Research Paper Presentation

</>Title

“Practices of Software Testing Techniques and Tools in Bangladesh Software Industry”

Trina Saha , Rajesh Palit
Department of Electrical and Computer Engineering, North South University, Dhaka 1229
Email: trina.saha@northsouth.edu

</>Presented By

Group_6

Abrar Khatib Lajim _ 2022-3-60-043

Md. Saiful Islam _ 2022-3-60-045

Umme Mukaddisa _ 2022-3-60-317

Agenda

- Introduction
- Why This Topic Matters
- Objectives of the Paper
- Background (Global Research)
- Gap in Bangladesh
- Survey Design
- Key Metrics Collected
- Correctness Testing Usage
- Functional Testing Usage
- Non-functional & Security Testing
- Automation Tool Usage
- Bug/Defect Tracking Tools
- Challenges Identified
- Recommendations

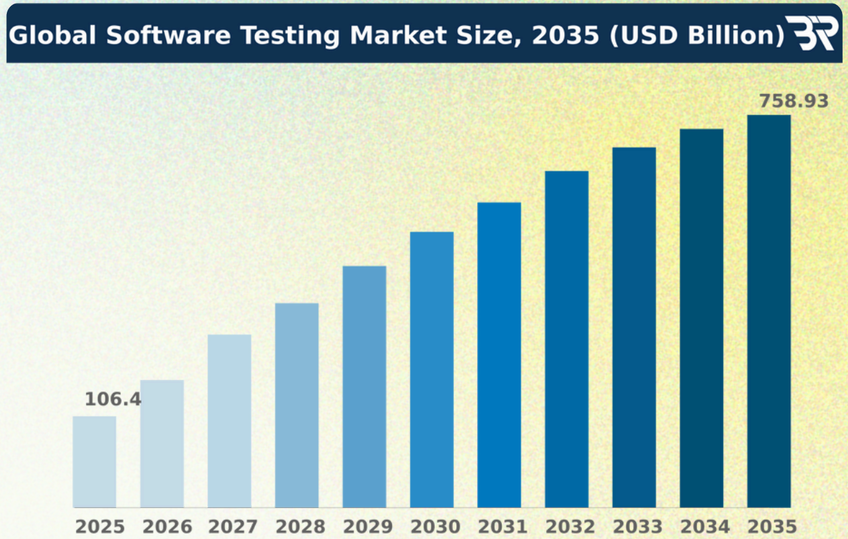
Back to Agenda Page

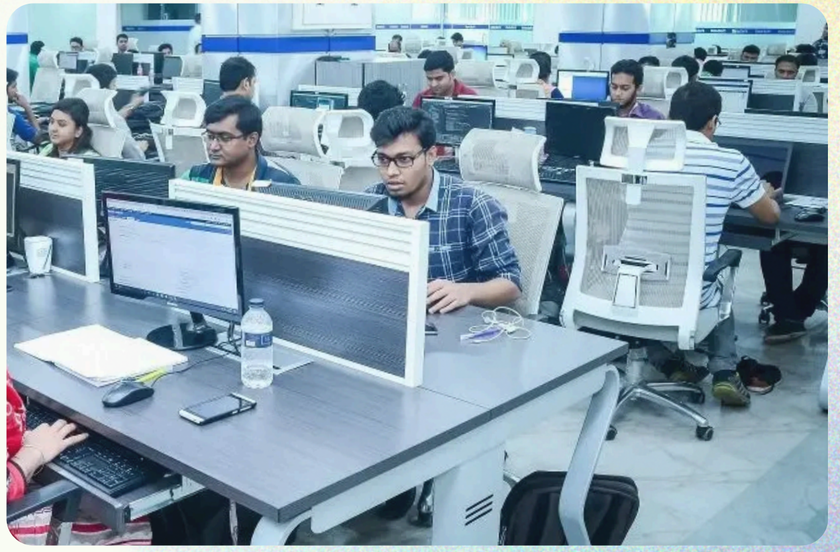
Why This Topic Matters

- **Quality testing** = essential for global competitiveness
- **Manual → Automation** trend rising globally, but **Bangladesh still lags in automation usage**

BASIS
Bangladesh Association of Software & Information Services

- **BASIS report:** $800 million software export (6720 crore)
- **High-quality software** is essential for:
  - Sustainable IT industry growth
  - Reducing defects & failures



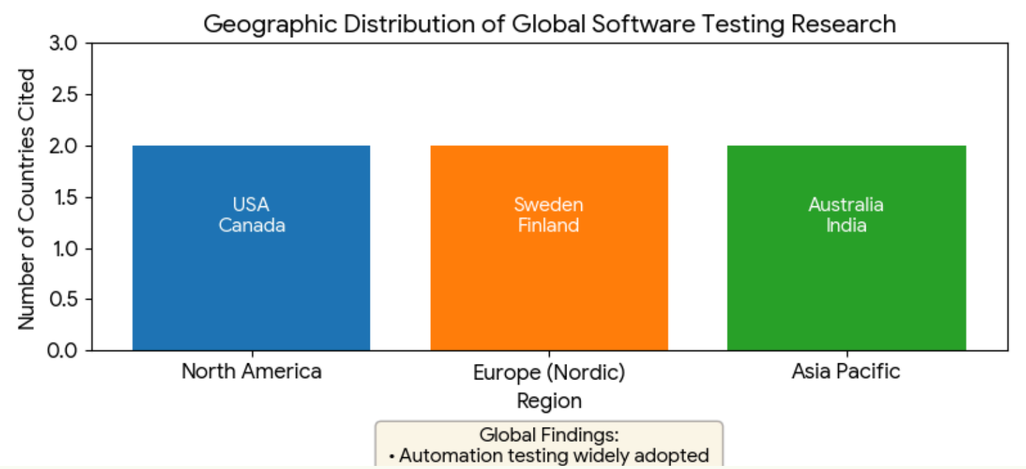


Back to Agenda Page

Objectives

1. Examine testing practices used in Bangladesh software firms
2. Identify commonly used testing tools & techniques
3. Understand major QA challenges
4. Provide insights for improving testing maturity in the industry

Background

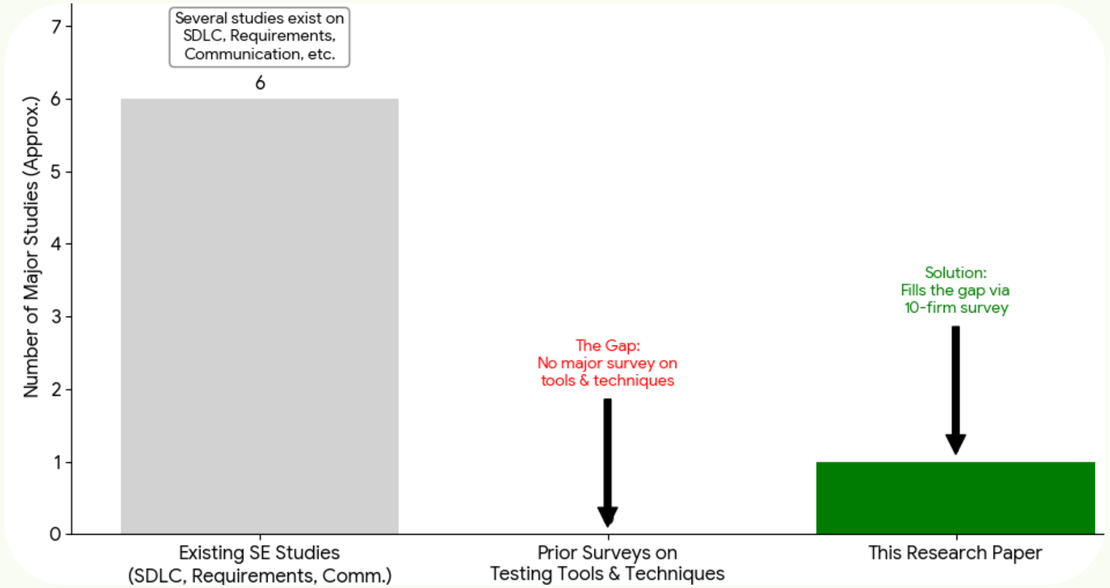


Global Research

Studies conducted in: USA, Australia, Canada, Sweden, Finland, India

Global Findings:

- Automation testing widely adopted
- Regression & unit testing highly used
- Developing countries struggle with skilled testers
- Tools support CI/CD & modern QA workflows



Gap in Bangladesh

- Several studies on SDLC, communication, requirements, etc.
- No major survey on testing tools & techniques in Bangladesh
- Lack of data on QA challenges & testing maturity
- This paper fills that gap through a 10-firm industry survey

Survey Design

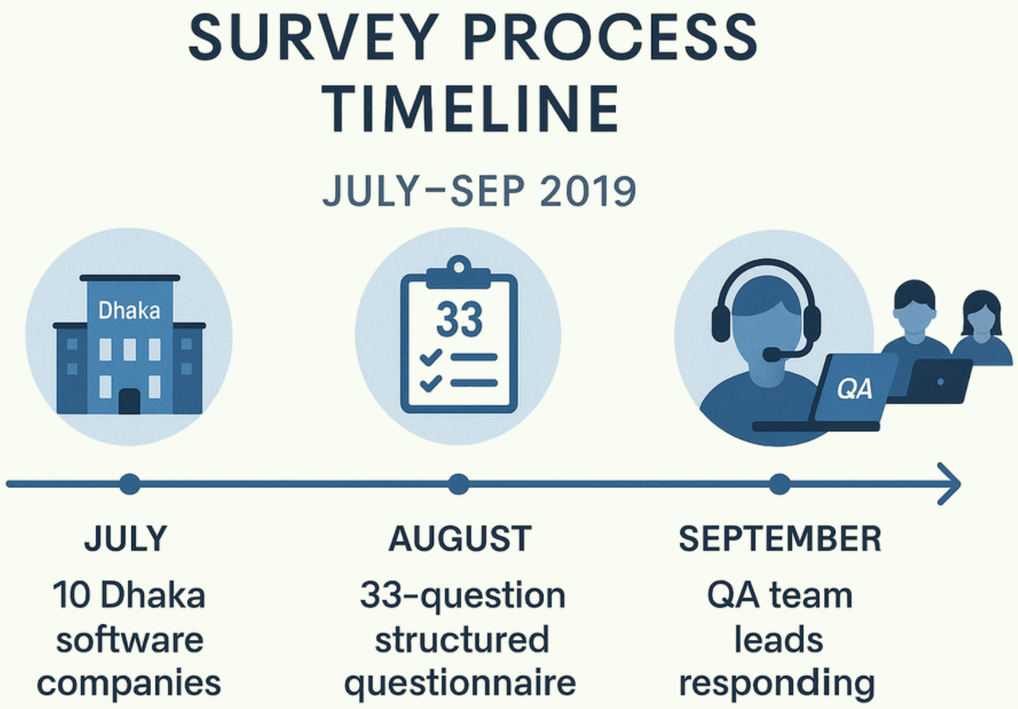
Back to Agenda Page

Survey Execution & Methodology

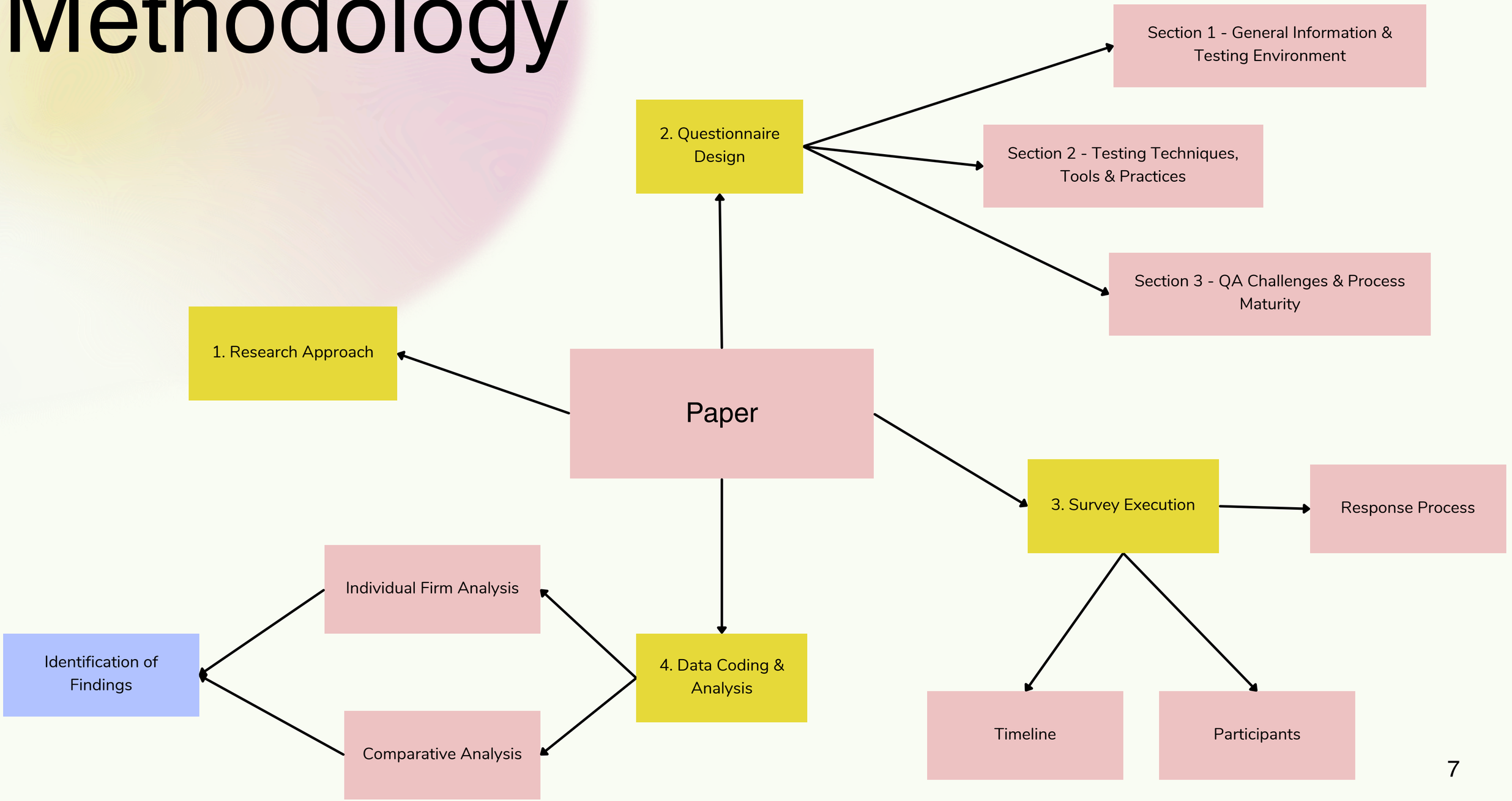
- Conducted July–September 2019 across 10 leading software firms in Dhaka.
- Respondents were mainly **QA Team Leads/Heads**, ensuring reliable and expert-level insights.

Questionnaire Structure (33 Questions)

- **General Profile**
- **Techniques & Tools**
- **Maturity & Challenges**



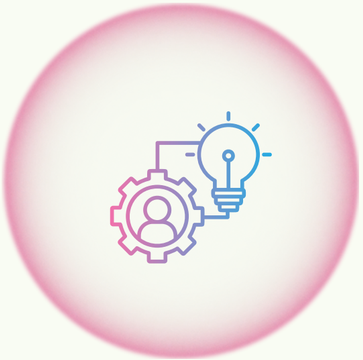
Methodology



Questionnaire Structure

General Profile

Company details, software categories, platforms, and QA team size



Techniques & Tools

Manual vs. automation usage;
correctness (black,white-box)
security testing;
tools like Selenium, JMeter, Jira.

Maturity & Challenges

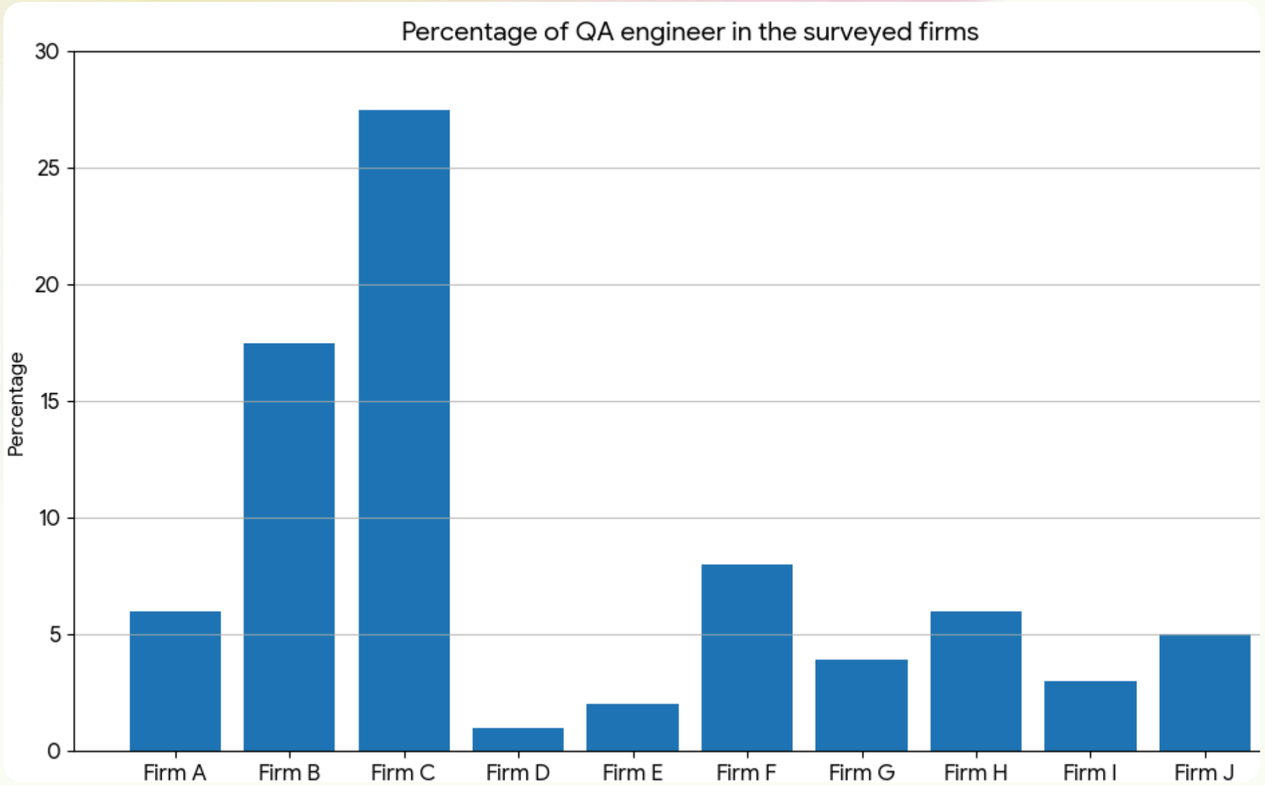
Test automation level, difficulties faced, and compliance with standards such as CMMI and ISO.

Participant Overview

Firm Characteristics

- **Software Types:** Web MIS, ERP, Mobile Apps, Financial Systems, and specialized tech (Face Recognition).
- **Platforms:** Java, .NET, Android, iOS, PHP.
- **QA Staffing:**
  - **Low Ratio:** Most firms have a very low percentage of dedicated QA engineers (e.g., Firm D has 1%, Firm E has 2%).
  - **Exceptions:** Only Firms B and C had significant QA staffing (17.5% and 27.5%).
- Process: 70% follow formal testing processes; 20% mix formal/informal.

Key Metrics Collected



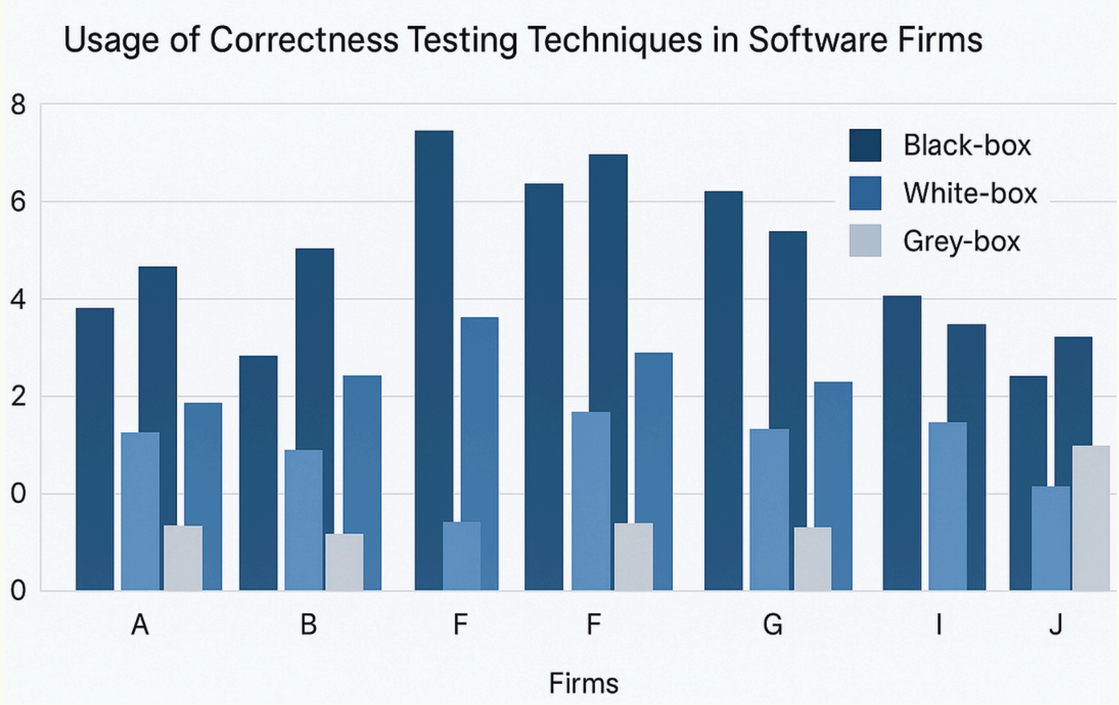
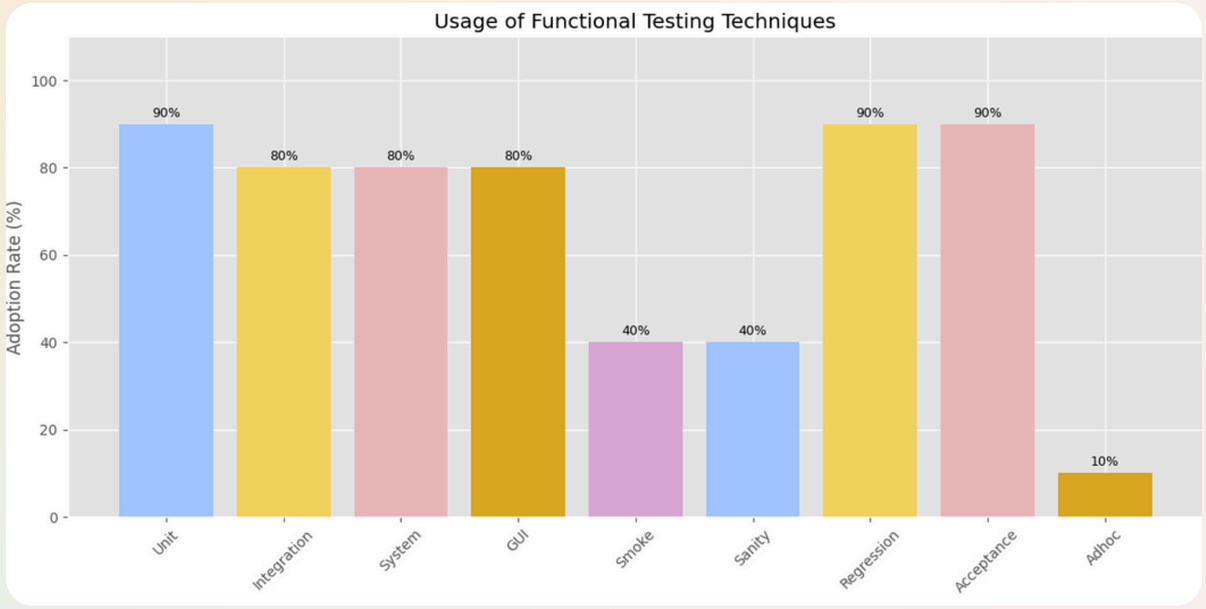


Figure 1 shows:
Percentage of QA engineers per company (A–J)
Values ranging from 1% to 27.5%

Figure 2 shows:

- Usage of Black-box, White-box, Grey-box
- **Black-box most common**

Functional & Non-Functional Testing Techniques



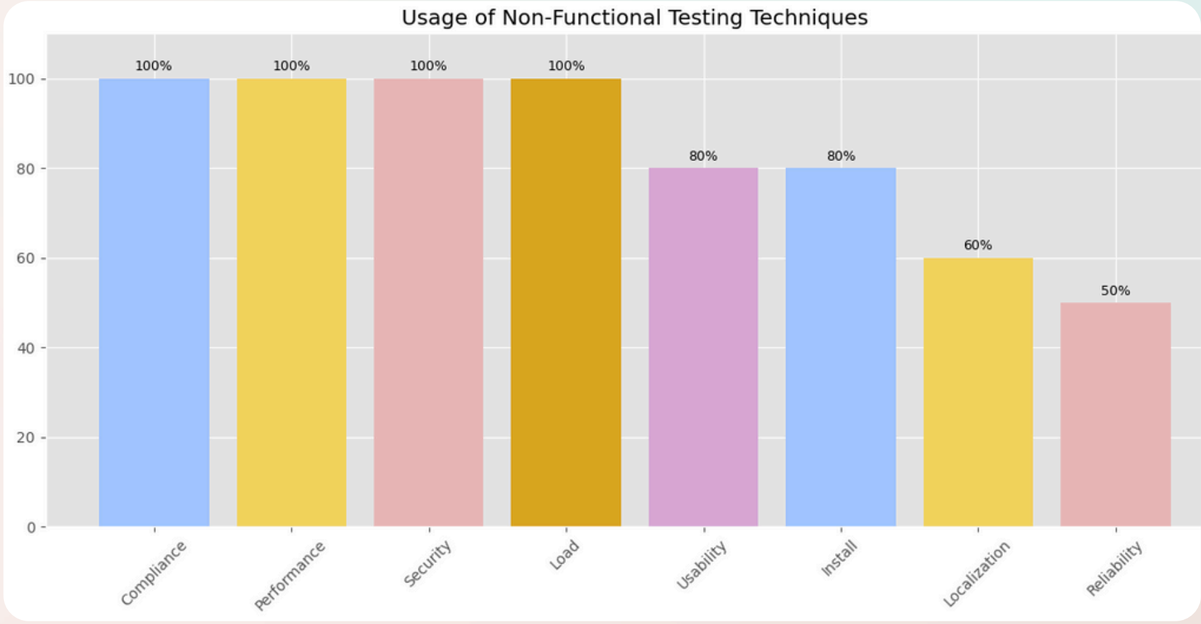


Figure 1 shows:

Most-used functional test types:

- Unit testing
- Integration testing
- System testing
- GUI testing
- Regression testing (≈90%)
- Acceptance testing (≈90%)
- Smoke & sanity testing widely used

Figure 2 shows:

Non-Functional Testing:

- 100%: Performance, Compliance
- 80%: Usability, Install testing
- 60%: Localization

Security Testing Techniques Usage

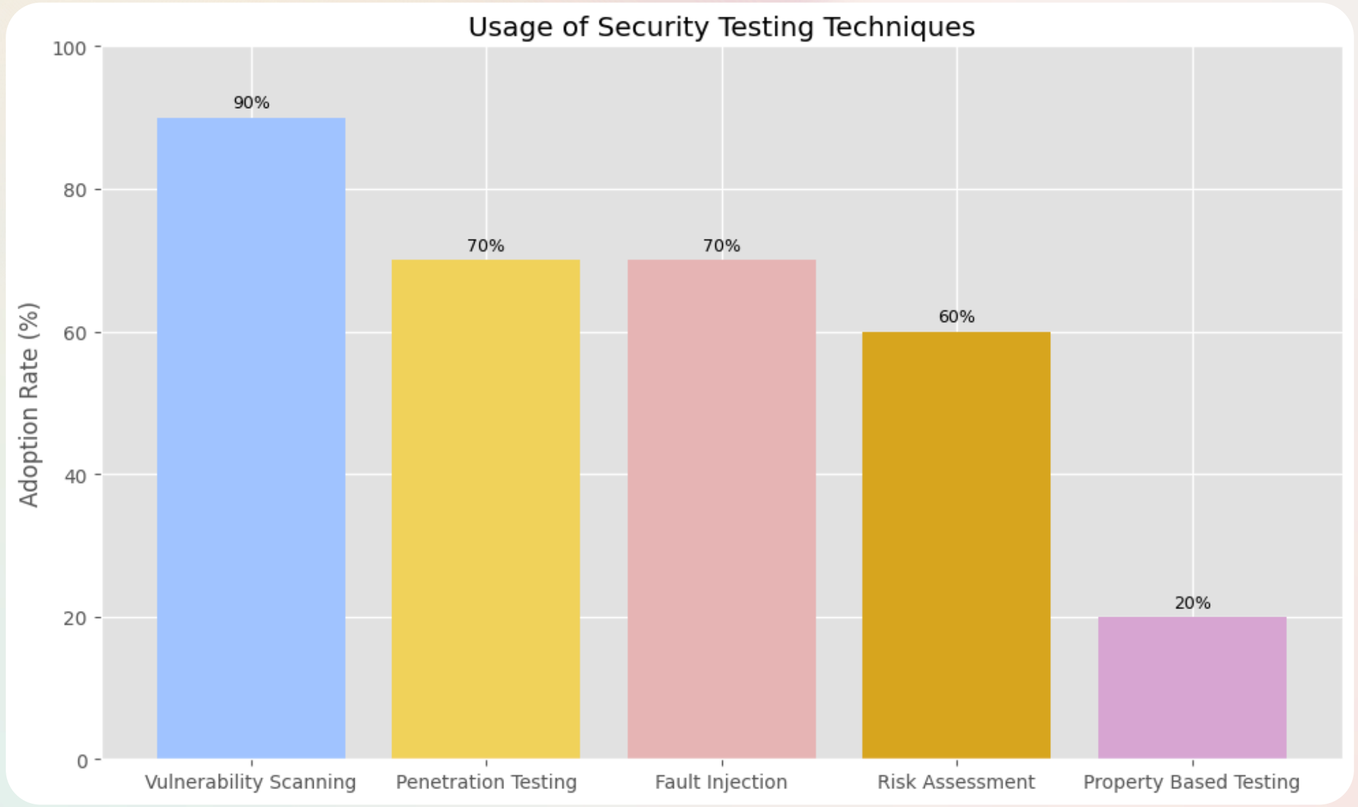
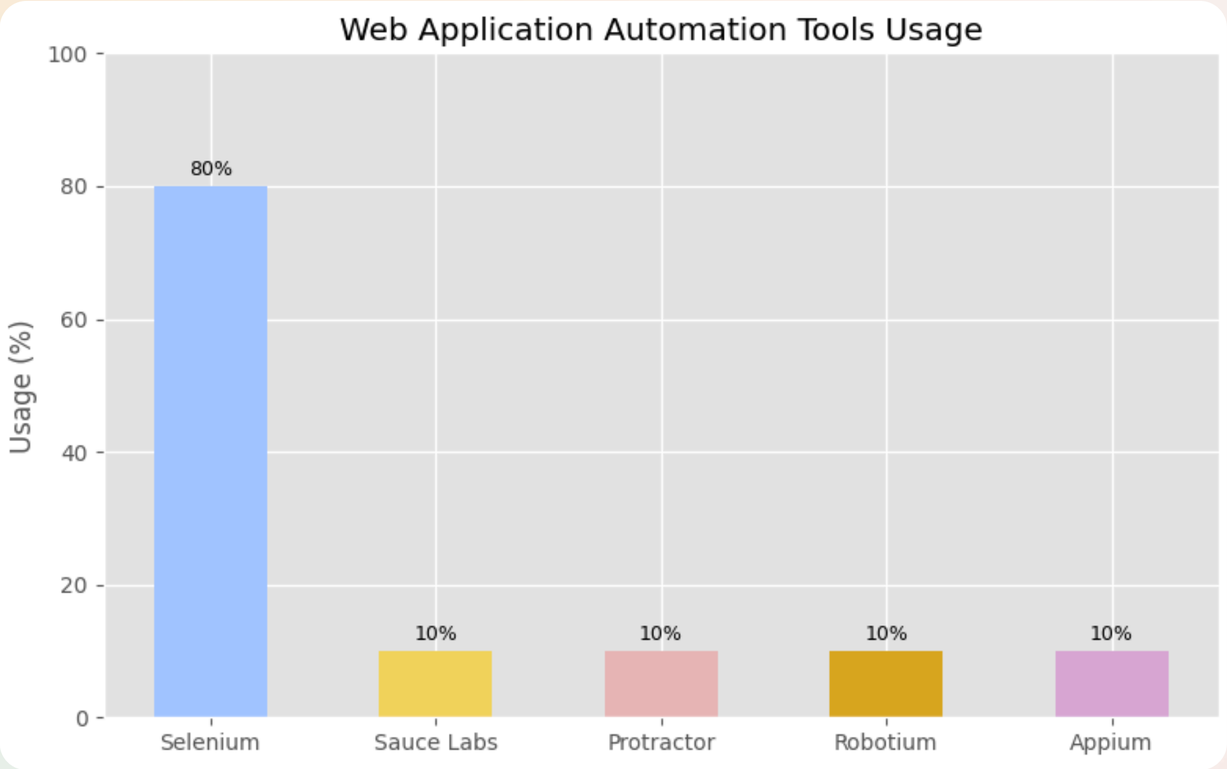


Figure shows

Security Testing:

- 90%: Vulnerability scanning
- 70%: Penetration testing
- 70%: Fault injection
- 60%: Risk assessment

Functional Automation Tool Usage



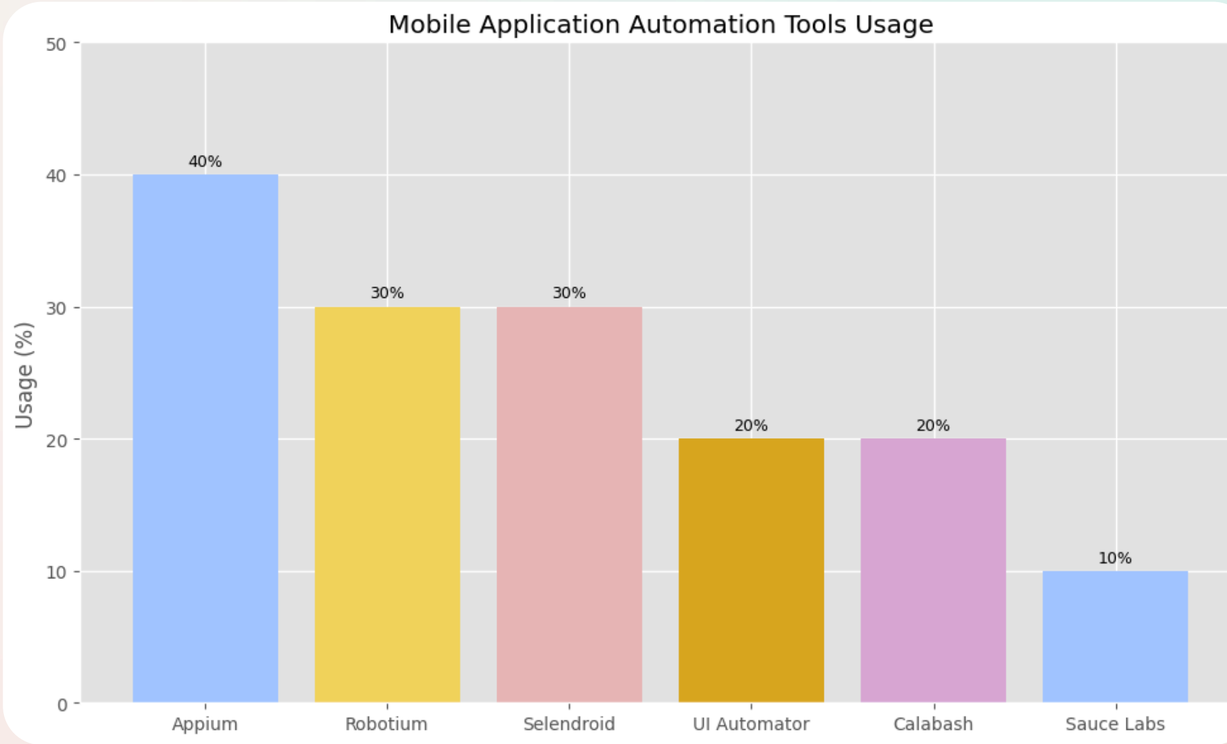


Figure 1 shows:

Functional (Web):

- Selenium → 80%

Figure 2 shows:

Mobile Testing:

- Appium (40%)
- Robotium (30%)
- Selendroid (30%)
- Many firms still test mobile apps manually

Automation Tool Usage for Load & Bug

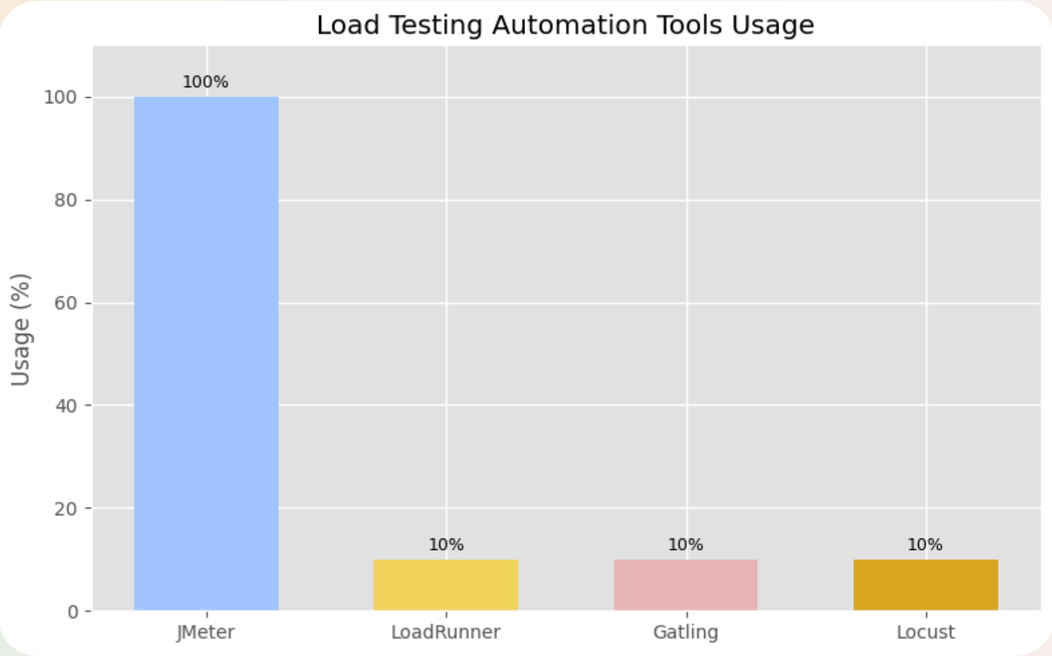


Figure 1 shows:

Load Testing:

- JMeter → ≈100%
- Other tools: LoadRunner, Gatling, Locust

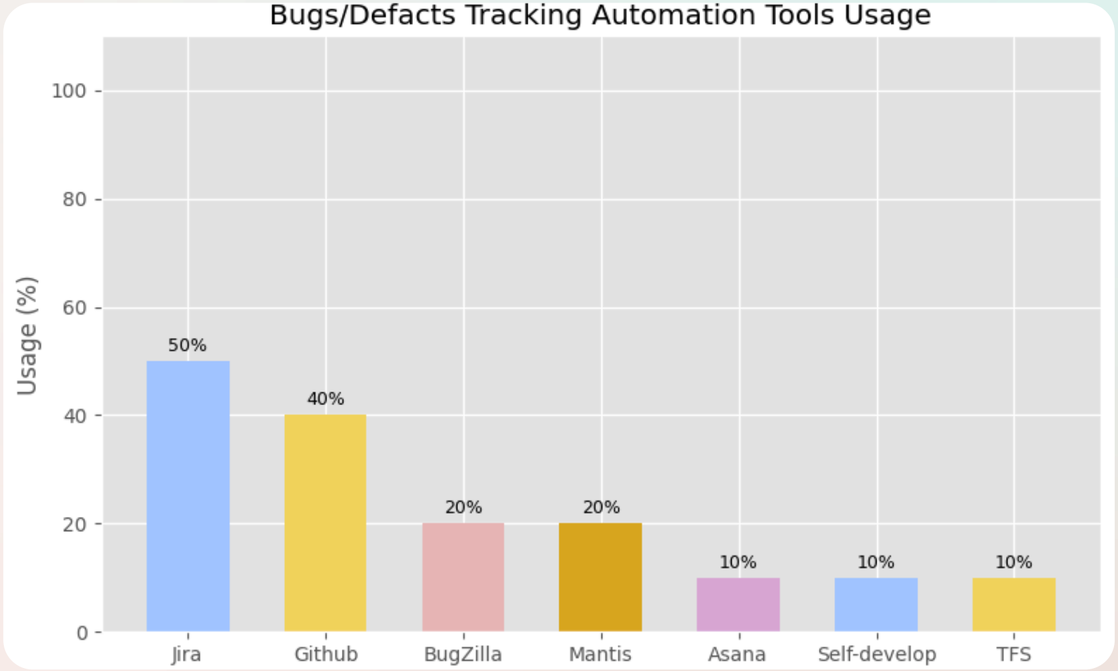


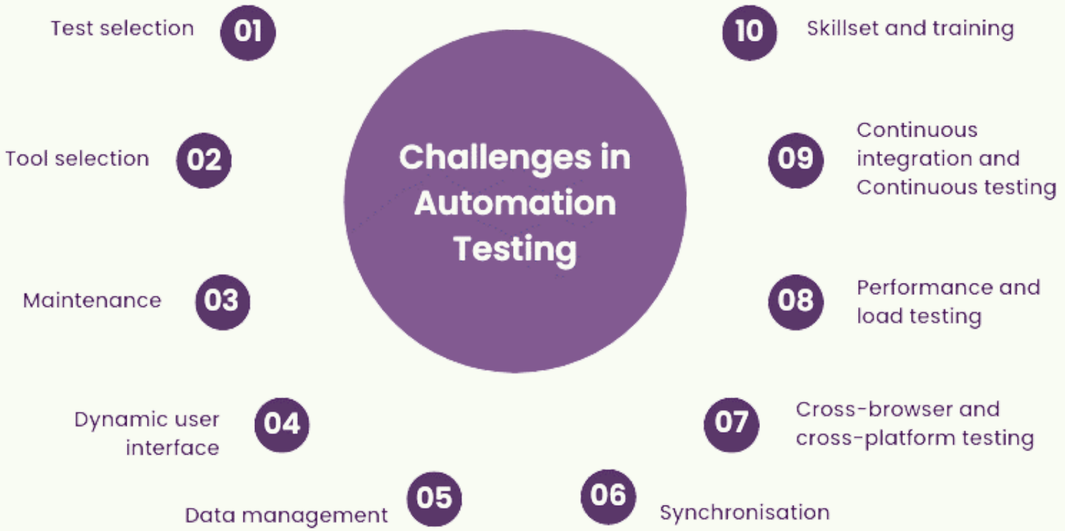
Figure 2 shows:

Most used tools:

- Jira (50%)
- GitHub Issues (40%)
- Bugzilla (20%)
- Other tools: Mantis, Asana, Redmine, TFS

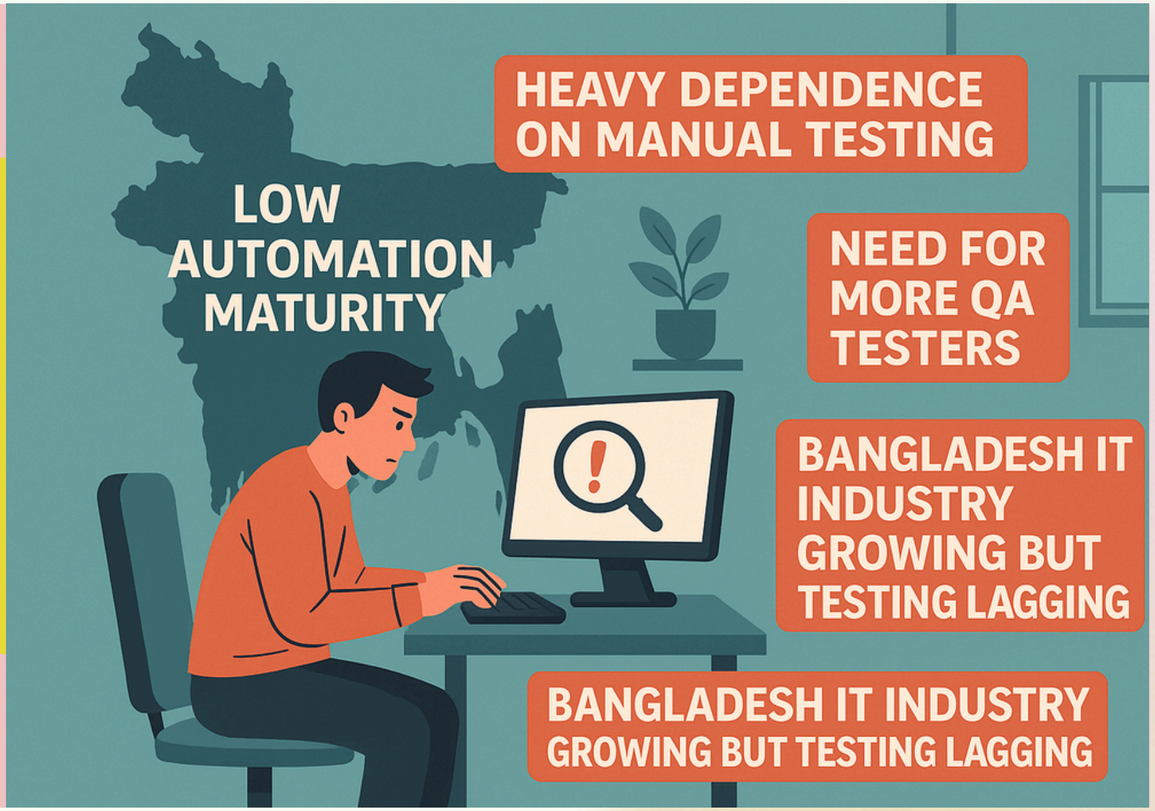
Challenges

- **Shortage** of skilled QA engineers; low-quality entry-level testers
- **Weak** practical QA education; **limited** formal training & few ISTQB-certified testers
- **Low adoption** of automation; **lack** of automation experts
- **Limited use** of testing tools beyond basic Selenium/JMeter
- Resource and time constraints affecting testing depth
- **Long** testing cycles due to manual-heavy processes
- **Inconsistent** standards (few firms follow CMMI/ISO)
- **Weak** testing culture—QA not integrated early; limited CI/CD practices



Conclusion From Survey

- IT industry growing, but QA not keeping pace
- Firms rely heavily on manual testing
- Automation tools used but not effectively
- Limited QA training and certification
- Need for improved testing maturity



Back to Agenda Page

Comparison of Bangladesh vs. Global

The study's primary contribution lies in filling a geographical knowledge gap, as previous research focused on developed IT markets. While Bangladeshi firms successfully perform core functional, non-functional, and security testing, the industry lags significantly in its adoption of automation and standardization, particularly when compared to countries where such practices are now mature.

SQA Indicator	Developed Markets	Bangladesh (Survey Findings)
Core Process	Automation is a clear imperative; high adoption of TDD/Agile Testing.	**90% reliance on manual testing**; automation is an afterthought, applied selectively.
Standardization	High adherence to CMMI/ISO; strong emphasis on test-related training and certification.	**40% of leading firms follow no standard**; low emphasis on ISTQB certification.
Staffing & Expertise	Structured hiring and continuous training; focused effort to increase QA-to-Dev ratios.	Severe talent crisis; scarcity of certified automation engineers; low overall QA staff percentage.
Tool Usage	Integrated use of specialized tools across the lifecycle (e.g., JUnit for Unit Testing).	Tools used in silos: Jmeter for load, Selenium for web. Four firms manually test mobile apps.

Recommendation

For the Software Industry

- **Full Automation:** Move beyond selective automation; fully automate functional & non-functional testing across all platforms.
- **Strengthen QA:** Increase QA-to-developer ratio; integrate QA early in Agile/DevOps cycles.
- **Certification:** Mandate training & certifications (e.g., ISTQB) to close the skills gap.

For Academia and Policy

- **Curriculum Update:** Introduce hands-on courses in testing, requirements engineering, and automation tools.
- **Industry Collaboration:** Formal internships and knowledge-sharing to build practical skills.
- **Standard Adoption:** Promote/subsidize CMMI and ISO standards to institutionalize process maturity.

Thank you!

Do you have any questions?