HfS Blueprint Report

Enterprise Artificial Intelligence (AI) Services 2018

Excerpt for IBM

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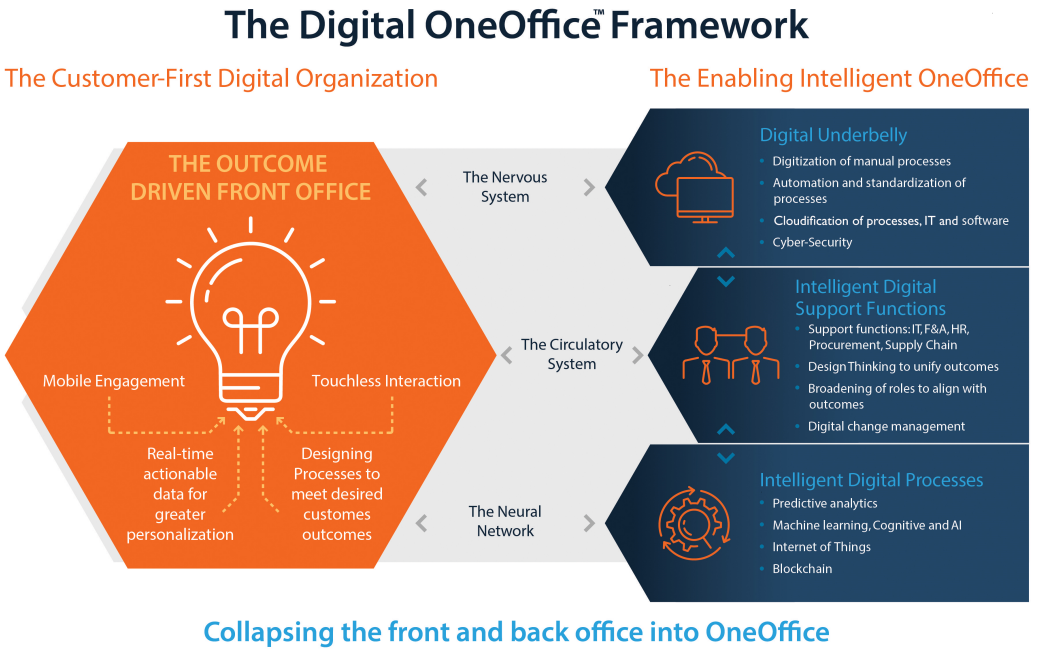
Introduction and Key Definitions

Introduction to and Scope of the HfS Blueprint Report: Enterprise AI Services 2018 (1)

- The **pace of change in the development** and deployment of capabilities around the notion of Intelligent Automation (IA) and the expansion toward artificial intelligence (AI) is nothing short of astounding. HfS remains at the forefront of engaging with stakeholders around concepts, trends, market dynamics, and future directions. Many of those issues can be accessed through our expansive research library on Intelligent Automation.
- AI is many things: It is hyped, it is undefined, it is becoming pervasive, and it is fostering emotional and at, times, heated discussions. However, many of those discussions are more focused on consumer-facing issues such as self-driving cars, drones delivering Amazon purchases, or robotic home helpers. The broader market is not yet recognizing the nearer-term impact of AI on B2B and Enterprise operations. **AI aims to automate intelligent activities that humans associate with other human minds through a combination of reasoning, knowledge, planning, learning, natural language processing (communication), and perception (aka cognitive).**
- While **the broader market appears stuck in discussions around RPA**, we are keen to expand the conversation toward notions of service orchestration and integration around Intelligent Automation as well as the impact of cognitive and AI solutions. A useful context is the journey of organizations toward the OneOffice. IA is critical to develop both the Digital Underbelly as well as Intelligent Digital Processes. Cognitive and AI in particular enable those Intelligent Digital Processes to become predictive as well as enabling. However, we recognize that for some more IT-centric scenarios, this model needs to adapted. Furthermore, while we acknowledge the relevance of **RPA, those discussions are not in scope for this Blueprint unless there are broad elements of AI capabilities integrated**.



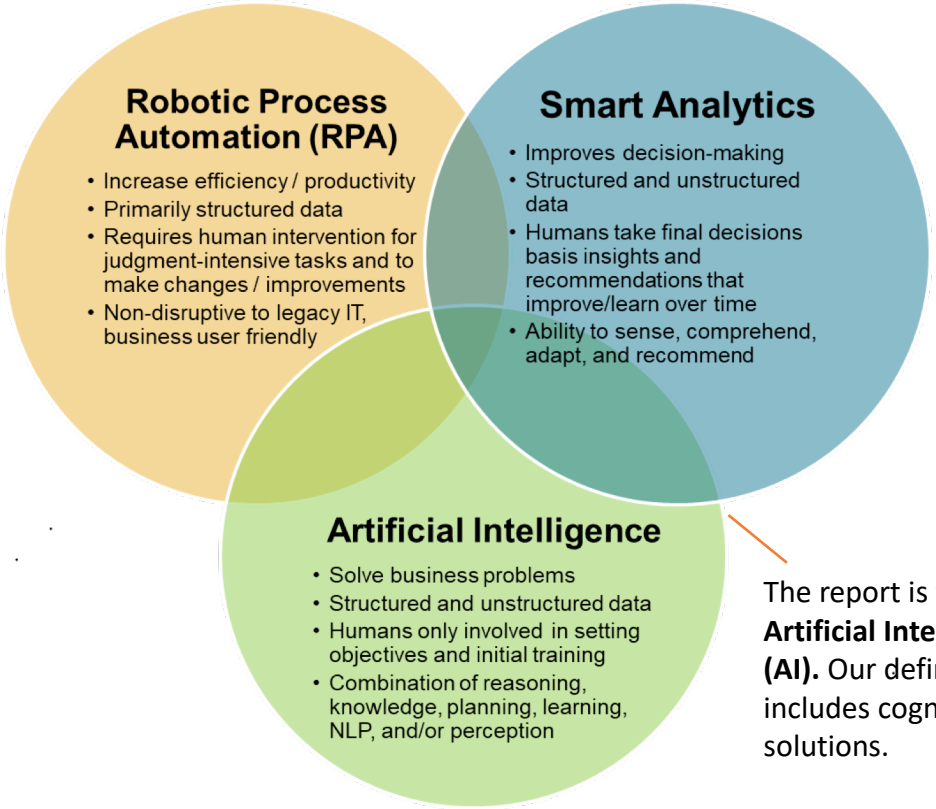
Introduction to and Scope of the HfS Blueprint Report: Enterprise AI Services 2018 (2)

- What we are trying to assess in this Blueprint is **how service providers are orchestrating diverse sets of cognitive and AI solutions as well as tools within the context of service delivery.** How are they proactively transforming the processes for clients? The emphasis is not on task automation or isolated point solutions, but on automation from a business function or process point of view. What are the data management strategies underpinning the move to AI? Similarly, advisory is only relevant as part of implementations. These capabilities might sit within traditional business units, but we are seeing the leading providers build out capabilities across those business units.

- As HfS has outlined in its Triple A Trifecta framework, the Trifecta is where **AI intersects with Automation and Analytics**. While each element of the Trifecta has a distinct value proposition, there is increasing convergence between the three elements. For instance, smart analytics are increasingly reliant on AI tools such as natural language processing (NLP) to conduct search-driven analytics, neural networks for data exploration, and learning algorithms to build predictive models. In fact, the Holy Grail of service delivery transformation is at the intersection of automation, analytics, and AI.

- **The Trifecta is nonlinear without a definite starting point.** Transformation is not a linear progression. Enterprises can start anywhere across the Trifecta. It is not necessary to start with basic automation and then advance to AI-based automation. However, it is critical that you understand the business problem that you are trying to solve and then apply the relevant value lever, or a combination of value levers.

The HfS Triple-A Trifecta



The report is focused on **Artificial Intelligence (AI).** Our definition of AI includes cognitive solutions.

AI Building Blocks (Illustrative, Not Exhaustive)

NLP	**Technology**: Nuance, Cortana, Alexa **Use cases:** voice recognition, conversational services
Machine and Deep Learning	**Technology:** Google DeepMind, Tensorflow, Loop AI, Microsoft Cognitive Services **Use cases:** integration of data on an industrial scale, pattern recognition without ontology or knowledge-base, analysis of dark or IoT data
Neural Networks	**Technology:** HIRO, ignio, HOLMES **Use cases:** discovery in accounting, KYC, batch management
Virtual Agents	**Technology:** IBM Watson, Amelia, LivingActor, Accenture myWizard **Use cases:** substitute of IT and business agent, virtual data scientist, virtual scrum master, mortgage broker advisor
Autonomics	**Technology:** IPcenter, HIRO, ignio, HOLMES **Use cases:** password reset in IT help desk, self-healing IT environment
Computer Vision	**Technology:** AntWorks, AlchemyAPI, Clarifai **Use cases:** pattern recognition in images, integration of handwriting

HfS Definition of Intelligent Automation and AI Services

Intelligent Automation Value Chain

Plan

- Advisory on autonomics, cognitive computing, and AI
- Workshops on IA vendor landscape and implications
- Automation opportunity assessment
- Business case development for automation deployment
- Operating model evaluation
- Automation roadmap
- Compliance and risk assessment
- Security implications
- HR and talent management strategy
- Governance policy
- Rollout strategy.

Implement

- Program management for process automation
- Process automation and customization
- Solution and technical design
- Process recording, mapping, and updating
- Data extraction from heterogeneous systems
- Leverage repository of pre-built components and utilities
- Predictive analytics
- Specialist development modules
- Enterprise systems integration.

Manage

- Governance management
- Maintenance of automated processes
- Optimization of BPO contracts and SSC delivery
- Upgrade support
- IA help desk
- Ongoing integration
- Support and maintenance
- Testing and QA
- New release and upgrade coordination
- Training and certification
- Acceptance testing
- Change management.

Operate

- Infrastructure management
- Application management
- IT help desk management
- BPO
- (Ro)Bot-as-a-Service
- Real time analytics
- Identify any required changes in service delivery or process to account for changing business requirements (e.g., M&A, divestment, new investments in IT)
- Mandatory regulatory adjustment ramification management and resolution.

Optimize

- New feature value identification and benefit analysis
- Ongoing adds and upgrades, migrations, and consolidation
- Integration of big data analytics, and insights
- Best practice understanding, documentation, and end-user adoption, content creation, and curation
- User community participation.

Executive Summary

Executive Summary (1)

- **Enterprise AI services are one of the fastest growing market segments with annual growth in excess of 100%,** albeit this growth comes from a low base. As Enterprise AI is not one market, sizing the total market would be misleading. Just for the RPA extension through AI, HfS estimates revenues of $1.6bn in 2018.
- **AI is not one market, but AI should be seen as a set of technologies and building blocks**. AI is not *one* market. AI not only intersects with automation and analytics as the Triple A Trifecta framework suggests, but AI should be seen as a set of technologies and building blocks that span a continuum and should be discussed within the context of business operational impact, service delivery capability, and specific use cases. However, unlike Intelligent Automation, AI is largely not plug-and-play.
- **Enterprise AI is still at the periphery of the enterprise or applied as a bolt-on.** Reflecting the early development phase, organizations are pursuing AI solutions with a "bolt-on" approach, applying AI at the edge of the enterprise. As the market matures, AI has the potential to disrupt and replace enterprise architectures and enterprise software.
- **The Enterprise AI market has a duplexity of approaches: Industrialization and project-centric**. We have to be cognizant of the disparate starting points and context for projects. To get a better sense of the capabilities of service providers, we need more differentiation in the discussions around AI. RPA and chatbots are low level; compare those with the expansion of data science projects, autonomics, or even virtual agents, which have a high complexity and require significant investments.
- **The market is awash with PoCs predominantly around RPA extension, autonomics, and conversational services.** Being largely at the stage of strategy formulation, PoC or pilot stage means that organizations have yet to deal with the commercial implications of deploying AI. Anecdotal evidence and perceptions of high levels of investment necessary for AI projects remain critical inhibitors as organizations. This includes expectation that disruption caused might offset cost savings.

Executive Summary (2)

- **Hype around chatbots is distorting the marketing communications**. For many buyers, all those chatbot PoCs are a risk-free toe-dip into the sea of AI with the hope of learning some valuable lessons. However, many of those PoCs are done without focusing on the customer by just offering narrowly defined conversations. The true value of conversational services is being realized where a customer interaction is taken all the way to execution. The strategic question: Who is providing those services? Will they be dedicated projects or will they be platforms such as Salesforce or ServiceNow that are integrating lower level conversational services?
- **The Holy Grail of AI is at the intersection of iterative data inputs and minimal training of algorithms.** There is the misguided expectation that one has only to throw machine learning at data and that would be sufficient to integrate those data sets in production. Rather, organizations have to move to a data-centric mindset where data is the centrepiece of digital strategies. This requires a new set of talent that blends the skills of data scientists and data engineers. The focal point is reducing the time to train algorithms while being able to integrate iterative data inputs of increasingly semi- and un-structured data. New technologies such as Gluon and AutoML will accelerate this process.
- **Adoption of AI is across all verticals**. While BFSI has the strongest investments, we are seeing deployments across all verticals. Threshold setting for AML is a representative use case for complex data requirements. Another example of the increasing complexity of projects is Hadoop cluster integration to feed every customer channel. Capabilities include sentiment analysis and real-time analysis. Those use-cases are examples for scale and service orchestration beyond the chatbot hype.
- **The center of gravity for AI is around the mega-ISVs: Microsoft, Google, AWS, and IBM.** Despite the plethora of AI start-ups, the big bets and investments are being placed by the mega-ISVs. The best way to understand the evolving AI supplier and capabilities landscape is to recognize the interplay of computing power optimized for AI, an expansive set of algorithms, platforms enhanced for the particular use-case, and, lastly but most importantly, access to vast data sets including unstructured data. Microsoft, Google, AWS, and IBM Watson are emerging as the central AI ecosystems that will evolve into alliances such as Oracle and SAP in the ERP era.
- **Service provider landscape.** We have assessed 18 service providers across multiple dimensions on Enterprise AI execution and innovation. The HfS Winner's Circle for the 2018 Enterprise AI Services is comprised of IBM, Accenture, TCS, Deloitte, Cognizant, and Genpact. Differentiating criteria are the variety, depth, and scale of use-cases as well as the robustness of delivery.

The State of the Enterprise Artificial Intelligence (AI) Market

AI Is Progressing at an Astounding Speed But Success Will Ultimately Depend on the Business Impact It Creates

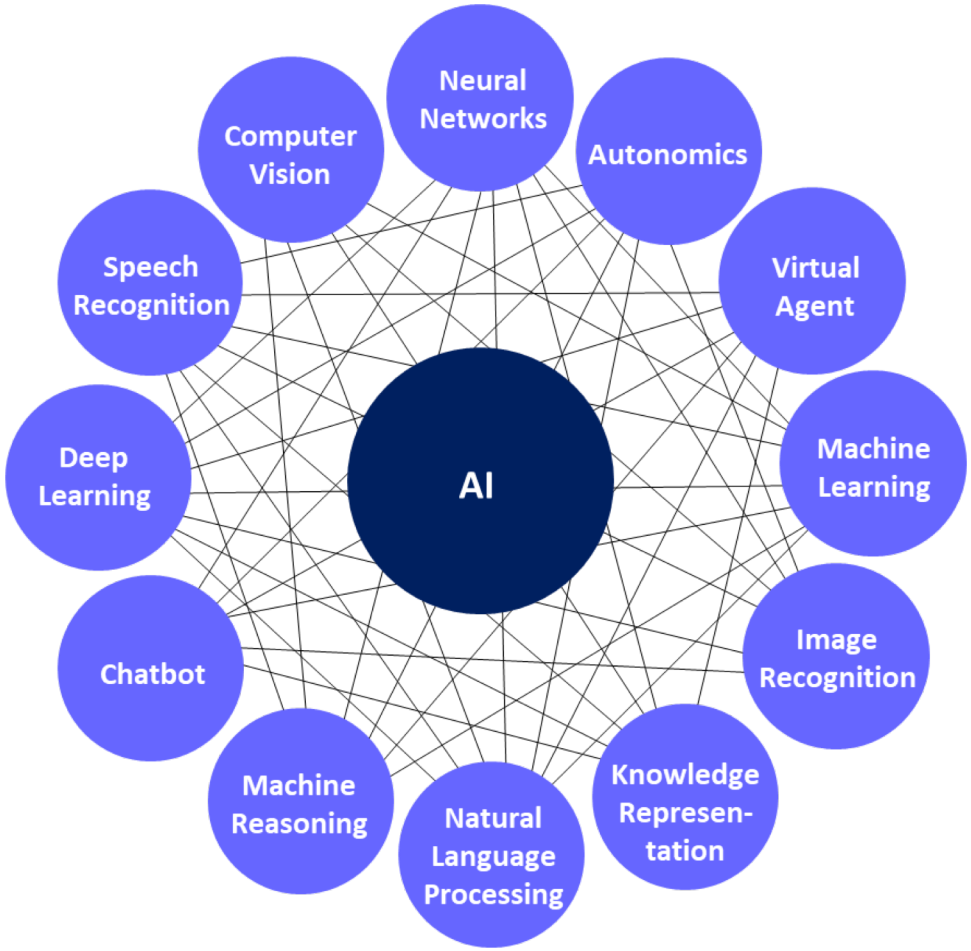
- **The pace of change is nothing short of astounding**: Providers are calling out an unprecedented speed of change with engagements moving from prototype to project in two to three months. At the same time, stakeholders are seeing an explosion of the automation eco-system. While the majority of stakeholders doesn't expect disruption from the start-ups because R&D costs too high in order to disrupt entire ecosystems, some indicated that this explosion of companies and capabilities is making them rethink the cloud stack and other broader assets.
- **Enterprise AI is still nascent, yet projects already dwarf RPA:** Despite all the marketing noise, there is little guidance and education on Enterprise AI. Much of the noise is around consumer facing applications such as Siri and Alexa as well as around the socio-economic impact such as job losses, the need for a basic income, or even fear that AI could lead to the destruction of society. While the market is still nascent and broadly speaking under the radar, the scale, depth, and value of the AI deployments dwarf anything that we are seeing in RPA. In many respects, HfS feels reminded of the early RPA days as we have to explain the basics to buyers and guide them with frameworks as well as lessons learned from the early deployments.
- **The market is characterized by a duplexity of AI**: As slide 13 highlights, the Enterprise AI market can be seen as a duplexity of approaches: both industrialization and project-centric approaches. While the boundaries of these approaches are fluid, industrialization is all about finding as many commonalities across delivery backbones as possible in order to scale and save costs at the same time. The strategic logic is 1-to-many. Examples would be monitoring of infrastructure or self-remediation as technologies including IPsoft and Arago. Conversely, project-centric approaches are highly domain-specific and the strategic logic is 1-to-1. Examples include the automation of a medical coding in a hospital to support diagnoses and improved patient records.
- **Clients don't buy technology; they buy outcomes.** Boards are paranoid about automation and AI, but they struggle to turn it into an actionable mandate. As a result there is a lot of experimentation by process owners and program managers. Yet, fundamentally they don't want to buy technology change agents such as RPA, AI, or Blockchain off the shelf, rather, they want to procure an outcome. It is here where we see a disconnect with the supply side, which for organizational reasons (including sales incentives) continues to evangelize on technology issues.

AI Is Not One Market, But AI Should Be Seen As a Set of Technologies and Building Blocks

- **Enterprise AI is a segment with many markets**: AI is not *one* market. AI not only intersects with Automation and Analytics as the Triple A Trifecta framework suggests, but AI should also be seen as a set of technologies and building blocks that span a continuum and should be discussed within the context of business operational impact, service delivery capability, and specific use cases. As such, AI discussions should follow the framework that HfS has developed across the broader notion of Intelligent Automation.

  While nothing in the context of automation is commonly defined, the HfS Intelligent Automation Continuum is aiming to provide stakeholders with a point of reference to discuss how innovation around automation is impacting enterprise operations.

Just like Intelligent Automation, AI should be seen as a continuum



The Enterprise AI Market Has a Duplexity of Approaches: Industrialization and Project-Centric

Industrialization

Service orchestration

Horizontal

Out-of-the-box

Alignment with Intelligent Automation

Service delivery

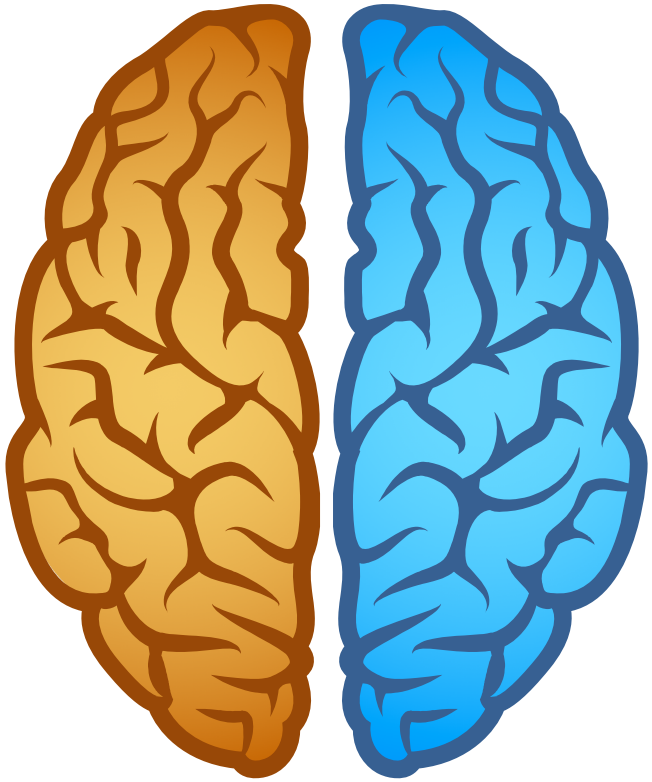
Mega ISVs

Data lake

RPA, autonomics, chatbots

Narrow AI

Industrialization is all about finding as many commonalities across delivery backbones as possible in order to scale and save costs at the same time. The strategic logic is 1-to-many. Examples would be monitoring of infrastructure or self-remediation technologies including IPsoft and Arago.



Project-Centric

Specific requirements

Sub-sector lens

Design Thinking

Expansions analytics

Data Science

Proprietary IP and open source

Data silos

Proprietary algorithms, Deep Learning

Strong AI

Project-centric approaches are highly domain-specific and the strategic logic is 1-to-1. Examples include the automation of a medical coding in a hospital to support diagnosis and better patient records.

Context, Context, Context: We Have to Be Cognizant of the Disparate Starting Points for AI Projects

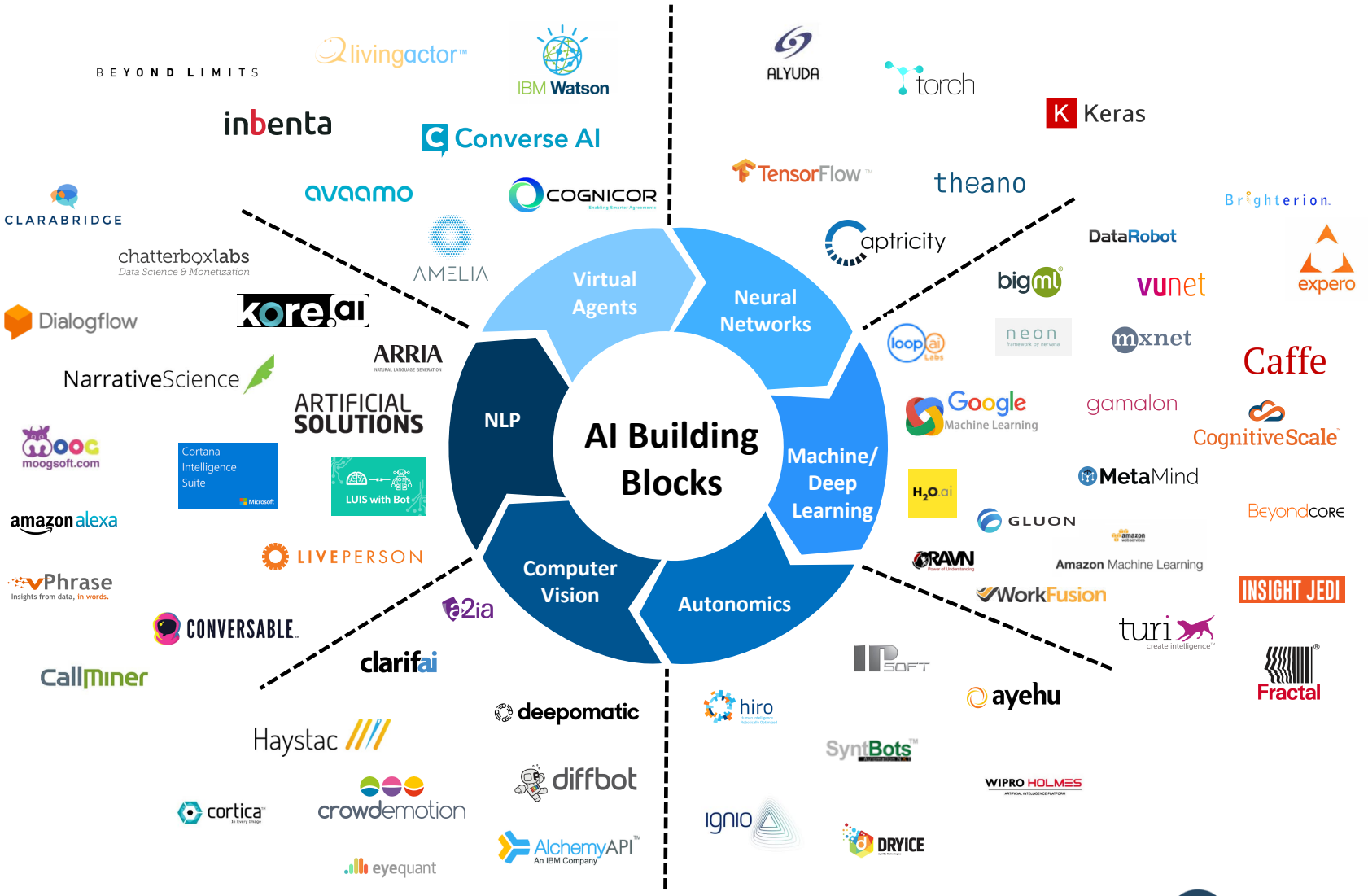
The AI journey has disparate starting points

AI deployment scenarios	Applicability business processes	Applicability IT processes	Investment requirements
Extension of RPA			
Conversational Services			Chatbot Virtual Agent
Autonomics			
Expansion Data Science			
Machine Learning			

- Suggestions of explaining AI better as "augmented" intelligence are just semantics. The fundamental point is about what business problems we can solve, not about getting confused by movies like The Matrix and discussion about the Singularity. The key question is: What can't scientists do today with traditional approaches?
- Put in other words, we have to be cognizant of the disparate starting points and context for projects. Not least in order to get a better sense of the capabilities of service providers, we need more differentiation in the discussions around AI.

- RPA and chatbots are low level; compare those with the expansion of data science projects, autonomics, or even virtual agents, which have a high complexity and require significant investments.
- For many buyers, all those chatbot PoCs are a risk-free toe-dip into the sea of AI with the hope to learn some valuable lessons. However, how do you compare this to the Watson projects costing millions trying to cure world hunger? In summary, AI is not a linear progression, neither from RPA nor chatbots nor any other starting points. This points to both opportunities but also disruptive threats.
- There can be many other variations of those starting point, not least with a highly specific vertical context, but this approach of clustering might help to convey the fundamental differences between those five clusters.

The Explosion of AI Start-ups Is Resulting in Partnership Ecosystems for Most Serious Enterprise AI Service Providers



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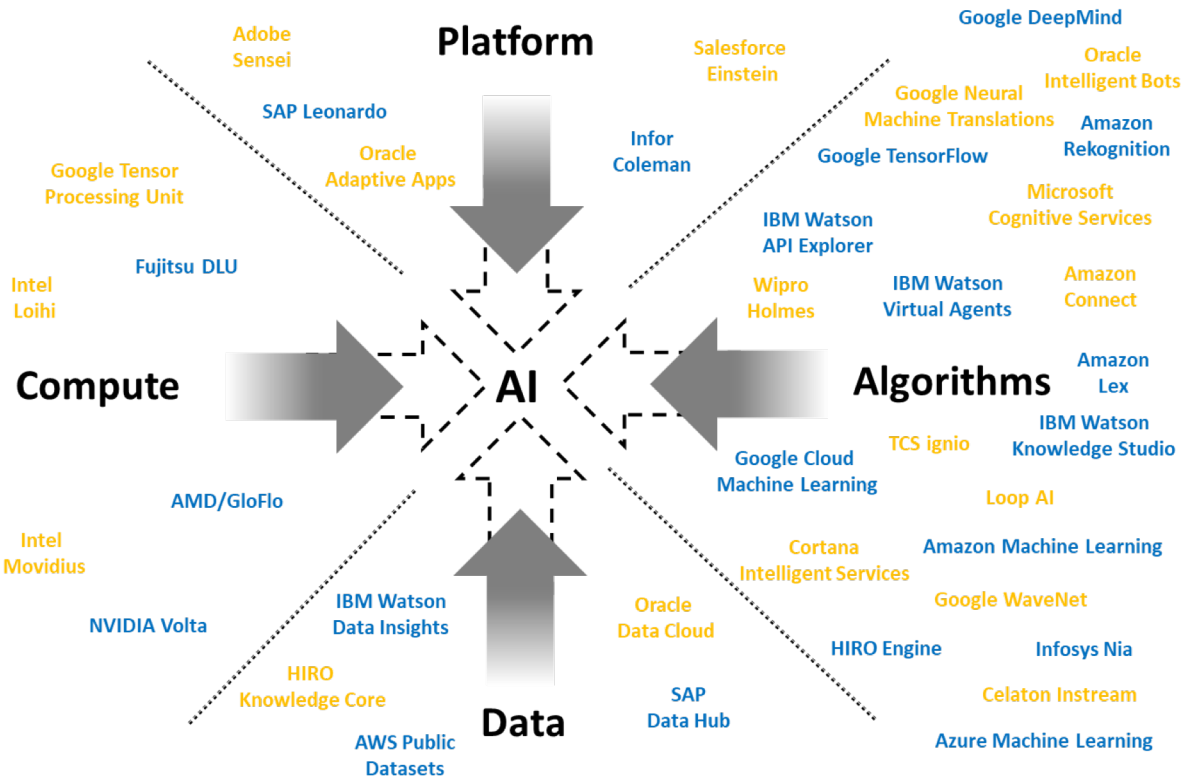
The Center of Gravity for AI Is Around the Mega-ISVs: Microsoft, Google, AWS, and IBM

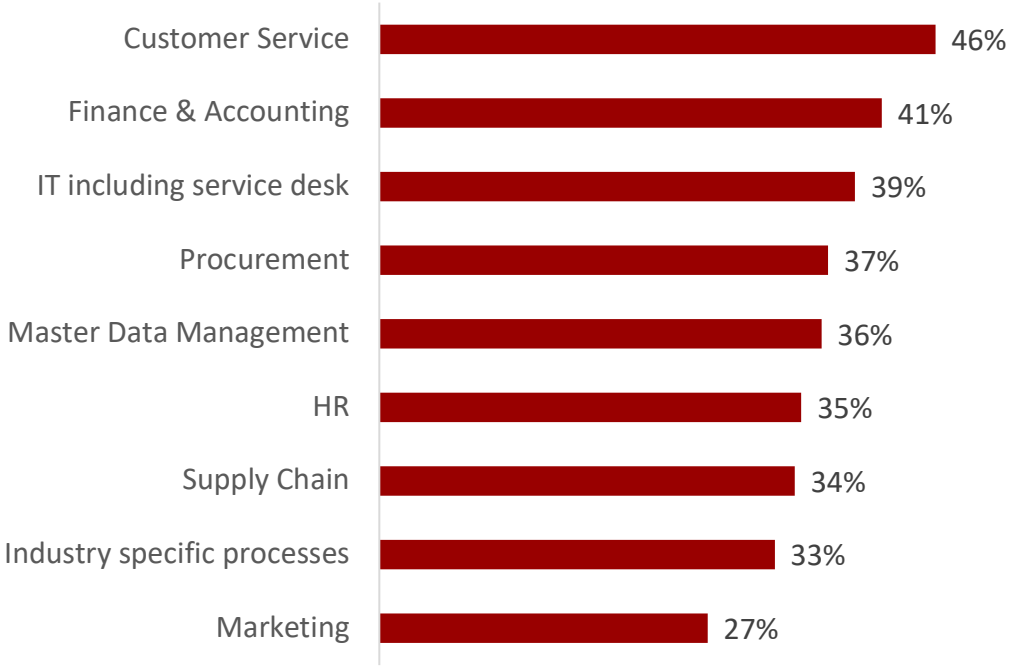


- Despite the plethora of AI start-ups, the big bets and investments are being placed by the mega-ISVs.
- The best way to understand the evolving AI supplier and capabilities landscape is to recognize the interplay of computing power optimized for AI, an expansive set of algorithms, platforms enhanced for particular use-cases, and lastly but most importantly, access to vast data sets including unstructured data.
- While the direction of travel is toward autonomous processes, we need people developing, improving, and refining the AI, its environment, and necessary algorithms.
- The use-case will determine the best technical approach, but critically will have to leverage commonality across their delivery backbones and develop the capabilities to route customer data through that backbone from interaction all the way to execution or conclusion.
- Thus, AI is reinforcing the necessity for organizations to drive service orchestration strategies.

Despite the Hype, the Current Enterprise AI Market Is in a State of Experimentation with Low-Level PoCs Around Chatbots and RPA Extensions

- Low-level PoCs around chatbots and RPA extension projects that are the majority of the AI deployments reference the nascent state of the market.
- This is reinforced by our recent study titled *State of Automation 2017* that customer service and F&A are the main processes for which AI has been deployed. Those projects typically focus on FAQs and next-best action for customer service as well as the integration of Google and Microsoft cognitive libraries into RPA deployments.
- While boards are paranoid about the impact of AI, they struggle to turn it into actionable agendas. Thus, few clients go for transformational projects. Rather, we are seeing narrow AI approaches around lower level chatbots and RPA extension that dominate the market.

For which processes have you implemented AI Automation?



Source: HfS Research "State of Automation 2017"
Sample: n=181 Buyers of AI

Innovative AI Use-Cases Are Starting to Emerge, But They Are Rare

Virtual Assistant integrated with Hadoop cluster: Big 4 for global bank, integration of Hadoop cluster to feed into every customer channel; included sentiment analysis and real-time analysis. Example for scale and service orchestration; goes beyond chatbot hype.

Exploring quantum computing techniques on AI and Machine Learning algorithms in Blockchain applications: Global SI for leading bank in Australia. Example for integrated approach of next-gen technologies and approaches.

Setup of joint AI CoE with Intel and support of Intel Nervana AI Academy. TCS provides a platform to connect researchers, developers, data scientists, and startups. These solutions will be optimized for the Intel portfolio of technologies Example for ecosystem enablement.

Leverage of ML for medical coding: Global SI (not Watson) helped European hospital to apply medical coding at scale to allow for digital patient record and diagnosis. Example for complex Data Science approach at scale for critical processes.

Integration of disparate sources for General Ledger: Global SI. Clients can drop disparate information for General Ledger requirements; Machine Learning and other technology building blocks allow for seamless processing. Example for reimagining processes.

Cross-fertilization from other sectors: Global SI has helped Australian company to automatically identify telephone posts using Google TensorFlow and Street View replacing manual inspection; broad replicability for other sectors, think insurance scenarios.

The Nascent Nature of Enterprise AI Is Characterized by Demand-Side and Supply-Side Challenges

Supply-Side Challenges (1)

- **Lack of organizational maturity around AI:** The nascent state of the market is also referenced by the fact that only few providers are moving toward a formalized AI practice or building practices around AI-specific partners. Thus far, only Accenture and KPMG have moved to a formalized AI practice. For most providers, AI remains a critical building block in their Intelligent Automation strategies. While we are seeing a slew of IBM Watson practices springing up, capabilities around Google, Microsoft, and AWS are part of broader alliance programs rather than dedicated AI programs. At the same time, providers like Cognizant work with an incubator approach, in this case around "conversational services". Only IBM, Accenture, and KPMG have formalized AI practices, while most providers drive AI from their analytics business units. Cognizant is using an incubator model, however, with a strong emphasis on conversational services. Broadly speaking, the success of AI projects currently is often left up to individuals and teams rather than organizational structures and strategic initiatives.

- **No mainstream organizational model around data yet:** It is unclear as yet what will become of the mainstream organizational model around data issues. Is it an emphasis on the quantity of data such as linking data lakes with AI capabilities? An emphasis on quality such as sub-sector focus? Or rather a federated model blending different approaches? Depending on the size of a provider, a federated model appears most likely. Both the lack of organizational maturity and, more importantly, the not yet aligned data management strategies are curtailing the scale of AI projects. Regarding the alignment of data management strategies we are seeing different schools of thought in the market. Providers with a strong emphasis on industrialization are aiming to integrate expansive sets of data lakes with their AI capabilities. A good example for this is IBM's Services Platform with Watson. Conversely, EY, with a much more domain-specific approach, suggests "most of the data needs ought to be applied with a sub-sector lens". Or put in other words, how much data do you need?

- **Scarcity of talent:** Despite all the marketing noise, the talent for AI capabilities is scarce. For instance, data scientists are a rare and expensive breed. It will take time for universities to adapt to the fast changing market. Crucially, it is not just about technical capabilities, as one senior executive quipped colourfully, "Data scientists can do the technology, but they don't have practical experience […] IBM, SAP all those guys, no one has enough resources in this space. Hence they roll out all those professors without any delivery experience." But it also flips in the other direction as another executive pointed out, "You easily drown in your own success, hence you have to plan accordingly".

The Nascent Nature of Enterprise AI Is Characterized by Demand-Side and Supply-Side Challenges

Supply-Side Challenges (2)

- **Platform approach as response to scarcity of talent**: Platforms like Salesforce Einstein, SAP Leonardo, or innovative technology providers like CognitiveScale, which offers pre-trained machine learning capabilities and curated data sets, are addressing the skills shortage. However, the key strategic question is how far such a "standardized" approach can deal with the complexity of organizations processes. The strategic intent is to make AI accessible. The focal point is the democratization, commoditization, and templating of the work of data scientists as well as training algorithms.

- **AI is rarely plug-and-play:** Despite the noise around platforms, the biggest value of AI is where it is leveraged to re-imagine processes rather than where it is used for industrialization. As one executive put it "the industry has to move an AI-patch model to and AI-led model". Another way of looking at it is that, for instance, managed services are AI supported whereas projects tend to be AI led. As such, AI is neither the linear progression on the Intelligent Automation Continuum nor does it lend itself to expansive plug and play. It is rather about moving to a data-centric mindset.

- **Immature commercial models:** As the market is awash with PoCs, it is not surprising that we lack robust insights into the commercial implications of AI. On the transactional side, organizations still struggle to move away from FTE and AHT-centric models. Yet, a key issue is clarity on ownership and accountability for data. Organizations should look for opportunities to use machine learning techniques to tap into "dark data"—information that organizations collect during their regular business activities but do not currently use. At the same time, buyers are wary of vendor lock-in, therefore data portability will emerge as a critical differentiator.

- **Lack of risk considerations:** Aligned with the immature commercial models, the lack of risk consideration is striking. Not least as AI is meant to be a conduit to achieve end-to-end processes. As one sell-side executive put it: "The question how do we manage risk never comes up; yet elevated risk levels are one of the most crucial issues on the journey toward AI".

The Nascent Nature of Enterprise AI Is Characterized by Demand-Side and Supply-Side Challenges

Supply-Side Challenges (3)

- **Focal point knowledge:** Knowledge is critical for the institutionalization of AI. However, the investments are around innovative approaches such as knowledge graphs that allow the leverage of data assets across an organizations similar to the way Facebook is dealing with information and data. Yet, as executives from Capgemini pointedly put it, knowledge management systems have become a corporate landfill across the industry. Put in other words—this is not old wine in new bottles.

- **Automation and AI won't lead to a reduction of the strategic importance of offshoring:** Against some bold statements that automation will lead to the death of offshoring, we are expecting a shift in capabilities rather than a diminished strategic importance. AI is no different from the broader notion of automation. Take the example of Accenture: 70% of its AI talent sits in India and a further 20% in APAC.

The Nascent Nature of Enterprise AI Is Characterized by Demand-Side and Supply-Side Challenges

Demand-Side Challenges (1)

- **Buyers are confused about AI:** As with most things around Intelligent Automation, AI is neither commonly defined nor are providers clear about the business challenges addressed or able to offer a clear depiction of cases. As we have suggested, boards are paranoid about the impact of AI; they struggle to turn it into actionable agendas. Thus, middle management is feeling the pressure to drive innovative approaches as they have precious little guidance from industry stakeholders about what their mandate should be and what lessons were learned from early deployments. In many respects, it feels like Groundhog Day—a reminder of the early days of RPA where basics and the framework need to be explained to industry stakeholders. As a direct consequence, for instance, TCS executives suggested that they don't talk about AI in client discussions, they instead tend to focus on the business problems.

- **Focus on technology versus "outcomes":** Buyers are clear in that they don't buy RPA, AI, or Blockchain off the shelf; they instead aim to procure an outcome. However, executives at EY rightly pointed out, "It is way too early to sell outcomes around AI". Therefore, we rather should understand those outcomes as business problems and use cases.

- **Scarcity of talent:** The talent that understands all the innovations subsumed by the AI moniker and, most importantly, their impact on process chains and workflows is scarce. The progression toward a data-centric model requires a blend of data engineers and data scientists to harness the value of data. And, more broadly, data has to become the corner stone of an organization's digital strategy, not just a by-product. Platforms such as Salesforce Einstein and SAP Leonardo are trying to mitigate the dependency on such high level talent. Organizations have to focus on evaluating processes where a platform approach can address their requirements. As such, it is similar to RPA. However, it will take significant time for the platform to mature. As with all things around AI, the approaches will become more robust the more algorithms are being trained.

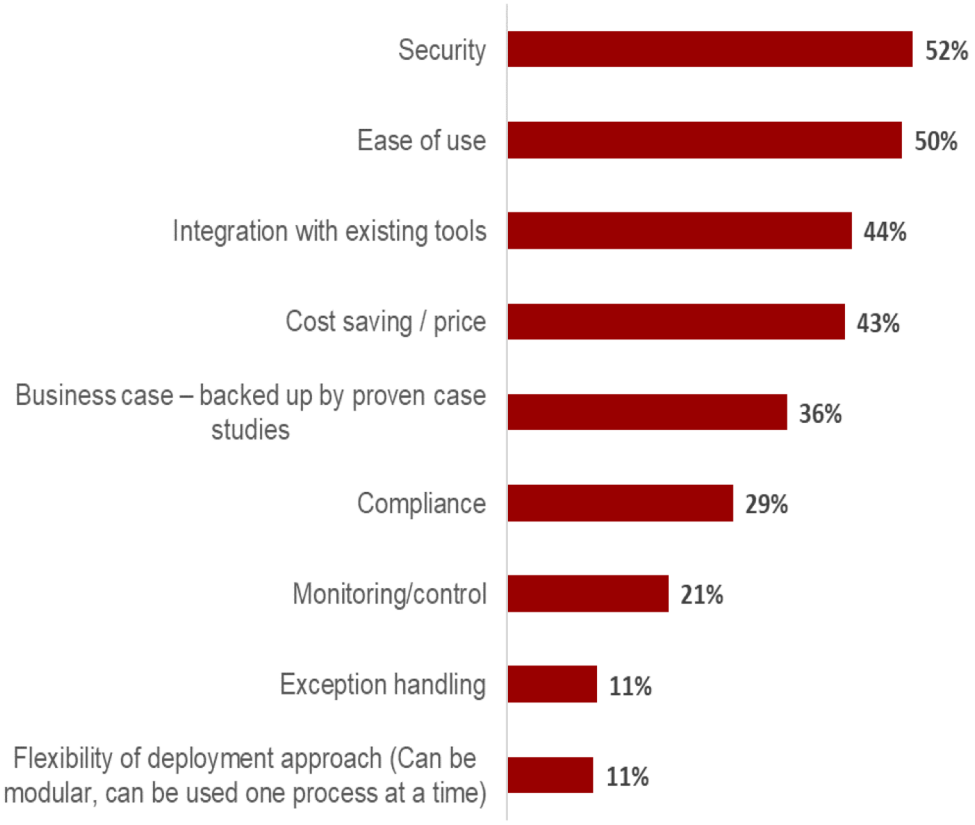
- **Lack of alignment between data and delivery strategies:** As the supply side is still unsure as to what the mainstream model of aligning data with AI technology building blocks might become, buy side organizations should seek advise from consultancies like the Big Four. However, the more fundamental challenge is to translate such top level guidance into managing day-to-day operations. There will be a new set of job functions emerging that organizations have to focus on.

The Nascent Nature of Enterprise AI Is Characterized by Demand-Side and Supply-Side Challenges

Demand-Side Challenges (2)

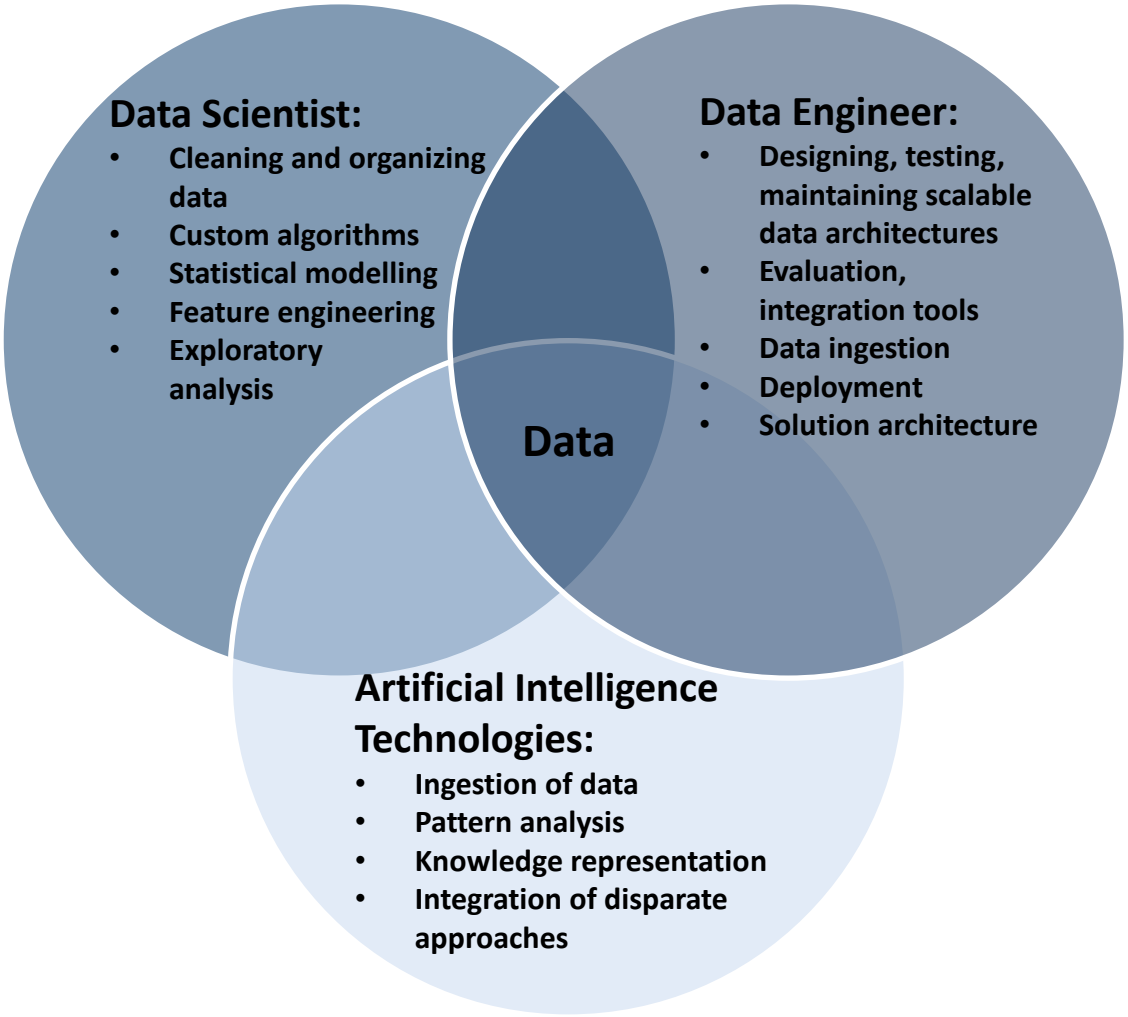
- **Governance, testing, and security hardly addressed:** Given the lack of education and communication, it might be not surprising that as an industry we have hardly touched discussions on governance, testing, and security. However, the more we progress toward notions of self-learning and self-remediation, the more urgently we need discussions how the operating model for digital is being transformed and challenged by the rise of AI. Yet, as a buy-side executive reflected self critically, "We didn't know our processes well enough and they weren't properly documented". Thus, both supply and buy side have to engage in new ways of collaboration. Another executive added that such a collaboration has to look for new model, "Our governance is too heavy for Intelligent Automation; we need more agility".

Which of the following would AI Automation have to be able to demonstrate before your organization considers using it?



Source: HfS Research "State of Automation 2017"
Sample: n=219 Non-Buyers of RPA

Moving Toward a Data-Centric Mindset Necessitates New Requirements for Talent



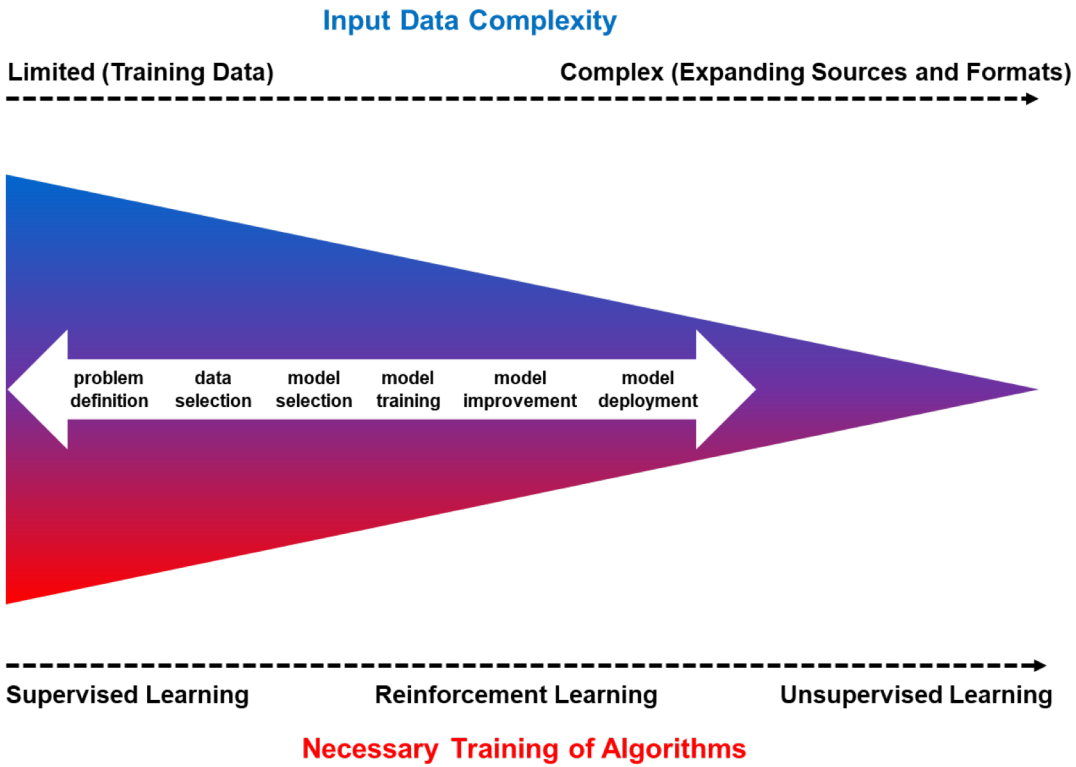
- The Holy Grail of AI is at the intersection of iterative data inputs and minimal training of algorithms.
- To drive scale and industrialization, technology providers like CognitiveScale offer a blend of machine learning training, pre-built agents, and curated data sets to operationalize AI.
- Those approaches are managing handoffs between data scientists, analysts, application developers, and process owners. Similarly, service providers are aiming at the industrialization of use-cases.
- Examples are Accenture's myWizard, Infosys' Nia, and Atos' Ystia platforms. The intent is to offer a common workplace to store, share, retrieve, and update assets, models, and frameworks.

The Holy Grail of AI Is at the Intersection of Iterative Data Inputs and Minimal Training of Algorithms

- Without access to vast data sets, AI will remain narrow, thus carrying out only specific tasks. Algorithms need more data than currently available to progress toward general AI with the goal to handle tasks from different areas and origins, such as any intellectual task that a human being can handle.

- The difference between Big Data projects and the need for integrating data on an industrial scale to progress toward the OneOffice is perspective is moving the perspective from the rear mirror view to the windshield. However, the data traditionally held in data warehouses cannot easily be leveraged for prescriptive analytics utilizing machine learning.

- Machine learning requires "learnable" data. That is, data that is known to contribute to inference. Crucially, those algorithms providing it need to be trained in order to leverage those data sets in production. To progress toward autonomous processes that are at the heart of the OneOffice requires the access to increasingly unstructured data. Only when algorithms can learn from those vast data sets will we inch further to the notion of General AI. In simple terms, less human interaction is required with more data that can be integrated and analyzed.



Enterprise AI Will Have a Profound Impact on the Ideals of the As-a-Service Economy

Ideal	As-a-Service Ideal Definition	Impact	Comments
Write Off Legacy	Using platform-based solutions, DevOps, and API ecosystems for more agile, less exception-oriented systems		In the long run, AI has the potential to become the new UI and as such overcome legacy. Given the nascent state of the market, AI is optimizing existing systems rather than replacing them.
Design Thinking	Understanding the business context to reimagine processes aligned with meeting client needs		Design Thinking offers the opportunity to reimagine processes. However, thus far we have seen very few examples of practical application. The more providers build out consulting capabilities, the more we expect that to change significantly.
Brokers of Capability	Orienting governance to source expertise from all available sources, both internally and externally, to address capability gaps		The broad set of platforms and frameworks support moving toward the notion of service orchestration; governance is still slow to move toward the experience-centric mindset essential for digital transformation.
Collaborative Engagement	Ensuring relationships are contracted to drive sustained expertise and defined outcomes		Collaboration has two key focal points: First and foremost, around conversational services; second, around crowdsourcing. Providers need to demonstrate proof-points.
Intelligent Automation	Using automation and cognitive computing to blend analytics, talent, and technology		Not all AI is plug-and-play. Most providers remain focused on Autonomics and motoring. Most providers talk about predictive maintenance, but it remains largely aspirational.
Accessible and Actionable Data	Applying analytics models, techniques, and insights from big data in real-time		As the market is progressing from Analytics to AI, solid set of capabilities, but slow journey toward expanding toward data-centric mindset and business model change.
Holistic Security	Proactively managing digital data across the service chain of people, systems, and processes		While the market is relatively mature around data governance, the opposite is true for assessing the risks when advancing to self-learning and self-remediating systems. Includes lack of specialist testing services
Plug-and-Play Digital Business Services	Plugging into "ready to go" business-outcome-focused people, process, and technology solutions with security measures		Plug-and-play capabilities are largely confined to AI platforms. However, even those platforms require training to support robust delivery. Will have significant impact as the market matures.

Research Methodology

Required Information and Model Weighting

Execution	
How the service provider works with clients to integrate automation into their delivery capabilities	25%
How the service provider addresses training and supporting clients	5%
Actual delivery of services	30%
Scale and repeatability of deployments	20%
How the service provider is leveraging service orchestration to deliver end-to-end and point solutions	10%
How the service provider supports clients with use case identification and match those with most relevant tools and approaches	10%
Innovation	
Vision for and investments in the evolution of intelligent automation	25%
Expanding service delivery toward AI	15%
Tool and platform strategy for intelligent automation delivery	20%
Data management strategies supporting the integration of semi and unstructured data	10%
Governance and testing services (e.g., services that offer innovative approaches for cognitive, AI, and self-remediating engines)	10%
Leverage of Design Thinking, co-ideation for reimagining and transforming processes	10%
Integration of process and organizational consulting	10%

Note: These scores will be based on the RFI response and the feedback from the client references.

Execution Definitions

Execution	How well does the service provider execute on its contractual agreement, and how well does the provider manage the client/provider relationship?
How the service provider works with clients to integrate automation into their delivery capabilities	How engaged is the executive and management team in defining and managing the delivery of IA? Do providers help clients to understand the end-goal of automation?
How the service provider addresses training and supporting clients	Is the service provider addressing the impact on talent? How is the provider advising on and supporting the transformation of knowledge work? Is there a structured approach to training?
Delivering actual services	What are the client's and market's overall impression of the quality of service across the value chain from this service provider? How is IA helping clients to transform processes? What is the overall impact on client processes?
Scale and repeatability of deployments	How is the service provider addressing scaling deployments across clients' processes? Is the service provider seeking to move to repeatability of IA solutions and projects?
How the service provider is leveraging service orchestration to deliver end-to-end and point solutions	When looking at a client's IA issues, can the service provider offer various solutions (point and end to end) to create a flexible and configurable (or customized) response? How is the service provider leveraging approaches for service orchestration and integration to deliver IA?
How the service provider supports clients with use case identification and matches those with most relevant tools and approaches	How is the service provider engaging with clients to transform their processes? What is the starting point for those discussions?

Innovation Definitions

Innovation	How well does the service provider innovate its offering(s) in response to market demand, client requirements and its own vision for how the IA market will evolve?
Vision and committed investments for the evolution of intelligent automation	What is the service provider's vision for the evolution of IA? Is there a clear strategy for delivering broader capabilities As-a-Service and are there identifiable investments in place to realize this strategy today?
Expanding service delivery toward AI	How does the service provider expand its delivery capabilities toward AI? What are examples for both partnerships as well as successful deployments? How do these deployments differ from RPA projects?
Tool and platform strategy for intelligent automation delivery	What is the role of tools and platforms in the service provider's offering strategy? Are the selected platforms developed in-house or are they provided by third parties? Is there a demonstrable intent to maintain and enhance the in-house platforms?
Data management strategies supporting the integration of semi and unstructured data	How does the service provider work with clients to develop a comprehensive set of data and then in turn make the analysis of that data and the development of insights possible? Is the service provider allowed by clients to act upon the developed data to improve the effectiveness of overall service delivery? Does the service provider have a vision to integrate IA with actionable data?
Governance and testing services (e.g., services that offer innovative approaches for cognitive, AI, and self-remediating engines)	How are these new environments to be governed? How is the service provider testing these new environments? How does this approach differ from traditional testing approaches?
Integration of process and organizational consulting	How does the service provider combine capabilities in process and organizational consulting and supporting technology in the form to create innovative IA offerings?
Leverage of design thinking, co-ideation for reimagining and transforming processes	How effectively does the service provider embed Design Thinking methodologies and notions of co-ideation in its IA engagements to define, prioritize, and execute against business outcomes of IA initiatives?

Research Methodology

Data Summary

- The data for this Blueprint was collected in Q3/4 2017, and covers services buyers, service providers, and advisors and influencers of Intelligent Automation.
- Invitations were sent to the top 20 service providers and consultancies by revenue.
- This report builds on the research for the HfS Intelligent Automation Blueprint 2017 and the AI-enabled OneOffice Premier League 2017. Furthermore, it is leveraging the ongoing discussion with stakeholders as part of HfS Intelligent Automation practice.

This Report Is Based On:

- **Tales from the Trenches:** Interviews were conducted with buyers who have evaluated service providers and experienced their services. Some were supplied by service providers, but many interviews were conducted by HfS Executive Council members and participants in our extensive market research.
- **Sell-Side Executive Briefings:** Structured discussions with service providers were intended to collect data necessary to evaluate their innovation, execution, market share, and deal counts.
- **Publicly Available Information:** Financial data, website information, presentations given by senior executives, and other marketing collateral were evaluated.

Participating Service Providers

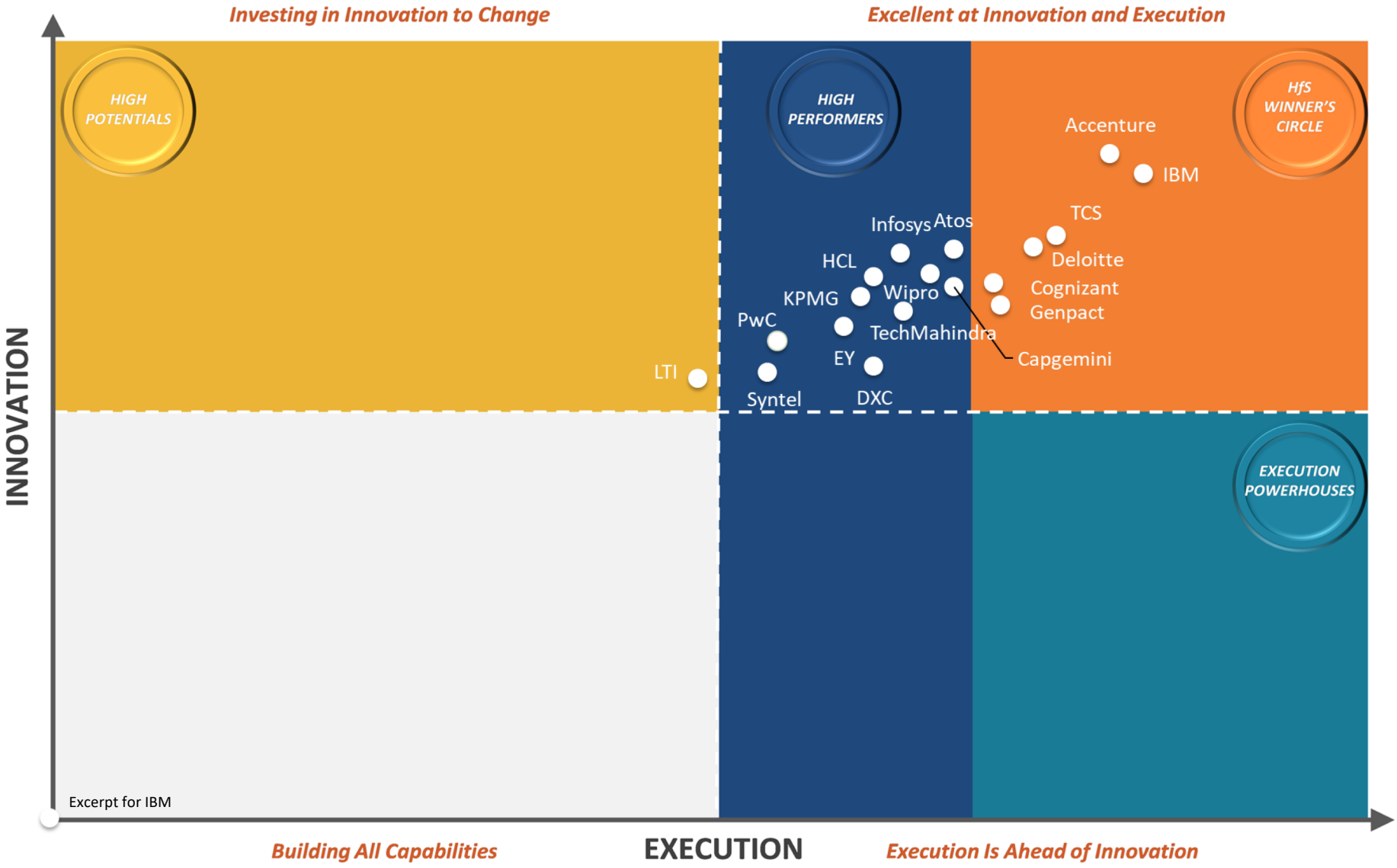
Service Provider Grid

Guide to the Blueprint Grid

To distinguish service providers that show competitive differentiation in a particular line of delivery with progress in realizing the As-a-Service Economy of business-outcome-oriented, on-demand talent and technology services, HfS awards these providers the As-a-Service Winner's Circle designation.

	Execution	Innovation
Winner's Circle shows excellence recognized by clients in the Eight Ideals in execution and innovation	Collaborative relationships with clients, services executed with a combination of talent and technology as appropriate, and flexible arrangements	Articulates vision and a "new way of thinking," has recognizable investments in future capabilities and strong client feedback, and is driving new insights and models
High Performers demonstrate strong capabilities but lack an innovative vision or momentum in execution against the vision	Execute some of the following areas with excellence: worthwhile relationships with clients, services executed with "green lights," and flexibility when meeting clients' needs	Typically describe a vision and plans to invest in future capabilities and partnerships for As-a-Service and illustrate an ability to leverage digital technologies or develop new insights with clients
High Potentials demonstrate vision and strategy but have yet to gain momentum in executing the strategy and vision	Early results and proof points from examples in new service areas or innovative service models but lack scale, broad impact, and momentum in the capability under review	Well-plotted strategy and thought leadership, showcased use of newer technologies or roadmap, and talent development plans
Execution Powerhouses demonstrate solid, reliable execution, but have yet to show significant innovation or vision	Evidence of operational excellence; however, still more of a directive engagement between a service provider and its clients	Lack of evident vision and investment in future-oriented capability, such as skills development, "intelligent operations," or digital technologies

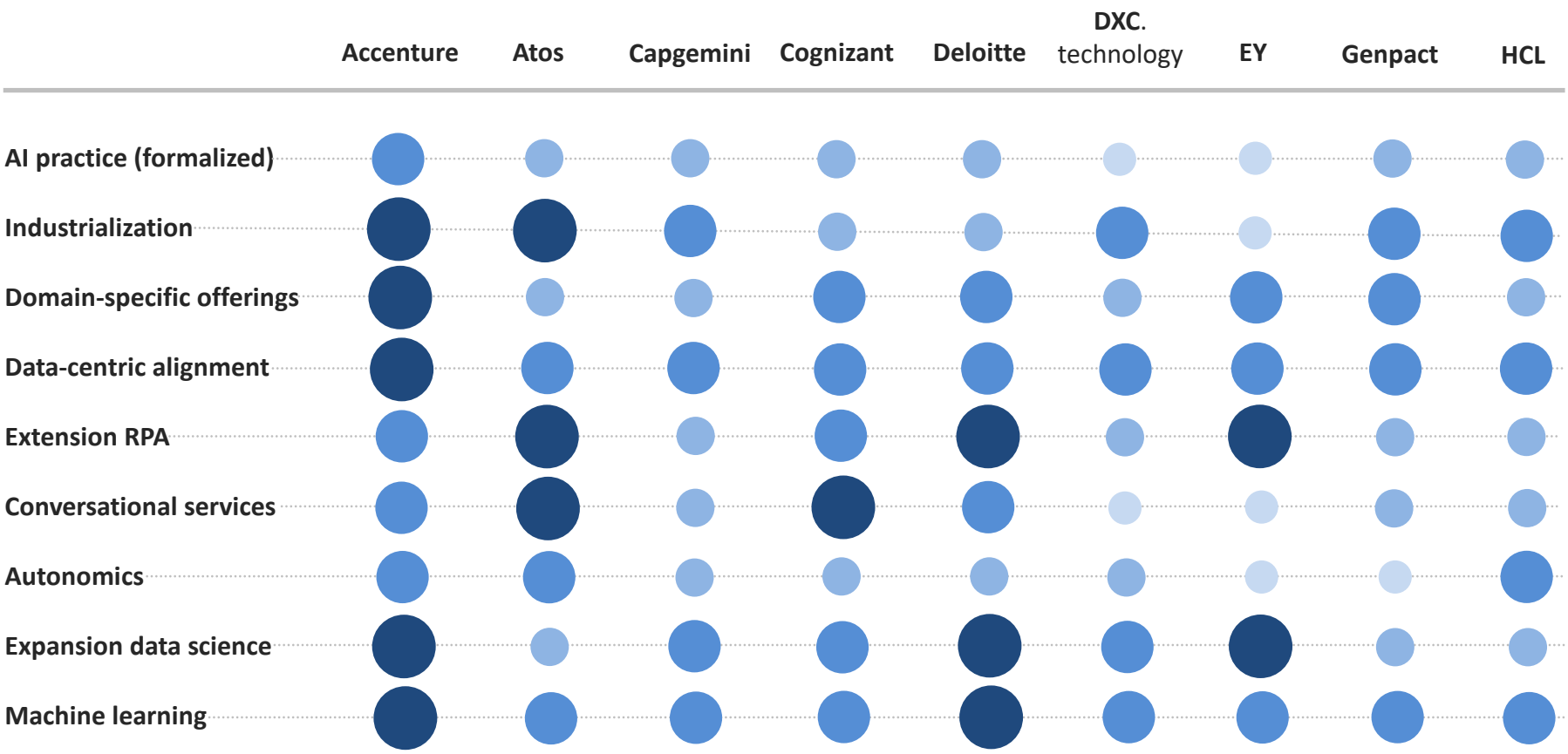
HfS Blueprint Grid: Enterprise AI Services



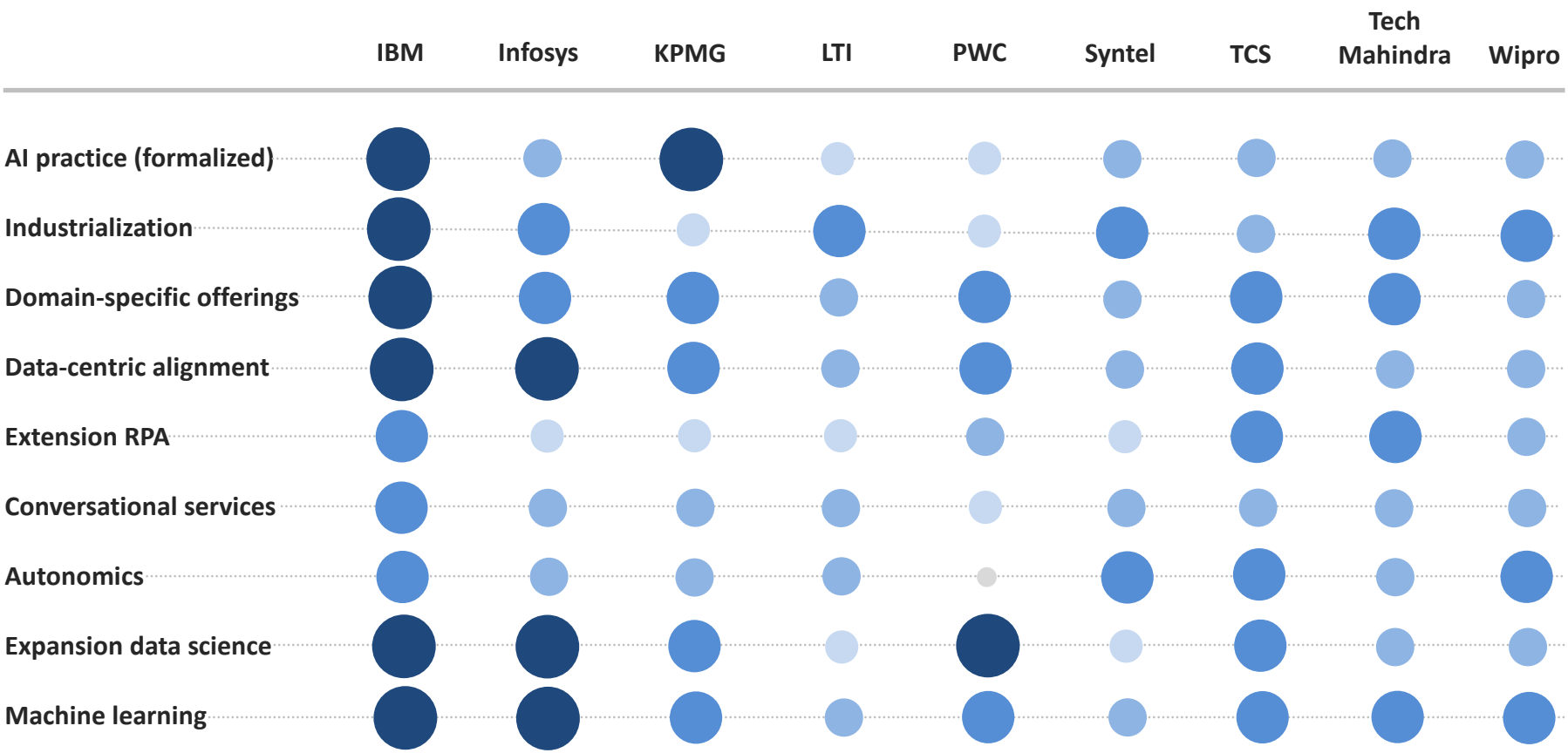
Assessing AI Capabilities and Maturity

- AI, just like automation, is in the eye of the beholder. Therefore, we have to be cognizant of both the different starting points and context of projects. The scale, complexity, and necessary investments are vastly different for projects like (low level) chatbots and (high level) data science.
- Similarly, providers have a different strategic focus and sweet spots. System integrators and BPOs are predominantly about industrialization services and offerings, while for instance the Big Four consultancies have a strong domain-specific focus such as vertically aligned data science projects.
- Thus, the mapping on slides 36 and 37 is an additional way to provide more differentiation along those focal areas and starting points for AI projects
- The criteria used in the mapping includes progress on the formalization of an AI practice as a measure of organizational maturity and data-centric alignment as to how data and AI strategies are being aligned and integrated. Furthermore, we try to offer more differentiation between low-level projects like conversational services and RPA extension and more complex projects like data science expansion and autonomics.
- This guidance is meant for organizations looking for insights who to include in their RFIs and strategic initiatives.

AI Capability and Maturity Mapping



AI Capability and Maturity Mapping



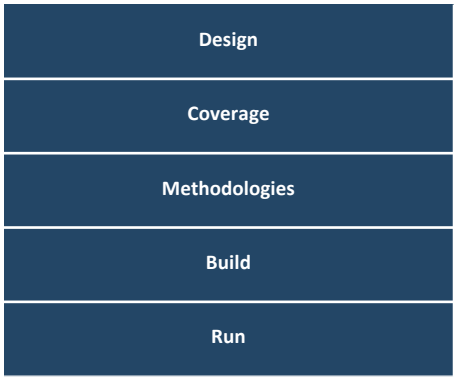
Service Provider Profiles

HfS Intelligent Automation Value Chain: Key to Profiles

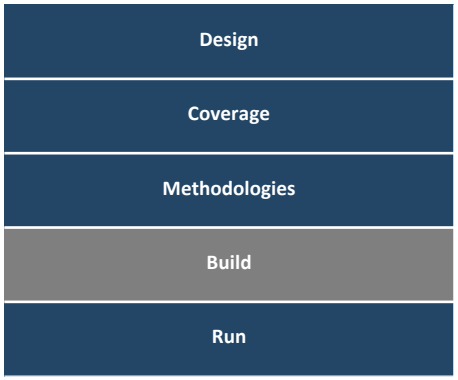
- Value Chain coverage is indicated by blue shading.
- Grey shading indicates that the service provider does not offer these services.

For example:

Full Value Chain offered



"Build" not offered



- Each profile also includes an "Operations" box where we list service provider statistics.
- "N/A" indicates that the service provider does not have this service today. In many cases, the service provider may have these certification applications in progress.

Major Service Provider Dynamics: Highlights

Execution

IBM is the leading provider in execution as clients cite best-in-class transformation capabilities that are underpinned by expansive IP including Watson, Weather Channel, and AlchemyAPI. Clients value IBM as a strategic partner that has demonstrated the robustness of automation without a single (or at least very limited) outage.

- **Actual delivery of services:** The key reference points are the depth and scale of use cases along the duplexity of AI. Furthermore, the focus is on solving business problems rather than engaging around technology capabilities. **IBM, Accenture, Deloitte, and TCS** are standing out in this regard.
- **Scale and repeatability:** Invariably stronger developed on the service provider side as they aim to industrialize service delivery. **IBM, Accenture,** and **TCS** are being called out by clients for blending AI into broader service provider capabilities. **Deloitte** and **EY** are referenced for robust RPA extension, driving deployments as part of broader digital initiatives.
- **Supports clients with use case identification and matches those with most relevant tools and approaches:** As was with the early RPA market, the identification of use cases and matching those with tools and technologies is critical for achieving robust delivery. **Accenture, IBM,** and **Deloitte** are leveraging their consulting expertise to achieve tangible results**.**

Innovation

Accenture is the leading provider in innovation. Its myWizard platform is a lighthouse investment for innovation. Clients reference that Accenture doesn't come across transactional; rather it comes across as a strong thought-leader with a more consultative approach: "They are making AI easy for us".

- **Vision for and investments in the evolution of Intelligent Automation:** Given the duplexity of AI, service providers are at the forefront of integrating AI into their delivery backbones. **Accenture, IBM, TCS,** and **HCL** stand out for their vision for the evolution of Intelligent Automation and AI.
- **Expanding service delivery toward AI:** Broadly speaking, the market is early in expanding toward AI. But both the investments and pace of change are astounding. **IBM, Accenture, Infosys, Atos, and TCS** impressed both in terms of vision as well as capabilities.
- **Governance and testing services:** Only few providers have demonstrated thought leadership and best practices around AI. **Accenture**'s Teach and Test solution is leading the market with addressing issues such as bias as well as taking the end-to-end processes in mind. Similarly, **IBM** and **TCS** have demonstrated both though-leadership as well as robust capabilities.

IBM

Winner's Circle

Leading global service provider driving AI at scale with differentiating assets around Watson ecosystem

Blueprint Leading Highlights

- Vision for and investments in the evolution of Intelligent Automation
- Scale and repeatability of deployments
- Expanding service delivery toward AI
- Data management strategies integrating semi and unstructured data

Plan

Implement

Manage

Operate

Optimize

Strengths

- **Strong association with cognitive and AI:** Through the Watson brand and its capabilities, IBM has become synonymous with the advance toward Cognitive and AI. For IBM, Cognitive is a strategic pillar of its corporate strategy along with cloud. Thus, IBM is broadly being perceived as early mover and thought-leader in the space.
- **Deep investments in Watson capabilities:** Deep long-term investments in Watson are further enhanced by acquisitions including the Weather Channel and AlchemyAPI. The Weather Channel acquisition highlights the investments in data assets that complement technology advances.
- **Formalized AI practice:** Cognitive Business Decision Support (CBDS) sits within GBS, within this service line, there is Advanced Analytics, Watson AI & Data Platform, Watson IoT, and SCM, and Watson Health. This drives AI as a foundational layer across the organization.
- **Driving scale through focus on core technologies:** IBM is focusing on three core technologies and driving them out at scale: Blue Prism in RPA, IPsoft in Autonomics, and Watson as a virtual agent and broader analytics scenarios. Some clients value IBM as a strategic partner that has demonstrated the robustness of automation without a single outage.
- **Broad set of vertical and domain-specific offerings**, including Cognitive Network Monitoring for telcos, cognitive manufacturing, visual inspection for work quality, and cognitive assignments for HR.

Challenges

- **More nuanced and detailed communication of Watson capabilities.** Cognitive and Watson are a central pillar of IBM's corporate strategy, which at times leads to an inflationary use of the cognitive moniker or too generic communication. Some of IBM's competitors partnering around Watson capabilities articulate their strategy more succinctly than IBM.
- **Watson curtails technology and tool choice:** While Watson offers a plethora of capabilities, some clients would like to see a broader choice in tools and technologies. Not least in the context of perceived necessary investments for projects. HfS acknowledges that there is at times a trade off between technology choice and robustness of delivery.
- **Loss of high-profile Watson accounts**: Press coverage of the loss of some hospital accounts with significant investment levels in Watson, reinforces the necessity of a more nuanced communication.

Relevant Acquisitions/Partnerships

Acquisitions include:

- AlchemyAPI
- Blekko
- Merge Healthcare
- The Weather Company
- Truven Health Analytics
- UStream
- Promontory Financial Group

Partnerships include:

- IPsoft
- SAP
- Light Bend
- Live Person

Key Clients

IBM works with clients across industry sectors:

- Sysco
- Danske Bank
- Maersk
- Exxon Mobil
- KONE
- Korean Airlines
- Quest Diagnostics
- MetLife
- Medtronic
- AmeriSource Bergen

Operations

Geographic footprint and scale of the AI practice:

The AI business (like all of the CBDS Service Line) focuses on 14 industries but their most successful are financial services, insurance, public sector, healthcare, and telco, with most resources in this space located in the US, EU, Japan, and India.

Technology Tools and Platforms

- **IBM Services Platform with Watson**: Foundational to IBM's AI-powered automation with single platform integration. Thus, allowing to deploy "consumable" services to clients. Building blocks include IBM Watson and Analytics as well as specialized Data Lake APIs for handling service management data.
- **Representative Watson APIs:** Include Vsion (visual recognition), Language (natural language classifier, language translator, personality insights, tone analyser, natural language understanding), Speech (speech to text, text to speech), Data Insights (retrieve and rank, document conversion), Conversation and Discovery (enable the user or application to find relevant information through cognitive and AI search capabilities.).
- **Automation Fabric**: Integration between RPA, BPM, analytics, and cognitive tools.

Market Predictions and Recommendations

Market Predictions in Enterprise AI Services

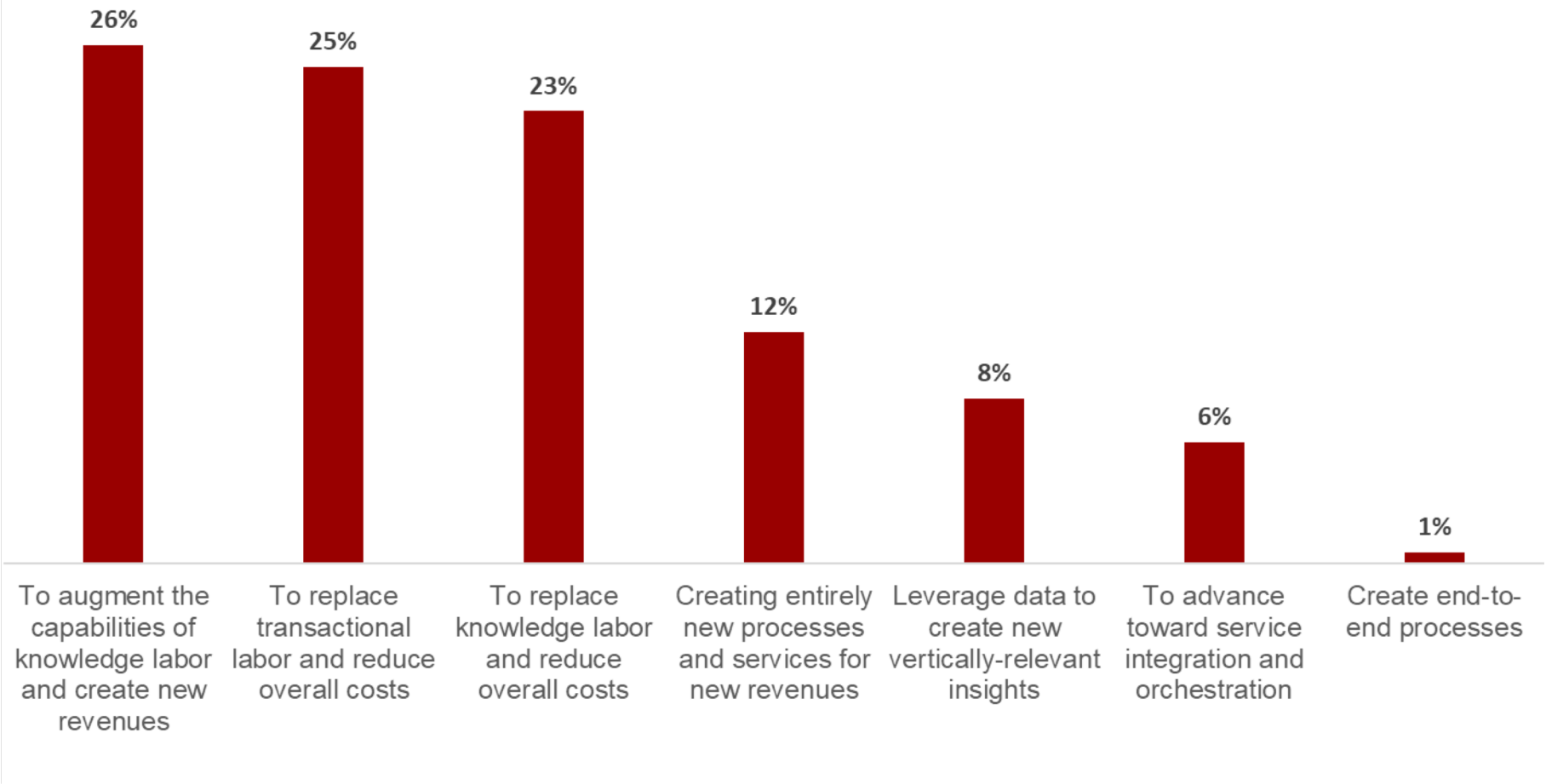
- **Organizational maturity around AI to accelerate:** Most providers will either understand AI as a foundational layer across their organization or even move to a dedicated AI practice. This increasing maturity will lead to a more robust education of stakeholders.
- **Stack players and mega ISVs will double down on AI**: Oracle's announcement of its Autonomous Database as well as SAP buying Recast.ai are an indication for an arms race on AI by the large stack players and mega ISVs. Those capabilities will be blended into both existing offerings and enhance specific AI platforms such as SAP Leonardo.
- **Most startups will be absorbed by M&A:** As one supply side executive pointedly put it, "the understanding of what is best-of-breed is changing weekly". Therefore, providers, especially outside the Winners Circle, are coy to devote too many resources to partner with those startups. However, a set of providers like Avaamo, CognitiveScale, and Loop AI have the opportunity to evolve into a reference partner for broader AI capabilities.
- **New set of specialist consultancies coming to the fore:** Just like Genfour and Symphony Ventures were at the forefront of educating and leading transformational RPA projects, we are likely to see the emergence of a new breed of consultancy replicating. Some of the RPA pure plays will morph into broader offerings.
- **Lack of governance might lead to high profile litigation**: The absence of discussions around risk and immature governance strategies that underestimate the impact of self-learning and self-remediating systems is likely to lead to high-profile cases of litigation, which in turn will help to mature AI capabilities.
- **Automated training of Machine Learning algorithms will accelerate and transform the market**: Technologies such as Gluon and AutoML are accelerating the training of algorithms. As slide 25 has highlighted, the Holy Grail of AI is at the intersection of iterative data inputs and minimal training of algorithms. Higher levels of unsupervised learning are critical to advance toward notions of end-to-end processes to accelerate the journey toward the OneOffice.

How Service Providers Can Differentiate in 2018 & Beyond

- **Demonstrating the impact on the Future of Work**: As the data on slide 62 shows, organizations see the biggest potential for AI in either augmenting or replacing labor. Therefore, a realistic guidance as to how organizations have to approach the transformation of their workforces is essential. This should include HR strategies, talent management, and effective change management.
- **Clarity on required investments whilst supporting change management**: As the data on slide 63 outlining the inhibitors for AI suggests, the most critical issues preventing AI projects are demonstrating that the required investment level justifies any potential disruption and redresses the notion that enterprise software platforms will provide all the necessary capabilities over the next five years.
- **Guidance on use cases and lessons learned:** The fourth most critical inhibitor is that organizations don't know where to start. Just like the early RPA days, the market urgently needs realistic guidance and thought-leadership. Of critical importance is playing back the experiences from the early deployments.
- **More nuanced communication between industrialization and project-centric requirements:** As we have called out repeatedly, the starting points and context for AI projects can be vastly different. Thus, go-to-market strategies have to expanded by more nuanced communication taking into account the respective vantage point of stakeholders.
- **Governance beyond data**: As organizations are progressing toward the OneOffice with ever more scalable end-to-end processes, the market urgently needs more holistic approaches to governances that brings security, testing services, process, and data governance together. GDPR legislation is a telling example for the urgency in building out those capabilities.
- **Put the process owner center stage**: Avoid jargon and technology-centric communication and put the process owner center stage by discussing business problems being solved in ways that are not possible with other technology and approaches.

The Biggest Benefits of AI

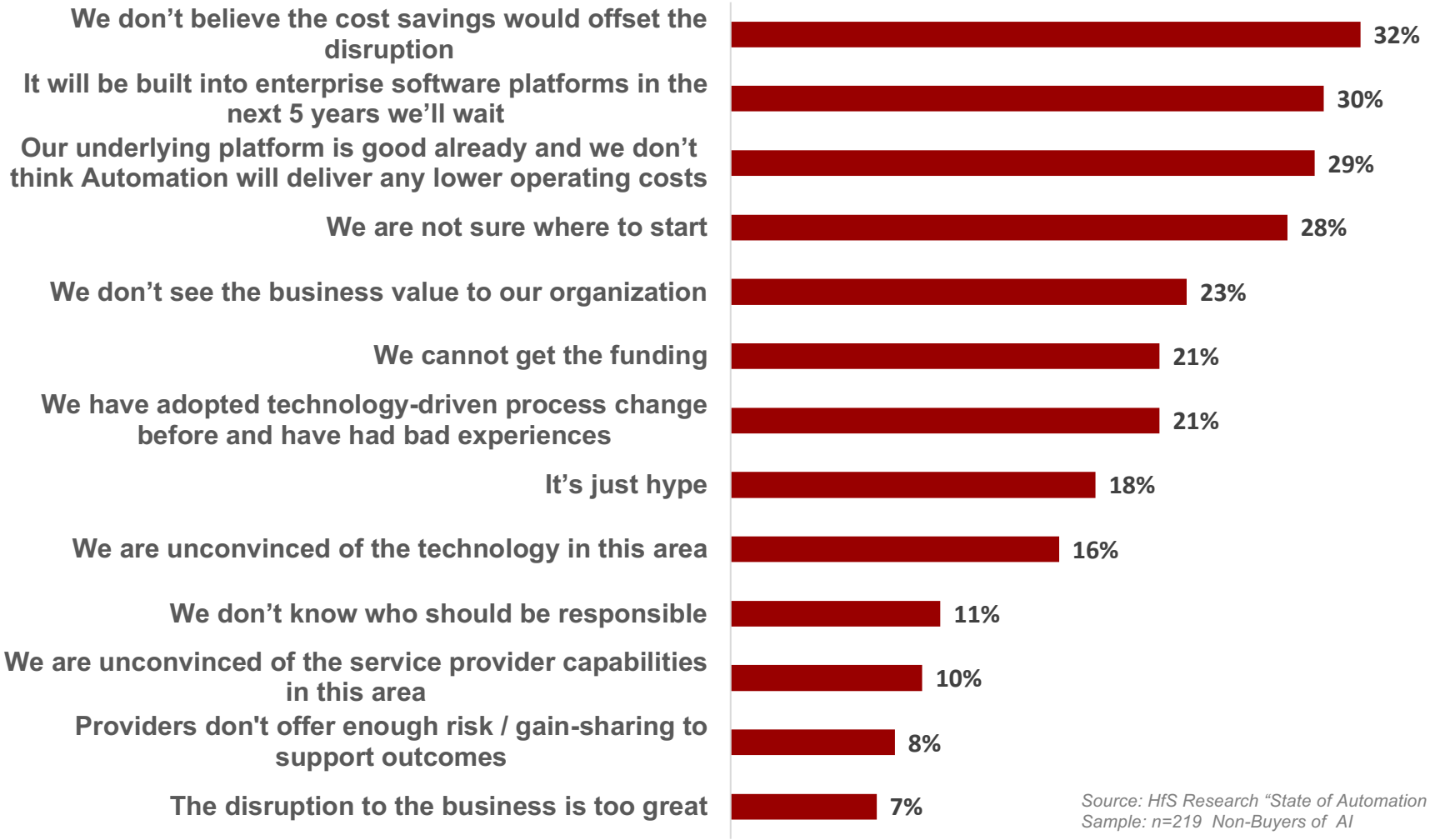
What do you believe to be the greatest potential benefit of AI?



Source: "State of Automation 2017"
Sample: n=181 Buyers of AI

What Is Preventing the Use of AI?

What is stopping you from using AI Automation?



Source: HfS Research "State of Automation 2017"
Sample: n=219 Non-Buyers of AI

2018 Recommendations: Service Providers

- **Invest in guiding clients around business problems and use cases:** Move beyond tool and technology mindset in order to support clients' journey toward the OneOffice. In terms of communication, best practices are approaches by firms like Capgemini and KPMG to describe the services delivered around generic activities including *extract, interpret, classify, diagnose, retrieve, and recommend*. Furthermore, there is an acute lack of realistic thought leadership on Enterprise AI, thus by being seen as an innovator and thought leader you can achieve competitive differentiation. By doing so, don't fall into the trap of highlighting unicorns and consumer technology issues. The relevant context should be enterprises held back by legacy systems.

- **Drive AI as a foundational layer across the organization:** To advance toward the OneOffice, progress on collapsing organizational boarders and drive AI and data as a foundational layer across the organization with the end goal of straight-through processing and end-to-end processes. Help clients to understand that they need the blend of the skills sets of data engineers and data scientists in order to be able to directly integrate data into production.

- **Explore the industrialization of data science:** As the market is awash with lower level machine learning and conversational services, the industrialization of high level and high value data science might provide both differentiation and stickiness in client relationships. In other words, leverage and blend both industrialization and project-centric work.

- **Re-evaluate partner eco-systems**: IBM Watson, TCS ignio, and Infosys NIA are examples for ecosystems that are being opened to competitors. Explore co-innovation and be clear about your strategic bets. In particular, demonstrate domain-specific capabilities and use cases. This can help to overcome fears of vendor lock-in around data issues that are widespread among the buy side.

2018 Recommendations: Buyers

- **Prioritize the evaluation of processes that can be automated through AI:** Building on the learnings from the early RPA deployments, prioritize the evaluation of processes that can be automated and enhanced by AI. Be clear on the business goals that are meant to be achieved.
- **Make talent a strategic priority**: Talent that understands the innovation subsumed under the AI moniker and more importantly their impact on workflows and process chains is scarce. Critically the buy side won't have first (or even second) pick from graduates. Therefore, organizations should review and refine their strategic approach to talent.
- **Leverage Design Thinking and co-innovation:** The ultimate goal of your AI projects should be to solve problems that can't be solved with other technology and approaches. Focus on re-imagining your processes rather than applying AI as patch work. Seek out specialist consultancies that can help drive the process.
- **Make data the cornerstone of your delivery strategy:** The Holy Grail of service delivery is at the intersection of automation, analytics, and data, particularly around the blending of iterative data inputs with minimal training of algorithms. Be mindful of the hype and hollow promises that platforms, cognitive libraries and machine learning will deal with your business problems. Rather invest in talent that blends data engineering and data science.
- **Move beyond an FTE-centric mindset:** Mature buyers are progressing from an FTE-centric mindset and traditional approaches to business cases. The essence of digital and Intelligent Automation is that routine service delivery is being decoupled from labor arbitrage. This necessitates to move to softer metrics such as business agility and customer satisfaction. The expectation is that on high scores for those metrics, cost savings and other tangible benefits will follow.

About the Author

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Overview

- Tom Reuner is Senior Vice President, Intelligent Automation and IT Services at HfS. Tom is responsible for driving the HfS research agenda for Intelligent Automation and IT Services. Automation cuts across the whole gamut ranging from RPA to Autonomics to Cognitive Computing and Artificial Intelligence. This includes increasingly the intersections of unstructured data, analytics, and Cognitive Automation while mobilizing the HfS analysts to research Intelligent Automation dynamics across specific industries and business functions. Furthermore, he is supporting HfS' push to disrupt IT Services research by focusing on application services and testing. A central theme for all his research is the increasing linkages between technological evolution and evolution in the delivery of business processes.

Previous Experience

- Tom's deep understanding of the dynamics of this market comes from having held senior positions with Gartner, Ovum and KPMG Consulting in the UK and with IDC in Germany where his responsibilities ranged from research and consulting to business development. He has always been involved in advising clients on the formulation of strategies, guiding them through methodologies and analytical data and working with clients to develop impactful and actionable insights. Tom is frequently quoted in the leading business and national press, has appeared on TV, and is a regular presenter at conferences.

Education

- Tom has a PhD in History from the University of Göttingen in Germany.

2018 AI Research Agenda

Change Agents. Triple-A Trifecta: Artificial Intelligence (AI)

"Boards are paranoid about automation and AI, but they struggle to turn it into an actionable mandate. Thus, HfS Intelligent Automation practice is aiming to guide stakeholders through the secular shift of decoupling service delivery from labor arbitrage. This guidance is based on the intimate knowledge of the leading players and on the best practices emerging from the early deployments."

- Tom Reuner

Research leader: Tom Reuner; Thought Partners: Phil Fersht, Saurabh Gupta, Melissa O'Brien, John O'Brien, Reetika Fleming

Timeline	Horizon 1: Act now	Horizon 2: Watch out	Horizon 3: Investigate
Q1 2018	• BP: Enterprise AI services • Emerging Market Guide: Cognitive Agents • PoV: Salesforce Einstein • PoV: AWS Cognitive Services • PoV: Voice of the customer in Enterprise AI services	• PoV: Digital Transformation needs Data and Algorithms	• PoV: The role of data in the "OneOffice" vision
Q2 2018	• PoV: Reality check on data capture/OCR • PoV: Making work easier for data analysts, engineers, and scientists • PoV: Voice of the Customer, Cognitive Agents • PoV: Reality v. Hype: Chatbots vs. Cognitive Agents	• Emerging Market Guide: Microsoft Cognitive Services/AI capabilities • Emerging Market Guide: Machine Learning • POV: How will IoT influence Triple-A Trifecta?	• PoV/Hot Vendors: Emerging players in AI
Q3 2018	• PoV: Primer for understanding ML and DL, devising data management strategies	• Emerging Market Guide: Google Cognitive Services/AI capabilities • POV: The intersection of the HfS Triple-A Trifecta and Blockchain	
Q4 2018	• BP: Intelligent Automation across the Triple-A Trifecta • PoV: Voice of the customer in Intelligent Automation		• PoV: From BI to AI

Premium research

The HfS Mission: Defining Future Business Operations

HfS' mission is to provide visionary insight into the major innovations impacting business operations: automation, artificial intelligence, blockchain, digital business models, and smart analytics. We focus on the future of operations across key industries. We influence the strategies of enterprise customers to develop operational backbones to stay competitive and partner with capable services providers, technology suppliers, and third-party advisors.

HfS is the changing face of the analyst industry combining knowledge with impact:

- ThinkTank model to collaborate with enterprise customers and other industry stakeholders
- 3000 enterprise customer interviews annually across the Global 2000
- A highly experienced analyst team
- Unrivaled industry summits
- Comprehensive data products on the future of operations and IT services across industries
- A growing readership of more than one million annually.

The As-a-Service Economy and OneOffice™ are revolutionizing the industry.