NEAT EVALUATION FOR CAPGEMINI:

Digital Testing

Market Segment: Overall

Introduction

This is a custom report for Capgemini presenting the findings of the 2017 NelsonHall NEAT vendor evaluation for *Digital Testing* in the *Overall* market segment. It contains the NEAT graph of vendor performance, a summary vendor analysis of Capgemini in digital testing, and the latest market analysis summary for digital testing.

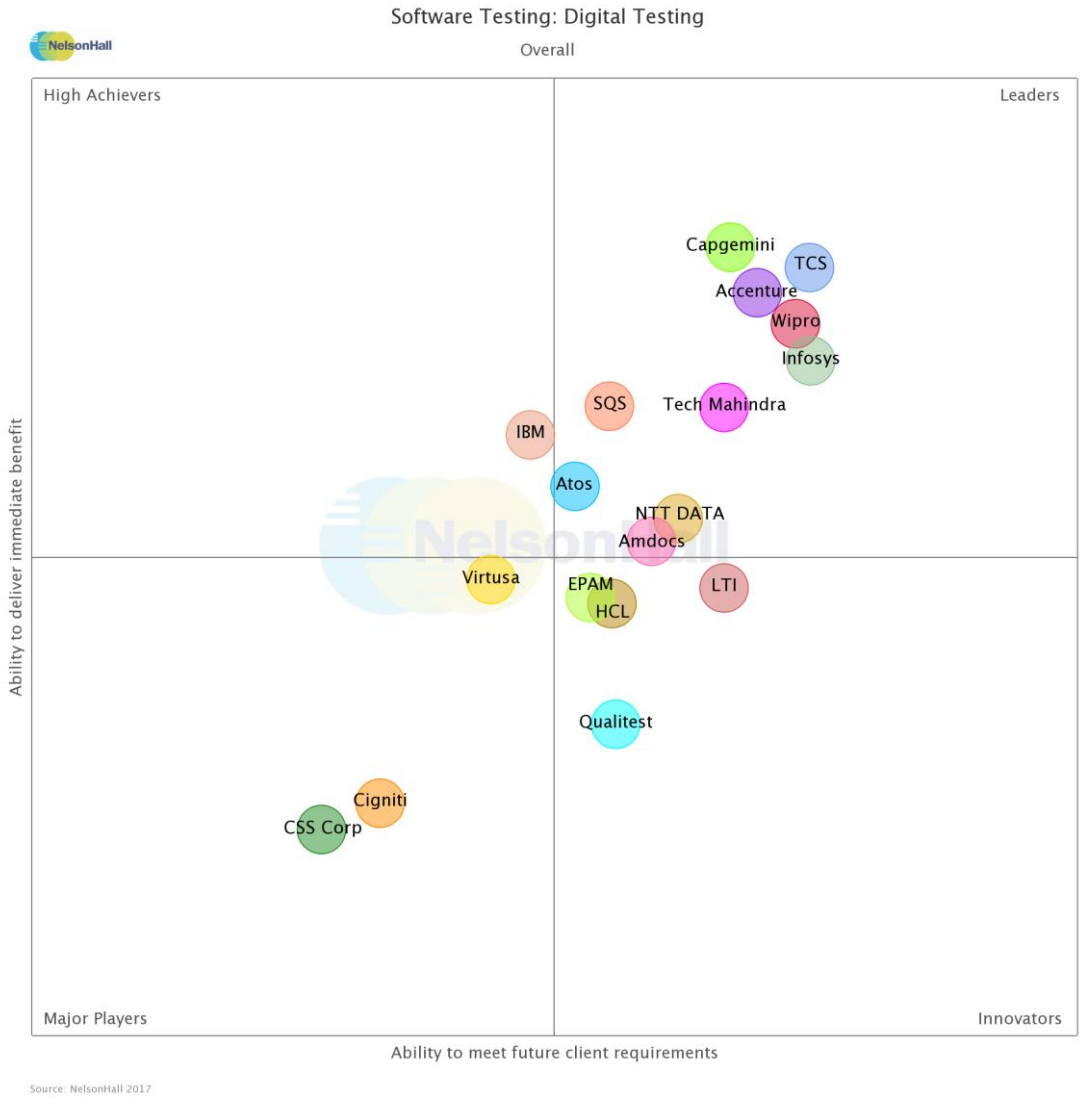
This NelsonHall Vendor Evaluation & Assessment Tool (NEAT) analyzes the performance of vendors offering digital software testing services. The NEAT tool allows strategic sourcing managers to assess the capability of vendors across a range of criteria and business situations and identify the best performing vendors overall, and with a specific focus on digital capability and DevOps & Agile capability.

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

Vendors evaluated for this NEAT are Accenture, Amdocs, Atos, Capgemini, Cigniti, CSS Corp, EPAM Systems, HCL Technologies, IBM, Infosys, LTI, NTT DATA, Qualitest, SQS, TCS, Tech Mahindra, Virtusa, and Wipro.

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

NEAT Evaluation: Digital Testing (Overall)



NelsonHall has identified Capgemini as a Leader in the *Overall* market segment, as shown in the NEAT graph.

The Overall market segment reflects Capgemini's overall ability to meet future client requirements as well as delivering immediate benefits to digital testing 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 Digital Testing NEAT tool here.

Vendor Analysis Summary for Capgemini

Overview

Until 2016, Capgemini operated in the software testing space through its Global Service Line structure, which grouped and coordinated activities between several Capgemini strategic business units (Application Services One and Application Services Two, Financial Services, and Sogeti). Under the new structure, Capgemini has moved away from a relatively centrally managed service line to a more SBU-centric approach. With this approach, it acknowledges that organizational demand for large managed testing services contracts has lessened recently, and has shifted to smaller, digital-centric contracts that require more onshore reactivity to respond to bids and other market opportunities. Capgemini also expects SBUs to be in a better position to conduct personnel reskilling locally, than a more centralized structure would have been.

Nevertheless, Capgemini wants to maintain a high level of coordination across its different software testing units, and in 2016 created its Unified Technology Office (UTO). UTO is a center of expertise which has responsibility for:

- TCoEs: both vertical ones (telecom, media and entertainment, financial services, energy and utilities, public sector, automotive, healthcare and life sciences, and high-tech) and technology ones (process, automation, performance engineering, specialized services, digital, and agile/DevOps)
- Accelerator and platform creation
- Co-leadership on personnel reskilling with SBUs
- Marketing
- Partnership relationships.

UTO is an important element of Capgemini's testing activities. It has ~200 dedicated personnel, and a budget which is 2% to 2.5% of Capgemini's testing revenues (~€25m).

Capgemini's testing activities involve ~19.5k career testers (this does not include 14.5k application engineers with testing capabilities). It has 500 testing clients including ~75 managed testing services clients.

Capgemini has several strategic priorities for testing:

- It is shifting its portfolio towards digital testing, agile, and DevOps, but also non-functional testing and other capabilities (e.g. API testing), and other specialized testing services (e.g. test support services such as service virtualization)
- It is further investing in IP, expanding its focus from accelerators to platforms. Capgemini unveiled its SmartQA platform in 2016 and is currently working on its next gen Quality Business Innovation Testing (QUBIT) platform
- It is reskilling its manual testers and driving their specialization towards more automation skills, technical services, and development skills. Development and software developers in testing (SDETs) is now a top priority for Capgemini; it only hires testers with a development background/skills.

Capgemini has been active in mobile testing, providing testing services primarily around mobile applications (and to a lesser extent around mobile devices). It has 400 mobile testing personnel, including 200 in India.

In the past 18 months, Capgemini has worked on developing its UX testing service portfolio, using COTS, open source software, and its own platform (DigiAssure).

UX testing services include:

- Accessibility testing (see Accessibility Testing sub-section)
- Sentiment analysis: mostly using DigiAssure
- Crowdtesting: through a partnership with passbrains for UX testing, functional testing, localization testing, volume testing, resilience testing, BI testing, and performance testing. Capgemini also works with Applause (and also relies internally on its community of career testers). Note that NelsonHall has published crowdtesting profiles of both Applause and passbrains.

In addition, in a different unit, Capgemini provides "visual testing" such as wireframe testing, using Adobe software products for both visual testing and content management.

DigiAssure

In 2017, Capgemini launched DigiAssure, its main UX testing platform. DigiAssure is UX-focused but also includes elements of DevOps (CI/CD) and mobile testing (for getting access to mobile labs, and for executing manual and scripted testing).

Features of DigiAssure include:

- User experience analytics, with data taken from production logs. The intention is to take an end-user view of production data (e.g. number of daily users, crashed sessions, and analytics including versions of the mobile app, the OS, device). This user experience feature links back to the omni-channel testing module, with the intention of letting testers re-test specific device/OS/browser combinations that were reported by production data
- Sentiment analysis: DigiAssure takes data from scores and comments available in app stores and identifies categories (i.e. keywords such as "crash", "network", "response", "deals", "great", and more testing-specific words) based on NLP technology. It also identifies a sentiment (positive, neutral, and negative) across time, with the intention of correlating end-user sentiment with application releases. Looking ahead, DigiAssure wants to conduct root cause analysis based on sentiment analysis results, drive a shift-left approach by feedbacking to developers, and compute sentiment analysis (positive, neutral, and negative)
- Social media sentiment: this module mirrors the sentiment analysis of app stores described in the above bullet point, for social networks (i.e. Facebook and Twitter). It also helps to identify how client organizations are using social media in responding to customers/end-users. The roadmap includes using the same sentiment analysis with ITSM tools from ServiceNow, HPE, and BMC Remedy
- User feedback testing: i.e. online surveys, based on an internal crowdtesting approach (for services including A/B and multivariate testing, and heatmaps) involving Capgemini personnel. Capgemini has had two clients for this offering: a North American insurance company for its auto insurance product, and a North American retail client. The roadmap includes integration with the crowdtesting systems of Applause and passbrains
- Accessibility testing: based on the integration of software tools described in the Accessibility Testing sub-section
- Reporting with an end-user visualization dashboard.

A key priority in the roadmap for DigiAssure is integration with crowdtesting vendors' platforms, expanding crowdtesting services to campaign management. Another key priority for DigiAssure lies around further developing AI and ML use cases, notably around production logs, crash reports, and release history; and identifying which relevant test cases should be used for the forthcoming release. Capgemini also wants to develop DigiAssure around connected devices and sensor data analysis.

Through its global service line DCX, Capgemini provides marketing content management. Services provided include:

- Marketing content management, including content verification, content placement across devices, flows and user scenarios
- A/B and split testing.

Financials

Across its testing units, Capgemini had revenues of ~$1.2bn in 2016, up 5%. This number relates specifically to Capgemini's 18k career testers and does not include developers with testing skills. NelsonHall estimates that the revenues from testing activities which are bundled within larger ADM contracts are in the range of ~€0.5bn-€0.8bn.

NelsonHall estimates that digital testing accounted for $240m in revenues in CY 2016. This number does not include revenues from agile testing.

At a group level, Capgemini has announced that digital and cloud accounted for ~30% of revenues.

Strengths

- Capgemini has comprehensive offerings in both digital and Agile/DevOps and is complementing these with its historical consulting capabilities, backed up by methodologies and best practices. It is also highly visible through its TMap series of books (with its last two books covering IoT and Cloud) and World Quality reports
- Capgemini has expanded its proprietary automation focus from standalone accelerators (of which it has more than 100) to platforms; with three platforms, one on DevOps, one covering the SDLC and integrating a wealth of technology components, and one on digital. The pipeline of its platforms is also promising, with WiseQA around ML and AI, and Qubit, with first launches in Q2 2017. We think that Capgemini has caught up with tier one vendors in digital and DevOps
- The company has scale in testing both offshore and onshore. With the fast adoption of digital and agile, it has the opportunity to turn its onshore presence into an additional asset and to provide local delivery, while maintaining client intimacy.

Challenges

- Capgemini's new testing organization may prove a distraction, by turning its focus to internal priorities, rather than capturing buy-side demand for shorter and discretionary projects. Also, time will tell whether this decentralized approach is a source of effectiveness in responding to client needs, or a source of inefficiencies and duplicate efforts
- Growing its headcount towards digital. In the past two years, Capgemini has suffered from CC/CS revenue growth similar to its market spending growth. Given its size and reach, and its wealth of offerings, it should be able to beat the market, mainly thanks to its exposure to digital, agile, DevOps and other specialized services
- Further coordination with other Capgemini units. Capgemini has a wealth of business lines, mostly virtual ones crossing over many Capgemini units. These include insights and data, DXC, cloud, and SaaS applications. It therefore has many cross-selling opportunities. Its challenge will be around coordination and building consistent offerings.

Strategic Direction

Capgemini continues to target large managed testing services contracts. It does expect, however, these contracts to contribute less to its revenue growth than in the past. It continues to shift its attention to smaller discretionary projects and aligning its portfolio towards performance, security, mobile, UX testing, and Agile/DevOps.

Along with Agile and DevOps, Capgemini will continue investing in its SmartQA, targeting contracts for areas which the client organization is finding difficult, for accessing test environments, and for test data. Capgemini will therefore continue to invest in service virtualization, test environment, and test data management.

Capgemini is also working on its QUBIT platform, to be released in 2020, with several functionalities released in late H2 2017. Qubit is meant to include vertical and horizontal knowledge and capabilities.

AI and ML are also on the agenda. Capgemini has its WiseQA accelerator which provides an analysis of past and live data collected from agile projects/builds and from sources including defect management systems, production logs, project management systems, and from communication information such as emails and chats. WiseQA has several use cases including increasing test coverage through requirement and test case mapping. It is based on IBM SPSS and is experimenting with IBM Watson; Capgemini has several PoCs using different technologies. WiseQA is based on using Watson, and should be released in late H2 2017.

As part of this strategy, a key execution element will be the reskilling of its testing workforce, both onshore and offshore. Capgemini will maintain its focus on offshore hiring.

A key element of Capgemini's digital testing strategy is around IoT and connected devices. Capgemini believes it has comprehensive ER&D capabilities thanks to its capabilities in automotive, energy and utilities, and medical devices. A priority for Capgemini is therefore to strengthen its ER&D testing capabilities. It is also counting on its relationship with GE (brought through the acquisition of IGATE). Areas of investment include service virtualization for device testing.

Outlook

NelsonHall continues to think that Capgemini's testing future looks promising, with a wealth of platforms and ongoing investment in additional platforms. In addition, Capgemini's continued push towards digital is clearly consistent with the direction that its testing activities are taking. Market conditions remain favorable onshore, even in the Netherlands and France, where it has suffered in the past.

Digital Testing Market Summary

Buy-Side Dynamics

There are four major buyer types (or segments), which are:

- "Efficiency organizations": have focused for ten years on costs savings and test automation (through the creation of TCoEs). They are now looking at how they can reskill and transform their TCoEs towards adopting digital and agile, while keeping offshore- and automation-centricity
- "Transformation-focused organizations": focus on internal IT projects and want to ensure the success of their application rollout through testing
- "Revenue seekers": are launching new services that require investment in websites or mobile apps. They want to adopt best practices of "digital natives", e.g. frequent releases, and therefore need to adopt agile, DevOps, and digital testing
- "Digital natives": are organizations whose technology is a core part of their activity (e.g. travel booking sites). They need high quality as their services/products are used by thousands or millions of end-users. They are continuous testing-centric.

Of the four buyer types, "efficiency organizations" have retained the most interest from vendors, largely because they purchased large managed testing contracts, focusing on process improvement, roll out of automation, and offshoring. The market for new-scope managed testing services is gradually turning into a renewal market and clients are reconsidering their managed testing spending, aiming to reduce costs through further automation. Client organizations are also reconsidering the scope and organization of their TCoE in the context of agile and DevOps.

Outside of "efficiency organizations", the three other client segments ("transformation-focused organizations", "revenue seekers", and "digital natives") mostly purchase testing services through project engagements. "Transformation-focused organizations" focus on their internal IT projects. Their spending growth is heavily influenced by macro-economic conditions and varies in the 4% to 5% range currently. "Revenue seekers" and "digital natives" are investing in strategic digital projects and are therefore spending much more money and will continue to do so, at least for the next five years.

Market Size & Growth

The software testing services market is a maturing market, expected to grow by 6.5% over the 2016-2021 period, from $20.4bn to $27.9bn.

The software testing services market is going through an important change in dynamics. Spending has been growing in the double-digits in the last few years, despite the sub-prime and the resulting sovereign debt crises. Managed testing services have led this growth during the period. This trend is now probably over; demand for managed testing services is now growing mildly and price pressure has increased.

The organization of the TCoEs needs to adapt to the digital world. This adaptation to agile requires a shift in the skills of manual testers, the development of scriptless or testing object based frameworks, and the deployment of automation software tools around DevOps.

In terms of service line, spending is shifting: in 2016 the share of functional testing represented 62% of software testing spending, and will decrease to 52% by 2021.

Spending in specialized testing services (i.e. non-functional, digital, and test support services) will grow to 48% of total spending. Within specialized testing services, digital testing is the fastest growing (+15% annually during the 2016-2021 period). Non-functional (performance and security) will be up 11%, and test support services up 9% annually.

Demand for digital testing services is structured around three sub-segments: mobility testing, UX testing, and other digital testing. Growth is fastest in UX testing currently, thanks to accessibility and usability testing. In the next few years, NelsonHall is expecting sustained growth in usability testing.

Vendor Selection Criteria

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

- "Efficiency organizations" consider a large presence in India as a given and now look for automation capabilities, not just from the professional services skills (to configure and deploy testing COTS), but also for structured offerings (e.g. test support services such as test data management and test environment provisioning) and platforms (integrating accelerators with COTS and open source software). Increasingly, they are asking their software testing vendors to provide a roadmap for transitioning their TCoEs towards specialized testing services, reorganizing to agile development and testing projects, and adopting DevOps/continuous testing automation
- "Transformation-focused organizations" want to succeed in their internal IT application rollout and do not benefit from lengthy managed testing services to fund automation. They therefore require vendors that come with reusable assets for automation purposes (especially around DevOps, for agile projects), personnel ramp-up capabilities, and domain and application knowledge across career testers
- "Revenues seekers", like "transformation-focused organizations", look for capabilities such as consulting expertise and understanding of new business models, and the ability to attract millennials across career testers, to help them drive the transformation of their business model and execute on it. They are eager to have the onshore expertise combined with the low-cost delivery that will help them match limited budgets such as mobile app testing and UX testing
- Finally, "digital natives" have been engaged in digital for years and need to continue to develop their digital leadership over competitors, while benefitting from low-cost delivery that will help them reach profitability in the mid-term. Such clients need a partner working for the long-run, not a one-off provider.

Outlook

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

- Continuing to invest in service portfolios and in creating IPs and technological accelerators. Most testing service vendors have created (or are creating) platforms on the DevOps/continuous testing side, or at least have reference architectures. These DevOps testing platforms for automating agile projects are now a must. In future it will be necessary to create platforms for digital testing, and in particular for UX testing. Usability testing, within UX testing, will be the industry's next automation challenge. Another high priority for testing services vendors is to create use cases for applying different AI technologies
- Reorganizing their clients' TCoEs. A major issue will be reskilling manual testers towards becoming testing software specialists. This transition of skills will have varying 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
- TCoEs in the long-term will need to provide an increasing share of specialized testing services, not only around digital testing, but also around test support services (test environment, test data, service virtualization) and non-functional testing.

NEAT Methodology for Digital Testing

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	Mobile testing UX testing DevOps testing
Delivery	Indian delivery capability U.S. onshore capability U.K. onshore capability Continental European onshore capability RoW onshore capability Ability to automate mobile & UX testing Ability to automate agile & DevOps - Ability to share personnel across clients for functional testing
Presence	Global presence In N. America In U.K. In Continental Europe In RoW
Benefits Achieved	Level of cost savings achieved Increased application quality/reduced production downtimes Increased speed-to-market for digital initiatives Increased end-user/business satisfaction

Exhibit 2

'Ability to meet client future requirements': Assessment criteria

Assessment Category	Assessment Criteria
Digital, Agile & DevOps Testing Investment	Current & planned level of investment in IP & platforms in support of digital testing Current & planned level of investment in IP & platforms in support of agile & DevOps testing Investment in collaboration tools & techniques in support of distributed agile testing Employee training investment in support of digital, DevOps & agile testing Investment in AI & ML around DevOps platforms
Digital, DevOps & Agile Services Market Momentum	Market momentum
Ability to Deliver Improved Outcomes	Mechanisms in place to deliver client innovation Client perception of innovation delivery Suitability to meet future client needs Perception of integration of digital testing operations with digital application agile development Perception of suitability for digital testing of AI & ML
Financial Security	Financial rating

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