ISG Provider Lens™

Next-Gen Application Development & Maintenance (ADM) Services

Global 2019

Quadrant Report

A research report comparing provider strengths, challenges and competitive differentiators

Customized report courtesy of:

Mindtree

August 2018
About this Report

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The research and analysis presented in this report includes findings from the ISG Provider Lens™ program and ongoing ISG Research programs, interviews with ISG advisors, briefings with services providers and analysis of publicly available market information from multiple sources. The data collected for this report represents information that was current as of March 2018. ISG recognizes that many mergers and acquisitions have taken place since that time, but those changes are not reflected in this report.

All revenue references are in U.S. dollars ($US) unless noted.

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EXECUTIVE SUMMARY

The global next-gen ADM market is following two different growth trajectories for the application development and application maintenance segments. Next-gen application development has branched out into areas such as analytics, IoT, cloud native architectures, SaaS-based offerings, security, customer experience (CX) and user experience (UX), mobile apps and others. Most next-gen development activities are focusing on solving business problems, improving profits or revenue, or enhancing brand value, rather than acting as a support mechanism for running IT operations. Concurrently, next-gen maintenance activities are focusing on finding different avenues to achieve cost savings by using technologies like intelligent automation. Such efforts can eventually reduce the cost of maintenance activities by 20 to 30 percent, thereby allowing enterprises to reinvest in development activities.

Next-Gen ADM

- **Digital labor is making the existing workforce more productive:** Digital labor goes far beyond the realms of bot-based automation to include diagnostic, predictive and remediating capabilities using intelligence acquired over time to solve non-linear problems. Digital labor is enabling the current ADM workforce to focus on higher-value work. For example: While working on a data analytics project, the analyst can now spend more time analyzing data, rather than checking the data authenticity, quality and applicability.

- **Demand for hybrid cloud environments is higher:** Enterprises are increasingly creating cloud-native applications that can be moved directly to the public cloud. However, owing to security and regulatory reasons, a pool of applications still resides in the dedicated private cloud. Hence, enterprises are seeking providers that can accomplish migration and maintenance across cloud environments.

- **Business-based metrics are used more often to measure results:** To divert budgets towards digital transformation, enterprises are looking for methods to quantify the next-gen services and their direct impact on business. Commercial contracting structures and preferences are shifting from traditional input-based transactional models to ones that are built on business-based metrics.

Agile Development

- **DevSecOps is becoming the new normal:** DevSecOps has replaced DevOps across the board. Enterprises and providers alike are realizing that security cannot be an afterthought. Thus, during early DevOps implementation phases, security principles are being incorporated as a default feature.

- **Rapid application development is on the rise:** As enterprises transform by becoming agile, there is a growing necessity for tight integration among their business, engineering and operations organizations. These organizations are required to
maintain rapid development cycles to quickly add features to existing offerings and release new ones in the market. Such enterprises are preferring to partner with service providers that can offer a globally distributed agile organization that balances the cost dynamics with the need for speed.

- **Full-stack developers are preferred for application development**: More and more, providers are preferring full-stack developers for application development to avoid unnecessary coordination cycles. Having a single resource provides a 360-degree view of the environment to speed the entire development cycle. A full-stack developer is a developer that has knowledge and expertise to work from back-end through front-end application components.

### Continuous Testing

- **Companies want to test automation as-a-service**: Test automation-as-a-service is being advocated as a differentiator to win testing contracts with dominant digital scope. Enterprises are engaging with service providers to build test automation centers of excellence and initially manage them.

- **Domain and vertical integration is necessary**: A wide range of testing services are being mapped with industry-specific tools, reusable scripts and accelerators. The services being mapped include test consulting, application testing, application security testing, enterprise solution testing and IoT testing. Moreover, service providers are creating specialized vertical solutions for testing clients.

### Next-Gen ADM – BFSI

- **Blockchain technology is finding more use cases in the financial industry**: Interbank use cases are still rare; however, banks are making use of the technology to simplify their existing systems and removing process bottlenecks. Blockchain is enabling faster and cheaper settlements and is shaving a significant portion of the transaction cost, while improving transparency.

- **Customer intelligence is becoming the predictor of growth**: Advances in data analytics are helping financial institutions to meet and anticipate customer needs. AI is becoming a reality for running various banking functions, including marketing and sales, wealth management and compliance.
Public cloud is becoming the default services model: Non-core functions like CRM, HR and F&A already are being delivered through a cloud-based SaaS model. Gradually, as the CXO organization becomes more comfortable, core functions such as payments, billing and credit scoring are being moved to the public cloud.

A design-thinking approach is key to delivery: A customer-first design is enabling application delivery. As banking consumers are becoming more tech-enabled, e-banking is becoming the primary channel to onboard, serve and retain them. Hence, each service, from account onboarding to loan disbursal, is being designed to decrease customer effort and enhance experience.

Next-Gen ADM – Healthcare & Life Sciences

Data-driven initiatives are coming of age: Healthcare and life sciences (HCLS) clients are adopting an analytics-driven approach to transformation projects to harness data and generate insights, thereby becoming more customer-centric and optimizing the entire value chain. The sector is also stepping into newer technology areas, like industrial machine learning (IML), which uses big data to improve healthcare standards. Such applications could lead to better clinical decisions, lower readmission rates and fewer adverse events.

Cloud adoption is accelerating: Cloud resources are addressing process inefficiencies, enabling end-to-end visibility and streamlining commercial operations for various life sciences companies. In the payer and provider segments, cloud adoption is boosting connectedness and information accessibility among practitioners, payers and patients.

Maintenance savings are funding change initiatives: HCLS organizational IT budgets have remained flat for several years. So, there has been more emphasis placed on reducing discretionary spend for maintenance services by using automation levers, then using the savings to fund business intelligence, cloud migration, data warehousing and platform development engagements.

Next-Gen ADM – Manufacturing

IoT is driving efficiencies: The scaled adoption of IoT is enabling predictive maintenance, self-optimizing production and automated inventory management, resulting in lower maintenance, maximized equipment life and uninterrupted production cycles. Although the IoT has far-fetched applications benefits, most use cases still pivot around value chain optimization.
- **The concept of smart factories is transforming the production process:** IIoT and smart factories are not just making the shop floor more agile and efficient, they are also leading to higher process compliance and better-quality management.

- **Omni-chain is disrupting supply chains:** Although in its infancy, there are instances where manufacturers are using a blockchain-based “omni-chain” model to connect different processes in the ecosystem. Omni-chain is a cloud model that unifies both internal and external processes across extended networks.

- **There is a rapid increase in enterprise cloud and mobility engagements:** Manufacturers are looking to leverage cloud and mobility to form a connected ecosystem of suppliers, manufacturers, customers and partners.
**Introduction**

Service providers are augmenting their traditional ADM offerings with emerging technologies and collaborative frameworks to meet their enterprise clients' objectives. ISG terms such contract types as next-gen ADM contracts. This study tries to understand the client objectives and assesses provider capabilities to deliver on next-gen ADM contracts.

**Definition**

Service providers are augmenting their traditional ADM offerings with emerging technologies and collaborative frameworks to meet their enterprise clients' objectives. ISG terms such contract types as next-gen ADM contracts. This study tries to understand the client objectives and assesses provider capabilities to deliver on next-gen ADM contracts.
Definition (cont.)

Scope of the Report

The following areas associated with next-gen ADM are included within this study:

Next-Gen ADM

Like traditional application services, next-gen ADM includes consulting, design, custom development, packaged software integration, operations and testing. However, the scope, delivery mechanism and outcome for such contracts pivot around a value-based approach where the focus is on achieving enterprise agility and solving business problems.

This quadrant assesses vendors based on their capability to augment traditional ADM services with emerging technologies and methodologies, like agile, DevOps, automation, digital and modernization techniques to deliver application outsourcing projects. It also assesses provider capabilities in incorporating new approaches to develop and deliver applications that focus on business outcomes.

Agile Development

Agile development focuses on an incremental and iterative approach to application development. Because agile encompasses frequent and early releases of the working software, it is being viewed by enterprise as a medium for attaining enterprise agility.

This quadrant assesses capabilities of a provider to deliver tangible results through use of various agile methodologies. It looks at the focus each provider has towards use of agile development with respect to its overall application development practice.

Continuous Testing

Continuous testing focuses on delivering quality assurance at speed. In terms of technology, it encompasses various aspects of automated testing such as shift-left, end-to-end automation across testing phases. However, in terms of people and processes, it goes a step beyond automation testing to accomplish higher collaboration among QA and development teams.
Definition (cont.)

to sync with sprint cycles, feature-driven testing, responsiveness to change, creating a feedback loop and promoting greater client involvement. Continuous testing is gaining momentum, especially to help enterprises keep pace with their agile and DevOps initiatives.

Service providers for this quadrant are assessed on their progress made and capabilities developed for creating a continuous testing environment with measurable outcomes for their clients.

Next-Gen ADM – HCLS

This quadrant assesses the strength of providers that provide next-gen ADM services to HCLS industry vertical, including healthcare institutions, payers, pharmaceutical, biotech and medical device companies.

Next-Gen ADM – Manufacturing

This quadrant assesses the strength of providers that provide next-gen ADM services to the manufacturing industry vertical, which includes conglomerates, capital goods, construction, consumer durables (like automotive, household appliances), aerospace and defense, materials, semiconductor, technology hardware and equipment companies.

Next-Gen ADM – BFSI

This quadrant assesses the strength of providers that provide next-gen ADM services to BFSI industry vertical, which is comprised of banking, diversified financial and insurance companies.
Provider Classifications

The ISG Provider Lens™ quadrants were created using an evaluation matrix containing four segments, where the providers are positioned accordingly.

- **Leader**
  The “leaders” among the vendors/providers have a highly attractive product and service offering and a very strong market and competitive position; they fulfill all requirements for successful market cultivation. They can be regarded as opinion leaders, providing strategic impulses to the market. They also ensure innovative strength and stability.

- **Product Challenger**
  The “product challengers” offer a product and service portfolio that provides an above-average coverage of corporate requirements, but are not able to provide the same resources and strengths as the leaders regarding the individual market cultivation categories. Often, this is due to the respective vendor’s size or their weak footprint within the respective target segment.

- **Market Challenger**
  “Market challengers” are also very competitive, but there is still significant portfolio potential and they clearly lag behind the “leaders”. Often, the market challengers are established vendors that are somewhat slow to address new trends, due to their size and company structure, and have therefore still some potential to optimize their portfolio and increase their attractiveness.

- **Contender**
  “Contenders” are still lacking mature products and services or sufficient depth and breadth of their offering, while also showing some strengths and improvement potentials in their market cultivation efforts. These vendors are often generalists or niche players.
Provider Classifications (cont.)

Rising Star

Rising Stars are mostly product challengers with high future potential. When receiving the “Rising Star” award, such companies have a promising portfolio, including the required roadmap and an adequate focus on key market trends and customer requirements. Also, the “Rising Star” has an excellent management and understanding of the local market. This award is only given to vendors or service providers that have made extreme progress towards their goals within the last 12 months and are on a good way to reach the leader quadrant within the next 12-24 months, due to their above-average impact and innovative strength.

Not In

This service provider or vendor was not included in this quadrant as ISG could not obtain enough information to position them. This omission does not imply that the service provider or vendor does not provide this service.
# Next-Gen Application Development & Maintenance (ADM) Services Cross-Quadrant Provider Listing 1 of 3

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*ISG Provider Lens™ Quadrant Report | August 2018*

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Next-Gen Application Development & Maintenance (ADM) Services Cross-Quadrant Provider Listing 2 of 3

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Next-Gen Application Development & Maintenance (ADM) Services Quadrants
NEXT-GEN ADM

Definition

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Observations

- Accenture banks on its rich technology consulting legacy and transition experience to offer next-gen services to large organizations.

- Atos has made a series of investments and struck vital partnerships to emerge as an effective option for next-gen engagement initiatives.

- Capgemini has deep domain expertise, an extensive services portfolio, strong frameworks and leverages its Rightshore® strategy to get the right resource mix for each engagement.

- Cognizant leverages a domain-plus-technology strategy coupled with its depth and breadth of services to win large next-gen ADM deals.

- DXC Technology is a dominant leader in this space from its newfound scale and abundant IP.

- HCL has gained momentum in the next-gen application development because of its strong product portfolio, sharp vision and expanding delivery reach.

- IBM is a juggernaut in the next-gen service space based of its consulting and transformation experience, comprehensive services portfolio, investments in emerging technologies and partner ecosystem.

- Infosys impresses with its end-to-end offerings, resource pool and commitment to next-gen ADM engagements.

- Mindtree has clear positioning as a specialist provider that understands the next-gen requirements of enterprises and can custom-build a solution to meet the transformation end goal.
TCS continues to expand globally, riding on large-sized multi-year next-gen ADM deals. TCS differentiates itself based on comprehensive industry-specific and domain-aligned capabilities.

TechM is showing promise through its new 3-4-3 business strategy and from forming a formidable partner ecosystem to win and run next-gen ADM deals.

Wipro is going strength-to-strength in carving out an intriguing digital proposition and has a successful track record of running large managed services engagements.

LTI’s two-tier approach to transformation and its IP-driven offerings make it the Rising Star in the Next-gen ADM quadrant.
**Overview**

In 2017, Mindtree earned revenue of $626 million from ADM services. It has approximately 375 clients supported by nearly 14,600 employees.

Mindtree is positioning itself as an “Anchor Digital Partner” for clients based on technical prowess, thought leadership, on-shore consulting, automation, digital packages and platforms.

**Strengths**

- **Focus on rapid automation:** Mindtree has built multiple accelerators to help clients reap a high ROI by leveraging automation including:
  - Advanced Learning ENgine (ALEN): An accelerator to conduct ML modeling, testing and deployment to any platform;
  - Mindflow: Mindtree’s conversational platform that can integrate, orchestrate and automate with different NLP engines;
  - CAPE (Composable Automated Platform for Enterprises): Used to visualize the IT lifecycle, accelerate end-to-end integrated automation and real-time decision-making via unified dashboards;
  - CodeMill: Automates code generation using DB Model and reference implementation;
  - RAPID: Mindtree’s RPA (robotic process automation) implementation framework; and
  - ATLAS™ Intelyzers: Predictive capabilities to perform auto-triage, auto-respond, failure-detect and auto-fix in managed services environment.

- **Digital DNA:** Approximately 35 percent of Mindtree’s revenue comes from its digital services and almost one-third of employees are engaged in digital work. Mindtree has established a digital center of excellence called Digital Pumpkin. It is an innovation workspace meant to apply the fundamentals of design thinking to conceptualize and solve enterprises’ real-world challenges. It acts as a collaboration space for cross-functional vertical and domain teams and clients.

**Caution**

Mindtree should strike partnerships with innovative startups and look towards some key acquisitions to further strengthen its capabilities in areas such as blockchain, application security, cloud-native architectures and the API economy.
AGILE DEVELOPMENT

Definition

Agile development focuses on an incremental and iterative approach to application development. Because agile encompasses frequent and early releases of the working software, it is being viewed by enterprise as a medium for attaining enterprise agility.

This quadrant assesses each provider’s capabilities to deliver tangible results through use of various agile methodologies. It also looks at the focus a provider has towards the use of agile development with respect to its overall application development practice.
AGILE DEVELOPMENT

Observations

- Capgemini has a strong pod-based approach to agile development backed by an established agile ecosystem.
- Cognizant's digital engineering group and its rich experience in implementing SaaS solutions makes it a worthy contender for agile projects.
- DXC's development of new service delivery platforms that leverage agile principles is its core differentiator.
- HCL's agile-based target operating model, focus on extreme automation and service modernization are its fundamental strengths.
- IBM’s robust business agility offerings along with its comprehensive approach to digital reinvention forms its core advantage.
- Infosys’ Global Agile Delivery Framework and considerable agile/DevOps resource strength give it a distinct advantage.
- Mindtree’s strength lies in its agile experience, distributed delivery model and cloud migration capabilities.
- Softtek’s DevOps-first approach along with its nearshore delivery presence provide a differentiated and value-based option for enterprise clients.
- Wipro’s agile and DevOps advisory, coupled with its cloud capabilities and innovative product development, provides a strong value proposition.
- Hexaware’s technology focus, innovation initiatives and attention to DevOps make it the Rising Star in the agile development quadrant.
Mindtree's strengths include:

**Distributed agile delivery through GATE model:** GATE stands for Global Agile Teams for Enterprise. Through this model, Mindtree supports onsite agile delivery at clients’ premises, onshore at local delivery centers and offshore delivery from one of its Indian delivery centers. The core tenets of this model are to distribute cross-functional teams, to distribute work based on the level of collaboration (keeping higher collaborative work close to the client) and to use technology enablers to support virtual teams.

**Agile experience:** Mindtree has approximately 4,400 employees working on agile engagements. Of these, there are 3,970 agile engineers, 30 agile coaches, 200 scrum masters and 200 architects. It has its Agile Center of Excellence in Gainesville, Florida. This high-tech ideation and communications hub focuses on areas such as agile transformation, consulting, delivery and digital business.

**Cloud migration capabilities:** Mindtree takes a holistic approach to cloud transformation that spans from advisory to build, and from migration to management. It helps companies to quickly migrate to the cloud and scale in a factory-based model, which ensures the efficiency and flexibility to align with business needs. Mindtree offers 12 cloud-based, industry-specific business platforms to enhance productivity, inclusion and innovation.

**Strengths**

Mindtree's strength lies in its distributed agile delivery, selective industry focus, digital legacy, onshore innovation and a partnership-based approach to agile-enabled engagements.
Continuous testing focuses on delivering quality assurance at speed. In terms of technology, it encompasses various aspects of automated testing such as shift-left and end-to-end automation across testing phases. However, in terms of people and processes, it goes a step beyond automation testing to accomplish higher collaboration among QA and development teams to sync with sprint cycles, feature-driven testing, responsiveness to change, creating a feedback loop and greater client involvement.

Continuous testing is gaining momentum, especially to help enterprises keep pace with their agile and DevOps initiatives.

Service providers for this quadrant are assessed on their progress made and capabilities developed for creating a continuous testing environment with measurable outcomes for their clients.
CONTINUOUS TESTING

Observations

- Capgemini's core strength includes strong IP, industrialized delivery and a rich tool stack.

- Cognizant has been banking on its HiveCenter™ platform, pod-ready engineers and local delivery presence to win next-gen testing engagements.

- DXC's testing-as-a-service and intelligent automation offerings are some core differentiators.

- HCL has prebuilt accelerators and an upskilled workforce that is equipped to work on continuous testing projects of varying scope and size.

- Hexaware's in-house and partner-led solution development makes it a worthy contender to execute continuous testing projects.

- IBM's AI-enabled test services and home-grown automation tools give it a distinct advantage over competition.

- Infosys provides flexible contracting options, has specialized testing labs and is foraying into emerging areas to provide an array of next-gen testing services.

- Mindtree's experienced-based testing offerings and presence of cross-trained and full-stack engineers make it a specialist in this space.

- UST Global is banking on its alliances, tools, accelerators and acquisitions of specialist firms to compete and grow in this market.

- Wipro's focus on automation-led testing and its engineering approach towards newer testing techniques are its key differentiators.

- LTI's digital testing offerings and design-driven approach to testing earn it the Rising Star spot.
MINDTREE

Overview

Mindtree's 2017 application testing revenue was nearly $150 million, 60 percent of which was contributed by continuous testing services. Mindtree has approximately 1,650 testers supporting 27 enterprise clients globally.

Mindtree's continuous testing strategy is based on two principles: “automation across test life cycle,” including “test-as-you-build” and “fail-fast,” adopting shift-left concepts to ensure “prevention before detection.”

Strengths

**Full-stack and cross-trained resources:** Mindtree is aggressively upskilling resources on continuous testing concepts and tools. It is looking to train resources across the testing value chain from back-office to front-office testing. Testers are being trained on concepts like user experience, analytics and more. Testing is being executed through Mindtree's YORBIT virtual learning platform and classroom sessions.

**Proprietary tooling:** Mindtree has invested heavily to develop differentiated testing offerings that are in tune with today's dynamic test environment. Its major assets include the Dynamic Test Engineering Platform (DTEP), a unified platform for continuous testing that provides centralized access to several other proprietary resources and accelerators, and MIST, a complete scriptless end-to-end unified automation framework to enable faster script development and test execution for web, desktop and mobile.

**Agile QA Transformation Experience (ATX):** ATX is a new test consulting offering by Mindtree. This framework helps clients in their transformation journey by defining an operating model to suit waterfall and agile/DevOps process guidelines for continuous testing, behavior-driven development, test-driven development or acceptance test-driven development, as appropriate.

Caution

Mindtree should invest in creating more vertical-specific accelerators and tooling. There is also huge scope for enhancing its offerings in areas like application security, cognitive and cloud testing.
Definition

The Next-gen BFSI industry quadrant includes ADM services provided to banking, diversified financial and insurance companies.

This quadrant assesses the strength of providers that provide next-gen ADM services to the BFSI industry vertical.

Source: ISG Research 2018
Observations

- Capgemini’s systematic approach to transformation and longstanding industry partnerships make it a commendable choice.

- Cognizant’s vertical-oriented partnerships and varied deal experience are key differentiators.

- DXC’s automation capabilities, rich product set and industry partnerships offer a distinct value proposition.

- HCL’s micro-vertical approach, dedicated innovation labs and strategic partnerships are helping it create tailored BFSI solutions.

- Infosys’ BFSI stack, investment in fintechs and deep industry alliances are helping it create a value-driven position.

- TechM’s new-age delivery platform coupled with industry alliances makes it a worthy option for BFSI engagements.

- Virtusa’s vertical-specific tooling, domain expertise and innovation initiatives are a few of its key strengths.

- LTI’s has made some key acquisitions to enhance its positioning in this space. Additionally, its next-gen solutioning makes it a worthy contender for the rising star position.
NEXT-GEN ADM FOR HEALTHCARE AND LIFE SCIENCES (HCLS)

Definition

The Next-gen ADM HCLS industry quadrant includes ADM services provided to healthcare institutions, health payers and pharmaceutical, biotech and medical devices companies.

This quadrant assesses the strength of providers that provide next-gen ADM services to HCLS industry vertical.

Source: ISG Research 2018
**Observations**

- Capgemini's proprietary solutioning and its ADMnext suite provide a range of services for the HCLS industry.
- Cognizant is among the biggest providers to the HCLS industry with offerings spanning the entire value chain.
- DXC is relying on its cloud-based digital services platform and a range of acquisitions to further grow its business in this segment.
- HCL's core strength is its analytics-based approach to transformation. It has also developed tools to accelerate clients' journeys to digital.
- IBM is banking on its cognitive services and inorganic growth to add to its client base.
- Infosys’ AI-infused services, investment in R&D and domain expertise make it an ideal provider for next-gen services.
- TechM's technology partnerships, open-source capabilities and managed services toolkit are some of its key differentiators and helped it attain Rising Star status.
**NEXT-GEN ADM – MANUFACTURING**

**Definition**

The next-gen manufacturing industry quadrant includes service provided to conglomerates, capital goods, construction, consumer durables (like automotive and household appliances), aerospace and defense, materials, semiconductor, technology hardware and equipment companies.

This quadrant assesses the strength of providers that provide next-gen ADM services to the manufacturing industry vertical.
Observations

- Atos, through inorganic growth, has further strengthened its footprint in the manufacturing sector.

- Capgemini has an impressive set of digital offerings along with innovation that is being driven from its dedicated center of excellence.

- Cognizant takes an integrated digital approach to manufacturing clients and relies on its automation solutions to create differentiation.

- DXC, through its tools and accelerators, creates end-to-end value-based offerings for manufacturing clients.

- HCL’s Enterprise 360 strategy and its new FENIX operating model are its key differentiators.

- IBM’s experience-centric focus and its homegrown model factory for manufacturing clients offer a distinct value proposition.

- Infosys’ legacy modernization capabilities and solutioning in emerging areas like Industry 4.0 are its core differentiators.

- Rising Star TechM’s application migration capabilities and range of other application-based services are its key strengths.
Methodology
METHODOLOGY

The research study “ISG Provider Lens™ 2018 – Next-Gen Application Development & Maintenance (ADM) Services” analyzes the relevant software vendors/service providers in the Global market, based on a multi-phased research and analysis process and positions these providers based on the ISG Research methodology. The study was divided into the following steps:

1. Define the “Next-Gen Application Development & Maintenance (ADM) Services” market

2. Conduct questionnaire-based surveys with service providers/vendor across all trend topics

3. Hold interactive discussions with service providers/vendors on capabilities and use cases

4. Leverage ISG’s internal databases and advisor knowledge and experience (wherever applicable)

5. Analyze and evaluate services and service documentation based on the facts and figures received from providers and other sources.

6. Evaluate based on the following key criteria:
   - Strategy and vision
   - Innovation
   - Brand awareness and presence in the market
   - Sales and partner landscape
   - Breadth and depth of portfolio of services offered
   - Technology advancements
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