



ROI of Quality:

Making a Business Case for Modern Testing

ROI Quality: Making a Business Case for Modern Testing

“Digital transformation” may seem like a common buzzword these days, but this idea has helped many organizations build quality products and provide a quality user experience. Now, the shift to digital transformation is playing an even greater role in leading industries. 89% of US bank holders use mobile banking for account management, and 85% of users prefer native mobile apps to mobile websites.

The notion of “quality” that these organizations want can be broken down into four parts:

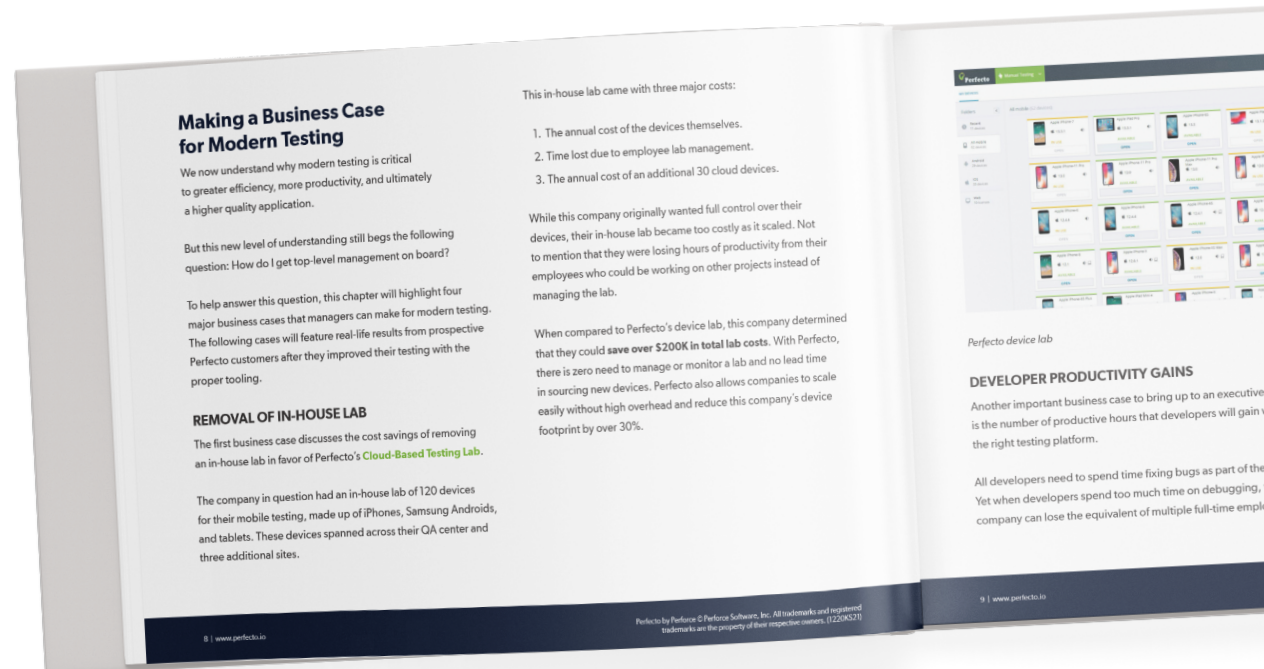
- **Improve innovation throughput.** Organizations want new features that release frequently.
- **Quality of output.** Quality products require bug-free releases on all digital platforms.
- **Time.** Teams need faster turnaround and to release in smaller, incremental bites.
- **Cost.** Organizations must stick to their budget.

Test automation, as well as other critical testing strategies, are essential to achieving quality. But the prospect of test automation is often met with resistance without a proper implementation strategy.

This eBook will discuss how to make a strong business case for modern testing by showing the ROI of a quality application.

This discussion of modern testing will cover three essential areas:

- Moving from manual to automated testing.
- Parallel execution at scale.
- Comprehensive reporting & analytics.



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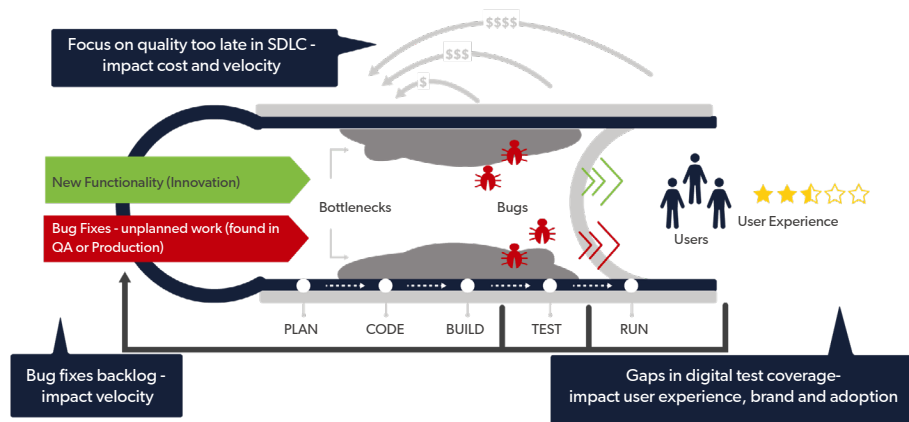
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Background: Pipeline Challenges & The Quality Cube

For any organization that is building an application, the goal is to create a five-star experience for their customers. While everyone should set their sights on a flawless user experience, teams, unfortunately, have limited resources.

To make the most of these limited resources, many teams take a risk-based approach when it comes to testing. Using a spot-check approach, these teams pick and choose their tests based on what seems the most urgent.

The problem with a risk-based testing strategy is that bugs usually slip past the unchecked areas of your application. These bugs leak into production, causing a negative ripple effect for the application, the testing team, and the greater organization.



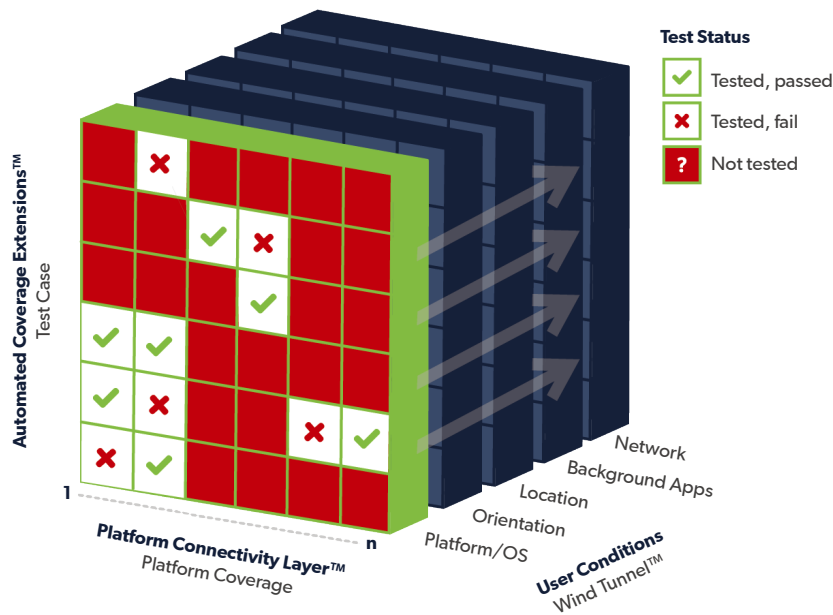
Bugs that escape to production are likely causing issues in other areas of the application. From a customer perspective, a buggy user experience lends to a bad brand reputation. In fact, **65% of users** say that a poor mobile experience impacts their opinion of a brand.

The organization is then stuck trying to recover its good name. But rebuilding your brand reputation is fighting an uphill battle: 70% of users will abandon an app with a load time of over three seconds, and 71% of uninstalls are caused by the application crashing.

“65% of users say that a poor mobile experience impacts their opinion of a brand.”

For the testing team, fixing a bug requires a thorough assessment not only of that specific issue but also where the bug may have unwittingly caused other errors throughout the application. While these assessments are necessary, they interfere with innovation and slow down the pipeline overall. Plus, the later you find a bug, the more difficult and costly it will be to resolve.

To begin the process of embracing quality, it is critical to understand your organization’s current testing capabilities. One great way to measure your testing capacity is with the Quality Cube.



- **Z-axis. User conditions.** There are additional complexities to consider for each platform that you are testing, such as location, network, and apps that are running in the background. These additional factors will give you a better understanding of your baseline on a platform level.

By finding out your current testing capacity, you can identify the lowest common denominator to begin the journey to better quality.

The Journey to Quality

Once your team has set up their baseline using metrics from the Quality Cube, it is time to adopt a modern testing strategy to prepare your application for success. As mentioned previously, modern testing is comprised of three parts:

1. Moving from manual to automated testing.
2. Executing parallel tests at scale.
3. Reporting that is both fast and comprehensive.

This chapter will discuss each element of modern testing in more detail while showcasing why winning organizations opt into these testing best practices.

The Quality Cube measures quality on three axes: platform coverage, test cases, and user conditions. Metrics from the Quality Cube can share insights on how long it takes to run your regression, sanity, and smoke testing suites.

- **X-axis: Platform coverage.** It is essential to test on a variety of platforms to ensure that your app is providing the same experience on different devices or browsers. These devices can range from iOS and Android devices to responsive web apps.
- **Y-axis: Test cases.** In addition to knowing your team’s number of test cases, this axis also refers to factors such as the time per test case and the percentage of automated tests in your suite.

MANUAL TO AUTOMATED TESTING

The first element of modern testing that winning organizations adopt is making the shift from manual testing to automation.

As previously mentioned, organizations that are struggling stick with a risk-based approach to testing, which leaves room for bugs to leak to production. On the other hand, digital winners release on a daily or bi-weekly basis with a lot more coverage. These organizations are testing in ways that cover all dimensions of the Quality Cube.

By having such robust coverage, these winning organizations minimize defects while the delivery pipeline focuses more on innovation. They spend no more than 20% of their time focusing on any backlog.

These organizations achieve these goals by automating 90% or more of their tests. These stable tests are running reliably in the background and giving testers the space to focus their efforts elsewhere. Either testers can run manual tests in the areas that need it or come up with different ways to test new application features.

PARALLEL EXECUTION AT SCALE

In addition to automating their tests, digital winners also test in parallel.

For many large enterprises, there is a lot of developer collaboration and requests to look more deeply into different sections of code. In these types of organizations, it is not uncommon to see up to 30 pull requests per day.

For each pull request, the testing team needs to run sanity and smoke testing to ensure that nothing bad is happening. There are a lot of test executions to go through in a short amount of time.

Instead of testing sequentially, winning organizations opt to test in parallel, on ideally 16-24 devices to cover 80% of your customer-used platforms. They also run smoke and sanity testing suites early and often, giving themselves multiple quality gates to run these suites during each stage of the app development process.

NORTH AMERICA

| Device Model | Screen Size | Screen Resolution | Release Date | Recommended OS | Status |
|-------------------|-------------|-------------------|----------------|----------------|--------|
| iPhone 11 | 6.1 | 828 x 1792 | September 2019 | iOS Latest | ↑ |
| Galaxy S10+ | 6.4 | 1440 x 3040 | February 2019 | Android 10 | ↑ |
| iPhone 11 Pro | 5.8 | 1125 x 2436 | September 2019 | iOS Latest | ↑ |
| iPhone 8 Plus | 5.5 | 1080 x 1920 | September 2017 | iOS Latest | ↓ |
| iPhone 12 Pro Max | 6.7 | 1242 x 2688 | November 2020 | iOS latest | ↑ |
| Galaxy S20 | 6.2 | 1440 x 3200 | March 2020 | Android 10 | ↑ |
| iPhone 11 Pro Max | 6.5 | 1242 x 2688 | September 2019 | iOS Latest | ↑ |
| Galaxy S9 | 5.8 | 1440 x 2960 | March 2018 | Android 9 | ↓ |
| Galaxy Note 20 | 6.7 | 1080 x 2400 | August 2020 | Android 10 | NEW |
| Pixel 5 (REF) | 5.7 | 1080 x 2280 | October 2020 | Android 11 | = |

*Data representative of United States usage. Download the full guide for Canada usage along with expanded list of top 32 devices by country and more.

Top 10 mobile devices to test on for North America, according to Perfecto's Test Coverage Guide.

By following this testing protocol, winning organizations should aim to get feedback in roughly 30 minutes at each building stage of a new feature. Then the testing team should run a full regression suite overnight to check for any other issues that may arise.

COMPREHENSIVE REPORTING & ANALYTICS

To get through the testing feedback in such a short amount of time, digital winners also rely on comprehensive reporting methods that give fast and actionable insights on defects.

There are four main reasons why tests fail:

1. Environment issues.
2. Test issues.
3. Issues with test data.
4. Actual defects.

According to Perfecto's data, no more than 4% of failures end up being an actual defect, but these are the most important failures to analyze when looking through testing reports. Organizations that do not have coordinated reporting methods can end up spending much more time than necessary on backlog looking at the other reasons why tests fail.

In addition, spending upwards of half a day or more looking at reports interferes greatly with innovation. Teams bogged down with analyzing reports will shift to working reactively instead of proactively.

Conversely, digital winners leverage a variety of methods such as heatmaps, insights from reports, and knowledge of common failure reasons to spend no more than 30 minutes evaluating and resolving issues behind failed test cases. These organizations use the tools at their disposal to cut through the noise and pinpoint actual failures that need a closer look.

Making a Business Case for Modern Testing

We now understand why modern testing is critical to greater efficiency, more productivity, and ultimately a higher quality application.

But this new level of understanding still begs the following question: How do I get top-level management on board?

To help answer this question, this chapter will highlight four major business cases that managers can make for modern testing. The following cases will feature real-life results from prospective Perfecto customers after they improved their testing with the proper tooling.

REMOVAL OF IN-HOUSE LAB

The first business case discusses the cost savings of removing an in-house lab in favor of Perfecto's **Cloud-Based Testing Lab**.

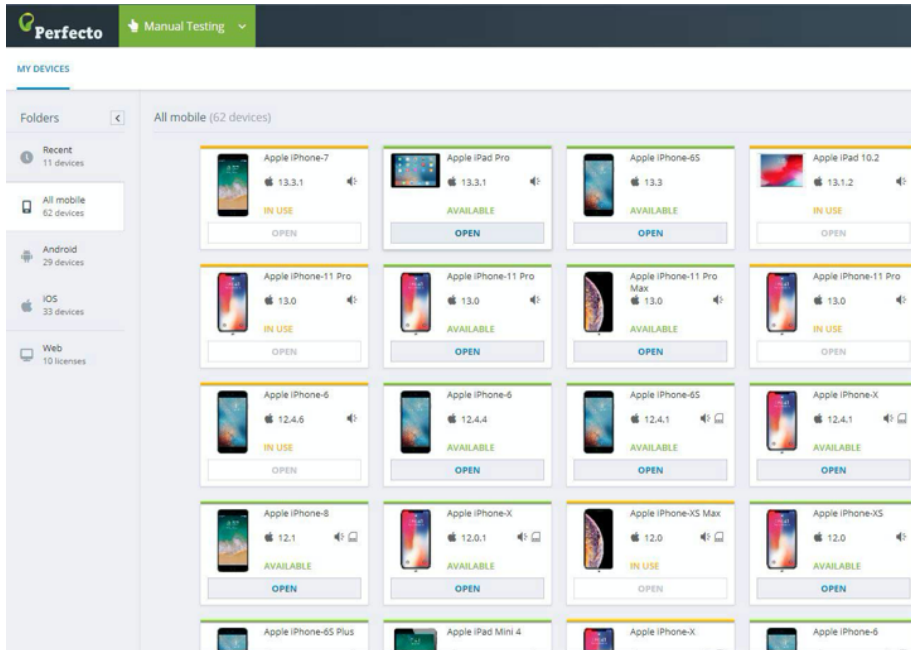
The company in question had an in-house lab of 120 devices for their mobile testing, made up of iPhones, Samsung Androids, and tablets. These devices spanned across their QA center and three additional sites.

This in-house lab came with three major costs:

1. The annual cost of the devices themselves.
2. Time lost due to employee lab management.
3. The annual cost of an additional 30 cloud devices.

While this company originally wanted full control over their devices, their in-house lab became too costly as it scaled. Not to mention that they were losing hours of productivity from their employees who could be working on other projects instead of managing the lab.

When compared to Perfecto's device lab, this company determined that they could **save over \$200K in total lab costs**. With Perfecto, there is zero need to manage or monitor a lab and no lead time in sourcing new devices. Perfecto also allows companies to scale easily without high overhead and reduce this company's device footprint by over 30%.



Perfecto device lab

DEVELOPER PRODUCTIVITY GAINS

Another important business case to bring up to an executive team is the number of productive hours that developers will gain with the right testing platform.

All developers need to spend time fixing bugs as part of their role. Yet when developers spend too much time on debugging, the company can lose the equivalent of multiple full-time employees.

Not only is this a loss when considering the number of hours resolving issues as part of a developer's annual salary, but developers are also losing time where they can be coding new features that can bring additional revenue to the company.

With Perfecto, developers can significantly reduce the time spent on fixing bugs and virtually eliminate the need to reproduce defects found in QA. With faster feedback due to testing earlier in the development process, companies have been able to reduce these debugging efforts by as much as 35% and **save over \$230K annually** in developer efficiency gains.

REDUCTION IN MANUAL TESTING COSTS

Reducing manual testing costs is another critical point to make to upper management when advocating for modern testing.

While manual testing will always play a role in a robust testing strategy, testing manually in areas that can be automated is extremely costly. In one company's evaluation of their manual testing efforts, they determined that they were losing the equivalent of over 20 full-time employees in manual testing hours every year.

Alternatively, implementing test automation reduces the need for manual efforts significantly while testing a larger breadth of the application in a shorter amount of time. The following table will show how organizations with a greater level of test automation maturity can also benefit in other areas of testing, such as a higher automation pass rate and increased quality gates.

| RELEASE VELOCITY | PHASE 1 (3-6 MONTHS) | PHASE 3 (MONTHLY) | PHASE 4 (2 WEEKS) | PHASE 5 (DAILY) | PHASE 1 (3-6 MONTHS) |
|---|--|---|---|--|---|
| Platform Coverage (% of customer base) | 1 of each platform | 15-30% | 30-50% | 50-80% | 80%+ |
| % Automation | ~10% | ~33% | 50-75% | ~75% | >75% |
| Automation Pass Rate | 0-50% | 30-70% | 70-95% | 95%+ | 99%+ |
| Quality Gates | <ul style="list-style-type: none"> • Test new features only • End of spring regression | <ul style="list-style-type: none"> • Add in-spring testing | <ul style="list-style-type: none"> • Add daily smoke tests • Add nightly regression | <ul style="list-style-type: none"> • Add scheduled sanity tests • Add smoke test to every pull request | <ul style="list-style-type: none"> • Full regression on every pull request |

THE DIFFERENT PHASES OF TEST AUTOMATION MATURITY

Customers who have hit phase 5 of the test maturity scale by automating 80-95% of their test cases with Perfecto have seen upwards of **\$1 million in annual savings** due to reduced manual testing efforts. While the prospect of that much automation may seem daunting, there is certainly enough ROI to entice upper management to take a closer look at the prospect.

REDUCTION IN COST IMPACTS OF ESCAPED DEFECTS

The final business case that will be discussed here covers how modern testing helps reduce the cost of fixing escaped defects.

According to Perfecto's customer insights, organizations must contend with a conservative yearly estimate of 120 defects in the delivery pipeline. Each defect is expensive and time-consuming to fix, costing a minimum of \$5,000 to support.

By adopting modern testing with a testing platform like Perfecto, organizations can shift left to detect issues early in the testing lifecycle. By catching device-specific issues in pre-production testing, organizations can either significantly reduce or even eliminate escaped defects on the UI/UX level.

Even with a 35% reduction in leaked bugs (which is a considerable percentage), companies can save a **minimum of \$340K** that would otherwise go to fixing bugs later in the development cycle.

Another important business case for modern testing that deserves an honorable mention is the ability to increase speed to market. While this is something that cannot be quantified as simply as the other business cases, bringing high-quality software to market faster ultimately makes a positive financial impact by attracting and retaining customers.

ROI of Quality: In-House Solutions vs. Perfecto

| BUSINESS CASE | IN-HOUSE | PERFECTO |
|--------------------------------|---|--|
| Device Lab Maintenance & Scale | <ul style="list-style-type: none"> • Increased device footprint. • Hundreds of employee hours spent on upkeep. • Costly to scale. | <ul style="list-style-type: none"> • Zero lab management or monitoring. • Reduced device footprint, and no lead time in sourcing new devices. • Scale easily without high overhead. |
| Developer Productivity | <ul style="list-style-type: none"> • Hours spent on debugging equivalent to multiple full-time employees. • Reduced time for innovation. | <ul style="list-style-type: none"> • Virtually eliminate the need to reproduce defects found in QA. • Reduced time for fixing bugs, increased time to focus on new app features. |
| Manual Testing Hours | <ul style="list-style-type: none"> • Hours spent on testing equivalent to multiple full-time employees. • Requires a risk-based approach to testing to keep up with time constraints. • Slower release velocity. | <ul style="list-style-type: none"> • Automate tests to test more of the app in a shorter amount of time. • Test in parallel. • Increased release velocity. |
| Bug Detection & Resolution | <ul style="list-style-type: none"> • Minimum of \$5,000 to fix bugs later in the development cycle. • Time-consuming process. | <ul style="list-style-type: none"> • Shift left to detect and resolve bugs early in development. • Catch device-specific issues in pre-production testing to reduce UI/UX-level defects. |

Summary

There is a great deal of ROI to choose from when it comes to achieving quality through modern testing. As highlighted in this eBook, some major benefits of modern testing include a reduction in manual testing costs, empowered teams, and no in-house lab costs.

While going through a digital transformation may seem daunting at first, these modern testing practices can help both the testing team and the entire organization in the long term.

RELATED RESOURCES:

- [Mobile & Web Test Coverage Guide](#)
- [Testing Trailblazers: How Digital Winners Address Test Automation](#)
- [The 2021 State of Test Automation](#)
- [What is Good Testing in 2021?](#)

About Perfecto

Perfecto by Perforce enables exceptional digital experiences and helps you strengthen every interaction with a quality-first approach for web and mobile apps through a cloud-based test platform. The cloud is comprised of real devices, emulators, and simulators, along with real end-user conditions, giving you the truest test environment available.

Our customers, including 50 percent of the Fortune 500 companies across banking, insurance, retail, telecommunications, and media rely on Perfecto to deliver optimal mobile app functionality and end-user experiences, ensuring their brand's reputation, establishing loyal customers, and continually attracting new users. For more information about Perfecto, visit perfecto.io.

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