets
Africa	1. Payoneer 2. M-Pesa 3. Orange Money 4. MTN	1. M-Pesa 2. Orange Money 2. MTN 2. Payoneer 3. PayPal	1. M-Pesa 2. Orange Money 2. MTN 2. Payonee 3. PayPal
Asia	1. Netbanking 2. Suica 3. Internet Bank Payment (IBP) 4. Payoneer	1. PayPal 2. Google Pay 3. Apple Pay 4. Paytm	1. PayPal 2. Alipay 3. Osaifu-Keitai 4. Visa Checkout 4. Amazon Pay
Europe	1. Klarna 2. Revolut 2. Curve 3. Sofort 4. Internet Bank Payment (IBP)	1. PayPal 2. Google Pay 3. Apple Pay 4. Revolut 5. Payoneer	1. PayPal 2. Skrill 3. Neteller 3. MasterPass 5. Visa Checkout

Region	Alternate payments	Mobile wallets	E-wallets
North America	1. Klarna 2. Netbanking 3. Interac 4. Payoneer	1. PayPal 2. Apple Pay 3. Google Pay 4. Apple Wallet	1. PayPal 2. Visa Checkout 3. MasterPass/ SRC 4. Amazon Pay 4. Google Pay Send
South America & LATAM	1. Payoneer 2. OXXO Pay 3. Boleto 4. Internet Bank Payment (IBP)	1. PayPal 2. Visa Checkout 3. Skrill 4. Google Pay Send	1. PayPal 2. Google Pay 3. Any 4. Apple Pay



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