

NEAT EVALUATION FOR TCS:

# Next-Generation Software Testing

Market Segment: Overall

## Introduction

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This is a custom report for TCS presenting the findings of the NelsonHall NEAT vendor evaluation for *Next-Generation Software Testing Services* in the *Overall* market segment. It contains the NEAT graph of vendor performance, a summary vendor analysis of TCS for software testing services, and the latest market analysis summary for software testing services.

This NelsonHall Vendor Evaluation & Assessment Tool (NEAT) analyzes the performance of vendors offering next-generation software testing services. The NEAT tool allows strategic sourcing managers to assess the capability of vendors across a range of criteria and business situations and identify the best performing vendors overall, and with a specific focus on mobile testing, AI-based automation, UX testing, and other cognitive and testing capability.

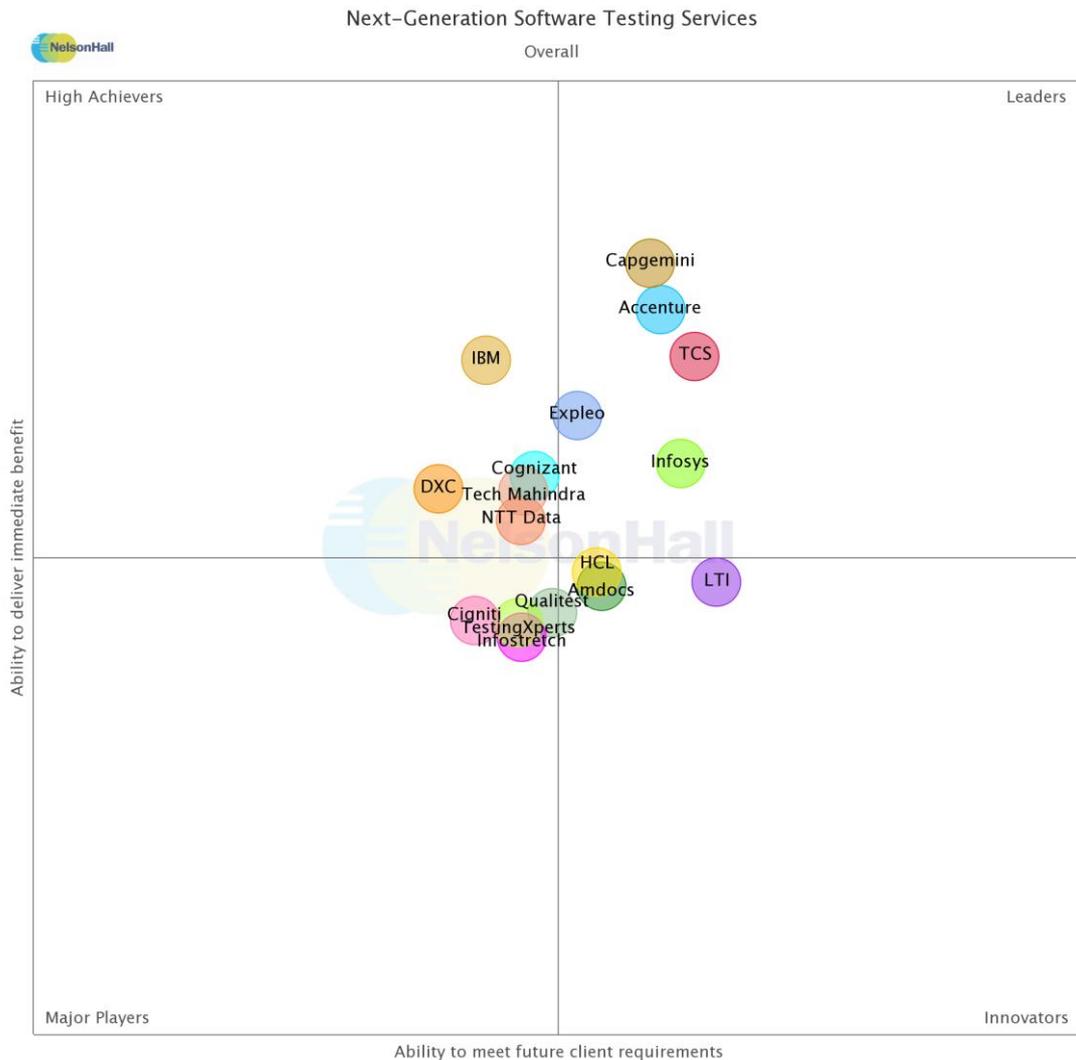
Evaluating vendors on both their 'ability to deliver immediate benefit' and their 'ability to meet client future requirements', vendors are identified in one of four categories: Leaders, High Achievers, Innovators, and Major Players.

Vendors evaluated for this NEAT are: Accenture, Amdocs, Capgemini, Cigniti, Cognizant, DXC Technology, HCL Technologies, IBM, Infostretch, Infosys, LTI, NTT Data, Qualitest, SQS, TCS, Tech Mahindra, and TestingXperts.

Further explanation of the NEAT methodology is included at the end of the report.



## NEAT Evaluation: Next-Generation Software Testing Services (Overall)



NelsonHall has identified TCS as a Leader in the *Overall* market segment, as shown in the NEAT graph. This market segment reflects TCS’ overall ability to meet future client requirements as well as delivering immediate benefits to software testing services clients.

Leaders are vendors that exhibit both a high ability relative to their peers to deliver immediate benefit and a high capability relative to their peers to meet client future requirements.

*Buy-side organizations can access the Next-Generation Software Testing Services NEAT tool (Overall) [here](#).*



## Vendor Analysis Summary for TCS

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### Overview

TCS had initially set up its Quality Engineering & Transformation (QET), then under a different name, in 1998. QET was a horizontal service line with P&L responsibility and aligned by vertical, mirroring TCS' vertical structure.

In FY18, TCS initiated its Agile Strategy which implies all application services activities will be aligned around agile by FY20. As part of this transformation, the company changed the scope of QET from a horizontal line to governing most of TCS's software testing service activities to focusing on non-linear growth through test platforms.

TCS was one of the early testing service vendors, emphasizing the notion of QA in this market, investing from 2010 onwards in IPs and platforms, and in its digital testing services portfolio since 2013. QET continues to invest in both IP and service portfolios; examples include TCS Digital Video Assurance and BITS, its big data testing IP.

As part of its IP creation, QET has been involved in the creation of two significant IPs: Customer Experience Assurance Platform (CXAP), and Smart QE Platform.

NelsonHall estimates that approximately 40k career testers work across the different ISUs of TCS.

### Mobile testing

Mobile testing was the first building block of QET's digital testing service portfolio. It still is the largest of its digital testing activities.

TCS has 300 mobile testing clients. The largest share of clients is in the BFS space, and then in retail. In the past 18 months, QET has seen an uptick in mobile testing by the communication industry.

TCS is increasingly selling mobile testing contracts that include setting up a mobile lab or using the services from cloud-based mobile labs and their related software products, from vendors including TestPlant, Experitest, and Perfecto Mobile.

QET provides access to mobile labs through Perfecto Mobile, Experitest and EggPlant across several options: access to the cloud, on-premise or hosted in TCS' facilities (Experitest and Perfecto Mobile), and on-premise (EggPlant).

TCS also provides access to Micro Focus Mobile Center, in its Customer Experience Center in Chennai, and to its two shared service centers in Kochi. It also uses Sauce Labs and Amazon device farm and has a mobile device lab servicing multiple clients in Kochi.

TCS has several accelerators related to mobile testing:

- OMNI is an accelerator for executing test scripts across combinations of browsers, devices/desktops, OS; and also for web services (SoapUI, and RestAPI). OMNI integrates with Jenkins for CI
- m-raft is an automation framework based on RAFT, specifically for mobile applications and websites. mRAFT integrates with ISV Testplant and Experitest, with defect management software (MF ALM, and TestLink), and with CI (Hudson, Jenkins, and CruiseControl)



- ASAF is a recent mobile testing framework developed in Java that includes several of the features of m-raft as well as features related to data (e.g., data conditioning, sub-setting and masking, ETL testing, and volume load generation), DevOps (e.g., version control (based on using GitHub and SVN); middleware testing), security testing: (e.g., ZAP); other (API testing and service virtualization (around SoapUI, Protractor, and WireMock), and a dashboard and reports. An important element of ASAF is that it provides image testing, a compatibility testing IP comparing the initial image and its various rendering over phone devices, OS and browsers.

### UX testing

TCS has a wide offering in usability testing. The offering includes:

- Functional testing: UI testing including look and feel, action and behavior, screen flow, moving from landscape to portrait
- Sentiment analysis: collecting end-user feedback
- Techniques are coming from usability research. Examples include using TechSmith's Morae products, for creating usability labs based on desktop webcams, A/B testing, Navigation-Presentation-Content-Interaction (NCPI) and i-userX.

A usability testing accelerator is i-UserX. i-UserX focuses on user requirements (with information gathering templates and persona templates); usability testing test cases, feedback templates, and test scenarios; training and best practice materials; and intermediary assessments, as well as NCPI checklists, and heuristic analysis checklists.

As part of its UX testing offering, TCS provides performance and security testing. Performance testing includes:

- Load testing, using tools such as Micro Focus LoadRunner and Performance Center, Neotys Neoload, and Apache JMeter, and also taking a virtual load approach and network virtualization
- Monitoring of applications in production, based on using tools from Dynatrace and AppDynamics.

TCS is increasingly complementing its performance testing approach with UX testing to provide an assessment of how the performance of an application impacts the customer experience.

A key element of the value proposition of TCS' UX testing offering is its CX Assurance Platform (CXAP). TCS launched CXAP in 2018 to focus on a website/mobile app's five key attributes: compatibility, usability, security, accessibility, and performance (CUSAP).

TCS has structured its CXAP offering into four components, focusing on CUSAP:

- An assessment and benchmarking of the client's web application CX ('dipstick assessment')
- The dipstick assessment is complemented by a KPI-based assessment that is based on other data sources, e.g., Google Analytics
- A sentiment analysis
- A test execution.



### RPA and testing

TCS provides RPA testing as part of its RPA engagements and favors end-to-end engagements. The company highlights that usage of chatbots is most used in BFSI and retail for engaging with customers and accessing information. TCS has ~70 clients for its RPA services. Services provided include:

- RPA strategy
- CoE set up
- RPA software selection
- Implementation
- Operations.

Key partners include Blueprism, Automation Anywhere, UiPath, Pegasystems, and WorkFusion.

TCS has 2k personnel working on RPA projects, focusing on F&A, HR, SCM, and ERP.

The company estimates that 25% of an RPA effort is related to testing services. TCS is working on:

- Testing RPA software
- Testing bots.

### AI and testing

TCS Launched its Smart QE IP in 2018, with the intent of driving automation and bringing AI capabilities to continuous testing. Smart QE has several AI use cases, for automating testing:

- Dynamic root cause analysis of defects, incidents and log correlation
- Code path analyzer, for determining the impact of code changes on test cases. The tool initially generates a knowledge base across code components at the server (e.g., classes, methods, and LoCs) and UI (e.g., HTML) levels, and links these components with test cases. It will, for new releases, assess the impact of new code on its repository and, as a result, on the corresponding test cases
- Smart QE maps, which assesses the maturity of an application and maps the elements for providing analytics
- QE-bots, with the intent of automating certain tasks. Initially, TCS has automated the provisioning of test environments through a chatbot.

Along with its investment in AI use cases, TCS continues to enhance the functionality of Smart QE Platform; e.g. static code analysis, continuous deployment, dashboards, and a self-service portal. These enhancements and new functionality are incremental. Examples include the impact of code change in testing data format and requirements and monitoring the availability of test environments.



## Financials

NelsonHall estimates that TCS had software testing service revenues of \$2bn in CY 2018, and that TCS' next-gen testing service revenues in 2018 were ~\$450m.

## Strengths

- *Scale*: TCS is a top two testing service vendor by headcount and revenues. It has the budget and willingness to invest in its services portfolio, IP, and commercial activity, and it has demonstrated in the past it would do it
- *Mobile testing*: the offering is comprehensive and backed by many IP
- *UX testing*: the offering is comprehensive and ahead of the competition, backed by its CX Assurance Platform
- *AI use cases*: TCS has developed several AI use cases and is the first firm to have combined it with its continuous testing platform, as part of Smart QE.

## Challenges

- *Cognitive system testing*: TCS is currently expanding its testing capabilities around AI and RPA
- *Onshore presence*: TCS has not grown its onshore testing presence significantly, and NelsonHall does not expect it to. With the continued adoption of digital and agile, TCS will need to adjust its ratio of offshore to onshore career testers.

## Strategic Direction

With QET now focusing on driving non-linear growth, it is looking to create more IPs that it will sell under a license and/or subscription fee.

As part of its non-linear growth strategy, QET continues to enhance its key IP and has a functional roadmap for them. An example of future functionality is for TCS Digital Video Assurance platform, expanding the testing capabilities from video only to audio, chatbots, and voicebots.

Another area where TCS will invest is for CXAP: QET wants to add functional testing to the UX capabilities of the platform, focusing on regression testing.

Another important element of the strategy of TCS is also to sell bundled testing services with build work. The company highlights that recent digital or next-gen projects such as RPA, AI, or blockchain systematically involve development and testing.

Outside of QET, TCS is looking to expand its Digital Reimagination Center in Europe, initially in the U.K. and Northern Europe.



## Outlook

Looking ahead, expect to see TCS:

- Continuing its investment in AI and ML technologies around data analytics for testing, and creating new use cases
- Training and re-skilling, which is the number one priority.

# Next-Generation Software Testing Services

## Market Summary

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### Overview

The software testing services industry is quickly shifting its services capabilities and portfolio to the context of digital and agile/DevOps. Overall, most vendors have created their continuous testing platforms, which are enhanced reference architectures and clients are currently deploying these.

Vendors are turning massively towards AI, with the intent of using mostly NLP and ML technologies to automate testing services. The range of AI use cases is gradually expanding from analytics-based services to scriptless test automation, using web crawler technology.

Vendors have prioritized AI use cases over other offerings. UX testing has high automation potential. Other priorities will need to include testing of RPA software, of AI systems and also implement RPA to automate testing.

### Buy-Side Dynamics

The three major software testing services buyer segments are:

- “Efficiency organizations”: clients of managed testing services are mostly IT departments and continue to be a large testing service segment. Efficiency organizations are currently working on making their TCoEs relevant to digital. They are deploying automation through continuous testing approaches, AI and other cognitive technologies
- “Digital transformation-focused organizations” are business divisions rather than IT departments. They focus on their (mostly) external digital projects and want to ensure the success of their project rollout through testing. Their challenge is to adopt the best practices of “digital natives,” e.g., frequent releases and agile development, focus on UX
- “Digital natives”: are organizations whose technology is a core part of their activity (e.g., travel booking sites). They need high quality as thousands or millions of end-users use their services/products. They are continuous testing-centric.

Key selection criteria for selecting a software testing services vendor are somewhat different for each client segment:

- “Efficiency organizations” consider a large presence in India as a given and now look for:
  - Structured capabilities around DevOps to serve digital and agile projects
  - The ability to expand their automation capabilities outside of test execution to continuous testing, and experiment AI use cases
  - Along with this automation effort, clients also want help in reskilling their manual testers towards technical skills
- “Digital transformation-focused organizations” want their vendors to combine the flexibility and specialized capabilities of digital agencies while bringing their ability to bring automation, repeatability, and scale. Vendors need to demonstrate:



- A broad and deep next-gen testing portfolio, with investment in accelerators and platforms to support the automation
- Digital consulting capabilities combined with industry knowledge, including a focus on UX
- Finally, “digital natives” have been engaged in digital for years and need to continue to develop their digital leadership over competitors while benefiting from low-cost delivery that will help them reach profitability in the mid-term. Such clients need a partner working in the long-run, not a one-off provider.

## Market Size & Growth

The software testing services market is a maturing market, expected to grow by 5.6% over the 2018-2023 period, growing from \$23.0bn to \$30.0bn.

STS spending growth is still solid, growing one and a half time faster than IT services. However, it had slowed down very significantly from 12% growth ten years ago. The reasons include the reduction in manual testing, the impact of economic condition deteriorations, and the decline in large managed testing services contracts.

STS spending has shifted from managed testing services to project services. Since 2015, the number of new large-scale managed testing service contracts has decreased, and related spending is decelerating. NelsonHall expects this trend to continue, with clients looking to continue to decrease the cost of their managed testing contracts and reallocating services towards project services around automation, continuous testing and reskilling of their testing workforce.

Along with shift towards project services, spending is shifting from functional testing towards specialized testing services. Clients are investing in automating their functional testing activities and moving away from manual testing. NelsonHall is, therefore, expecting functional testing to remain flat, with initial automation investment resulting in less manual activities.

Spending on specialized testing services is driven by:

- Next-gen functional spending (+13%)
- Non-functional: driven by security and user-based performance testing (+11%)
- Test support services: +8%.

Next-gen testing accounts for 24% of software testing services spending. It is the fastest-growth offering with a 12.8% CAGR for the 2018-2023. Growth is driven by mobile testing, which still accounts for ~75% of all next-gen testing spending.



## Outlook

Over the next few years, the main challenges of the software testing service industry are:

- Converging mobile and UX testing offerings, and invest into IP and platform to increase the level of automation in UX testing, and expand to content testing and email campaign testing
- Continuing investing in AI use cases for further automating testing services, beyond test automation
- Including RPA in their its testing considerations for both automating testing of workflows and bots, and using RPA software for automating testing
- Reorganizing their client's TCoEs. A major issue will be reskilling of manual testers, towards becoming testing software specialists. This transition of skills will have divergent success among testing personnel. At this point, it is not clear whether testing service vendors will be able to effectively retrain manual testers or will have to turn to lay-offs
- Also, TCoEs in the long-term will need to provide an increasingly share of specialized testing services, not only around next-gen testing, but also around test support services (test environment, test data, service virtualization) and non-functional.



## NEAT Methodology for Next-Generation Software Testing Services

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NelsonHall's (vendor) Evaluation & Assessment Tool (NEAT) is a method by which strategic sourcing managers can evaluate outsourcing vendors and is part of NelsonHall's *Speed-to-Source* initiative. The NEAT tool sits at the front-end of the vendor screening process and consists of a two-axis model: assessing vendors against their 'ability to deliver immediate benefit' to buy-side organizations and their 'ability to meet client future requirements'. The latter axis is a pragmatic assessment of the vendor's ability to take clients on an innovation journey over the lifetime of their next contract.

The 'ability to deliver immediate benefit' assessment is based on the criteria shown in Exhibit 1, typically reflecting the current maturity of the vendor's offerings, delivery capability, benefits achievement on behalf of clients, and customer presence.

The 'ability to meet client future requirements' assessment is based on the criteria shown in Exhibit 2, and provides a measure of the extent to which the supplier is well-positioned to support the customer journey over the life of a contract. This includes criteria such as the level of partnership established with clients, the mechanisms in place to drive innovation, the level of investment in the service, and the financial stability of the vendor.

The vendors covered in NelsonHall NEAT projects are typically the leaders in their fields. However, within this context, the categorization of vendors within NelsonHall NEAT projects is as follows:

- **Leaders:** vendors that exhibit both a high ability relative to their peers to deliver immediate benefit and a high capability relative to their peers to meet client future requirements
- **High Achievers:** vendors that exhibit a high ability relative to their peers to deliver immediate benefit but have scope to enhance their ability to meet client future requirements
- **Innovators:** vendors that exhibit a high capability relative to their peers to meet client future requirements but have scope to enhance their ability to deliver immediate benefit
- **Major Players:** other significant vendors for this service type.

The scoring of the vendors is based on a combination of analyst assessment, principally around measurements of the ability to deliver immediate benefit; and feedback from interviewing of vendor clients, principally in support of measurements of levels of partnership and ability to meet future client requirements.



*Exhibit 1*

**'Ability to deliver immediate benefit': Assessment criteria**

Assessment Category	Assessment Criteria
Offerings	<ul style="list-style-type: none"> <li>Mobile testing - access to labs</li> <li>Mobile testing - framework</li> <li>UX testing - accessibility</li> <li>UX testing - end-user performance testing</li> <li>UX testing - research</li> <li>UX testing- content</li> <li>AI - analytics</li> <li>AI - automation</li> <li>RPA - offering</li> <li>RPA - use cases</li> <li>Testing cognitive</li> </ul>
Delivery	<ul style="list-style-type: none"> <li>Indian delivery capability</li> <li>North America onshore capability</li> <li>U.K. onshore capability</li> <li>Continental European onshore capability</li> <li>Indian leverage</li> </ul>
Presence	<ul style="list-style-type: none"> <li>Globally</li> <li>North America</li> <li>U.K.</li> <li>Continental Europe</li> <li>RoW</li> </ul>
Benefits Achieved	<ul style="list-style-type: none"> <li>Level of cost savings achieved</li> <li>Increased application quality/reduced production downtimes</li> <li>Increased speed to market for digital initiatives</li> <li>Increased end-user/business satisfaction</li> <li>Other benefits achieved</li> <li>Pricing approach</li> </ul>



## Exhibit 2

### 'Ability to meet client future requirements': Assessment criteria

Assessment Category	Assessment Criteria
Investment	<ul style="list-style-type: none"> <li>In mobile testing</li> <li>In usability testing</li> <li>In accessibility testing</li> <li>In end-user performance testing</li> <li>In AI use cases</li> <li>In RPA use cases</li> <li>In cognitive testing</li> </ul>
Market Momentum	Next-gen testing market momentum
Ability to Deliver Improved Outcomes	<ul style="list-style-type: none"> <li>Mechanisms in place to deliver client innovation</li> <li>Extent to which client perceives that innovation has been delivered</li> <li>Suitability of vendor to meet future needs of clients</li> <li>Perception of suitability to meet future needs around mobile testing</li> <li>Perception of suitability to meet future needs around UX testing</li> </ul>
Financial Security	Financial rating

For more information on other NelsonHall NEAT evaluations, please contact the NelsonHall relationship manager listed below.



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