ARTIFICIAL INTELLIGENCE IN INDIAN ENTERPRISES: PREPARING FOR THE FUTURE

Sponsored by: Intel India

Nishant Bansal   Shalil Gupta
Sandeep Sharma
December 2017

A. EXECUTIVE SUMMARY

Artificial Intelligence (AI)/Cognitive is being hailed as the core ingredient for Digital Transformation (DX) in Enterprises. IDC predicts that by 2019, 40% of all DX initiatives will be empowered by AI capabilities, providing timely critical insights for new operating and monetization models.

While business anticipations run high for AI, how are Indian organizations responding to this emergent phenomenon? An IDC *2017 Cognitive AI Adoption Survey* of 194 Indian organizations has revealed an increasing appreciation of the far-reaching business implications of AI.

As per IDC survey, an overwhelming 68.6% of organizations in India across verticals are expected to deploy AI within the next 18 months indicating adoption of AI in mainstream business. Telecommunications, Media, and Technology (TMT) and BFSI companies seem to have taken a lead in innovation with regards to current AI adoption, while, in the next 18 months organizations across Retail, Professional Services, Manufacturing and Healthcare verticals are expected to follow suit.

Organizations foresee an array of dividends from AI embracement- these include transforming business models, improving operational efficiencies, revamping customer engagement, and most importantly, improving profitability.

- Nearly 75% of the firms anticipate benefits in business process efficiency and employee productivity with the use of AI.
- 64% of organizations believe that AI can empower them in revenue augmentation through better targeting of offers and improved sales processes.

Additionally, several use cases (including those specific to only certain verticals) are also being experimented upon:
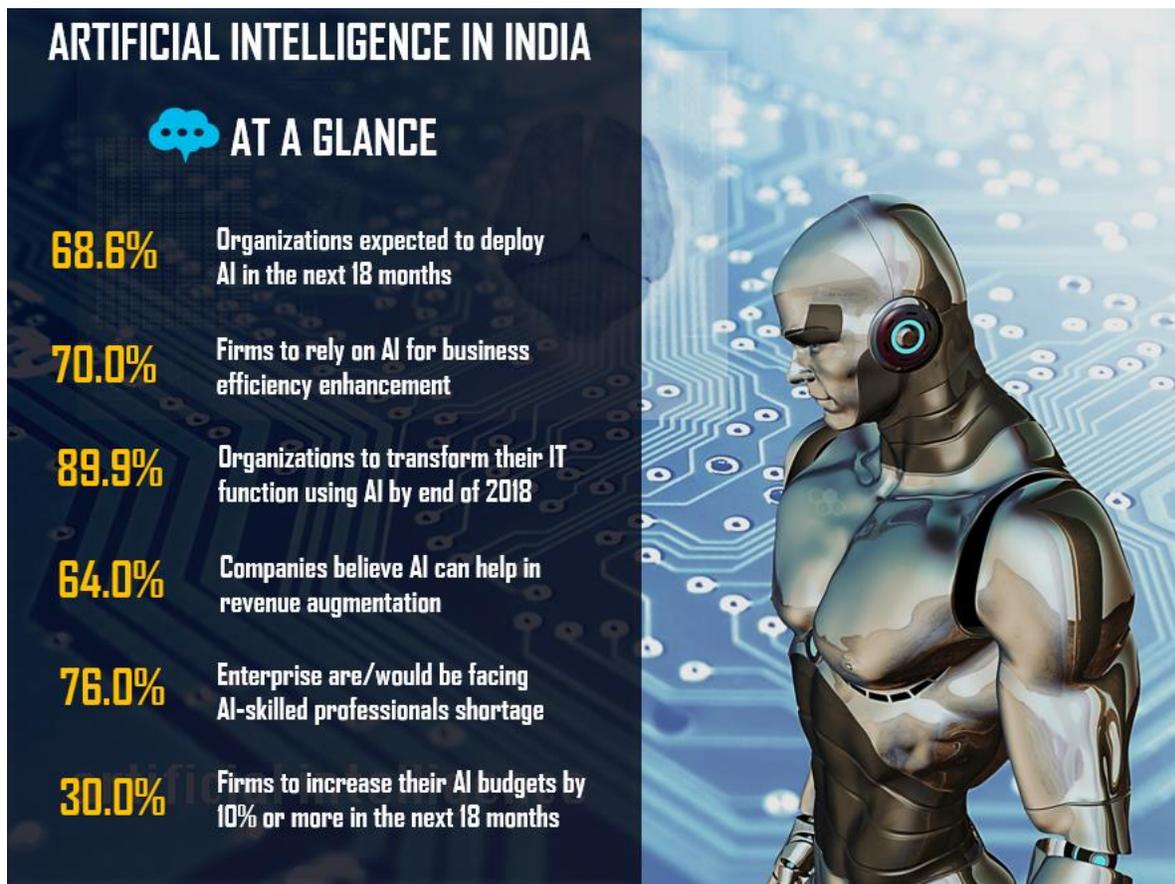
- IT Automation is the major cross vertical use case which organizations are primarily focusing on to improve efficiency.
- Fraud Analysis is a challenge currently being tackled by around 60% of Financial Services companies, owing to greater efficacy in analyzing huge volumes of structured and unstructured data.
- Similarly, Diagnosis & Treatment is already being utilized in several hospitals in India to sift through and make sense of data.
- In the manufacturing vertical, AI is being used to refine quality management processes.

While the potential of AI is being appreciated, organizations face several challenges in their AI journey.

- Currently, as most of the AI projects are in the pilot phase; executives are realizing that it will require significant effort and cost to deploy these solutions throughout the organization and they are not sure if such scale of investment can be justified or not.
- Additionally, the industry faces an acute shortage of skilled professionals with the required AI consulting, implementation, and support expertise.
- Cybersecurity issue associated with the migration and analysis of data using cloud infrastructure is another avenue that needs to be addressed by organizations and the vendor ecosystem.

FIGURE 1

Artificial Intelligence in India - At a Glance

ARTIFICIAL INTELLIGENCE IN INDIA

AT A GLANCE

68.6% Organizations expected to deploy AI in the next 18 months

70.0% Firms to rely on AI for business efficiency enhancement

89.9% Organizations to transform their IT function using AI by end of 2018

64.0% Companies believe AI can help in revenue augmentation

76.0% Enterprise are/would be facing AI-skilled professionals shortage

30.0% Firms to increase their AI budgets by 10% or more in the next 18 months

Source: IDC, 2017, n=194

B: IN THIS WHITE PAPER

AI has received enormous attention from Indian enterprises and as it becomes mainstream in next 18 months with 68.6% adoption rate, organizations are looking to understand its true potential and how it can benefit them. Equally important for them is to assess the AI pursuit by their ecosystem stakeholders (mostly their customers, and competitors).

This white paper presents research findings on the current adoption and outlook for AI amongst Indian enterprises. A total of 194 large and very large IT End User organizations were surveyed across four key industry verticals: BFSI, TMT, Manufacturing (including Automotive) and Retail, Professional Services and Healthcare Services (See Figure 2).

The document provides an assessment of the current adoption and outlook for AI in India, and begins by aggregating the findings across the following heads:

- Are the Indian organizations currently leveraging AI? What would be their maturity levels in the next 18 months? Which are the major industry verticals that have adopted AI?
- What are the AI applications (use-cases) that are prominent currently across the 4 industry vertical groups? How would these evolve over the next 18 months?
- What are the benefits and barriers organizations seeing from AI implementation?
- How much do the organizations intend to invest in their AI programs?

These are followed by IDC recommendations that highlight the key approaches to successful AI implementations.

FIGURE 2

India AI Adoption Survey: Respondent Demographics
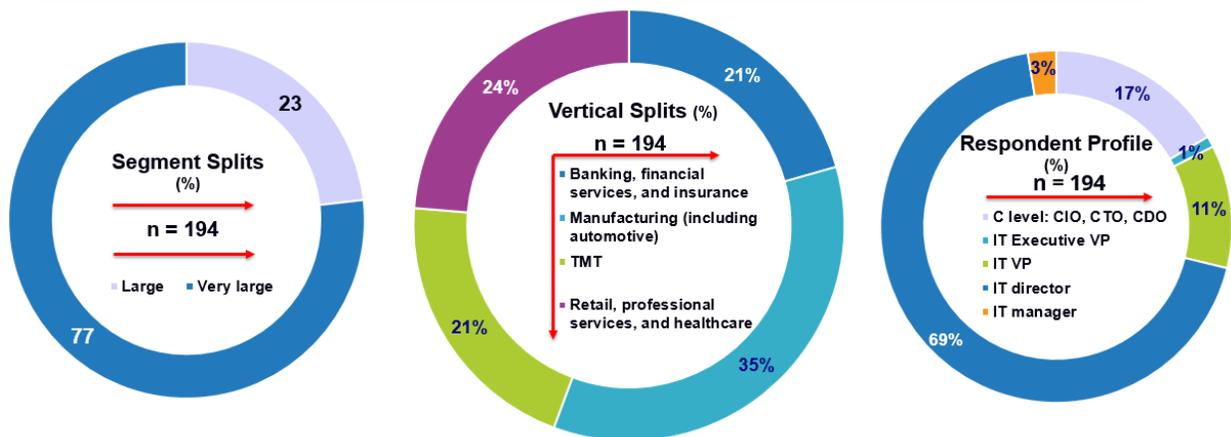
Notes:

Very large organizations ≥ 1,000 employees

Large organizations: 500–999 employees

CTO = chief technological officer; CDO = chief digital officer; CIO = chief information officer

Source: IDC, 2017

C: HOW DO INDIAN ENTERPRISES FARE ON THE AI DEPLOYMENT METER?

Indian enterprises have been quick to adopt AI in the recent past; nearly one in five organizations (22.2%) across the four verticals surveyed have already inched ahead with such implementations. This number is anticipated to soar considerably in the next 18 months with nearly 7 in 10 firms (68.6%) anticipated to leverage Cognitive systems, indicating that the technology will reach mainstream adoption (See Figure 3).

TMT companies (with 37.5% adoption) have shown the lead currently, especially the Technology companies - these have been saddled with insistence on process efficiency emanating primarily as customer requirements.IT & ITes organizations have always been people centric organizations be it onshore or offshore. However, with the rise of cognitive platforms, their customers are looking to improve efficiency and lower cost of operations by using AI to do the regular mundane IT related tasks. This has resulted in Indian IT companies automating many of the routine tasks which were earlier performed by human capital. For example, Wipro, a leading IT & ITeS organization, for instance, is using its own Cognitive Platform called HOLMES, to automate multiple processes of its IT projects & deliveries, and in the near term, accomplish cost savings of up to US$ 46.5 million.

A section of innovators in the BFSI vertical have implemented AI as a part of their IT and business process automation drive, and for customer engagement. Banks have leveraged chatbots to engage with the customers and help resolve their queries to the maximum extent possible. India's largest public-sector bank, State Bank of India (SBI), announced its chatbot SIA (SBI Intelligent Assistant) back in September 2017 to assist customer with everyday banking services just like a bank representative. SIA has been set up to handle nearly 10,000 enquiries per second, or 864 million in a day.

Manufacturing organizations have been slow to adopt AI compared to their peers in other verticals as they feel that technology is still in nascent stages and from a manufacturing point of view, there are not much enough use cases at present to go for large scale deployment. Bosch, the flagship company of the Bosch Group in India, is implementing smart manufacturing systems across its 14 manufacturing plants in India by 2018 to optimize manufacturing processes and improve productivity.

While 2nd from bottom in terms of current adoption, Growth in organizations from Retail, Professional Services, and Healthcare is expected to outpace the ones in TMT and BFSI in terms of AI implementation in the next 18 months overtaking organizations mainly due to focus on increased revenue and improved profitability. Indian retailers like Tata Croma, Titan Company and Metro Shoes are using AI solutions to gauge customers' behavior, so that it enables them to make the interactions with consumers more meaningful and personalized

FIGURE 3

Cognitive Adoption in India
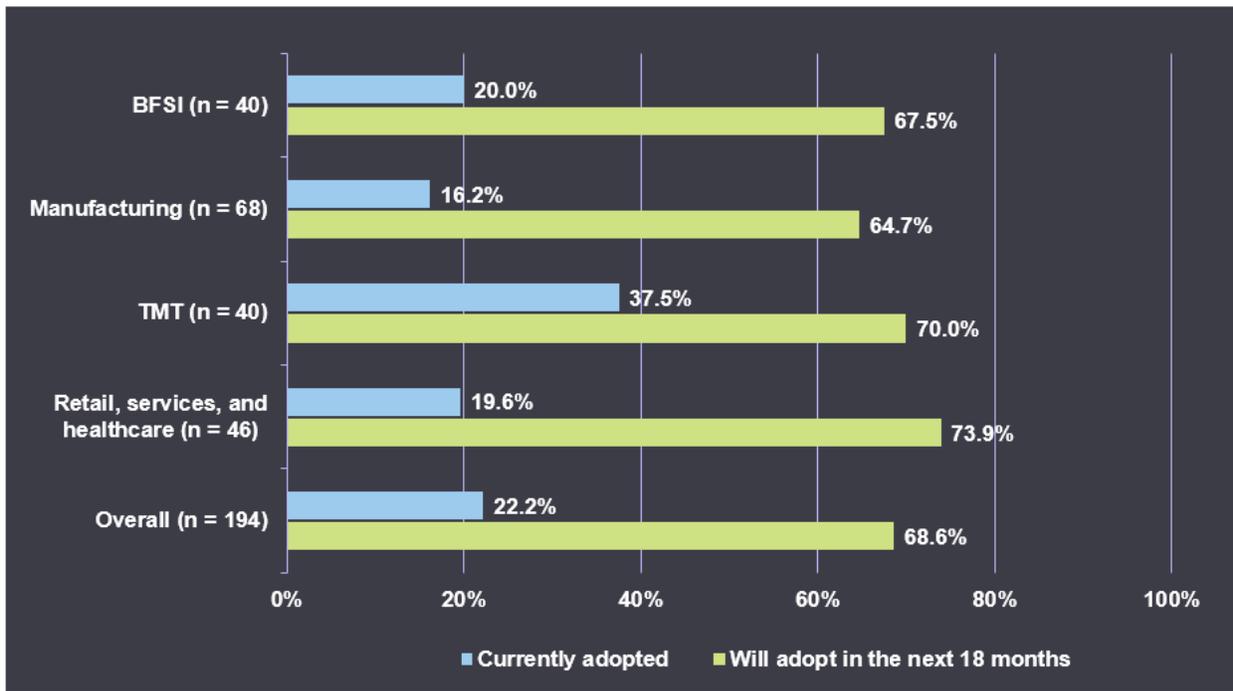
Source: IDC, 2017

D: PROMINENT AI APPLICATIONS (USE-CASES)

Cross Vertical Use Cases

IT processes are the most prominent function that are being impacted by organizations use of AI. IT was using AI to resolve employees' tech support problems, detecting and fending off computer security intrusions and automate routine tasks to boost organizational and employee efficiency.

Sales & marketing is yet another function that has witnessed the usage of AI. This has been predominantly used in Retail, and to some extent in BFSI organizations. Manufacturing and Retail companies have also attempted to redraw and refine their supply chain networks using AI. Almost 55% of Amazon's sales come from personal recommendations made by AI and ML algorithms. Flipkart, India's biggest e-commerce player, plans to deploy AI and machine learning based solutions to run future sales for the ecommerce unicorn.

In the next 18 months, the top three use-cases mentioned above are expected to mature and are to be leveraged the maximum by organizations across industry verticals (See Figure 4).

FIGURE 4

Cross-Vertical Use Cases
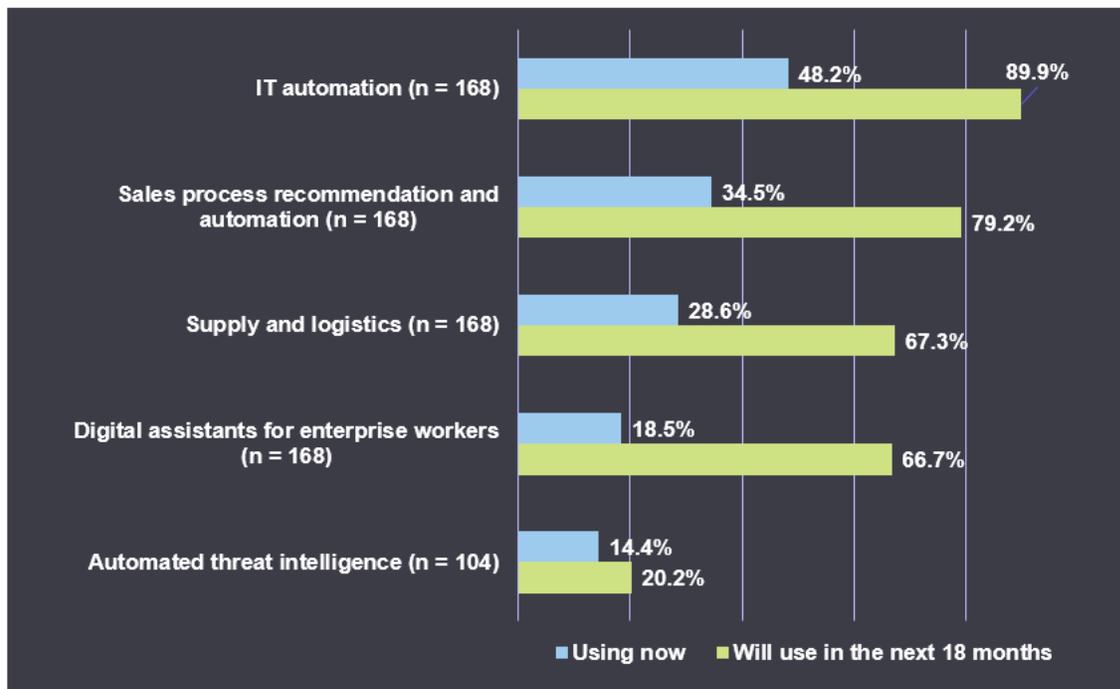
Source: IDC, 2017,

Vertical Specific Use Cases

BFSI

The implications of using AI for **Fraud Analysis & Investigation** are formidable, and already 61.1% organizations have undertaken projects in this space. AI, with its inherent capacity to process and

analyze large volumes of structured as well as unstructured data, provides the requisite efficacy in Fraud Analysis.

Danske Bank, a financial services leader in the Nordics, using machine learning to analyze tens of thousands of potential features, scoring millions of online banking transactions in real-time to provide actionable insights about any fraudulent activity. By significantly reducing the cost of investigating false-positives, the company said Danske Bank increased its overall efficiency and is now poised for substantial savings.

Going forward, banks would place a very high thrust on Fraud Analysis & Investigation and Program Advisors & Recommendation Systems. **Automated claims processing** would emerge as the top AI application for Insurance companies.

Manufacturing

AI has been applied primarily for **asset and fleet management** by manufacturing companies and is expected to be the top use case going forward as well. A combination of IoT and AI would be used for generating maximum advantage.

Quality management is an area that involves accessing, managing, and analyzing chunks of data; AI is poised to change the way the process is handled.

One of India's biggest automotive companies, Tata Motors has partnered with Microsoft India to leverage Microsoft's connected vehicle technologies that bring together artificial intelligence (AI), advanced machine learning, and the Internet of Things (IoT) capabilities on the global hyper-scale Azure cloud, to create a highly personalized, smart and safer driving experience across the digital life of a vehicle owner. This will be via Tata Motors' unique user interface application and services suite utilizing Microsoft enabled functionality like advanced navigation, predictive maintenance, telematics and remote monitoring features.

Retail, Services, & Healthcare

The Retail vertical is currently undergoing a wave of disruption with the charge being pressed on the e-commerce players. With a substantial surge in digital transactions (and number of customers), there is a need for the retail companies to study purchase behavior data and convert them to relevant insights for creation of new products and solutions, and to generate efficiencies in their sales processes. Customer engagement through **automated customer service agents** would be at the top with regards to the use-case in the next 18 months, followed by **merchandising for omni-channel operations**.

A section of healthcare service providers in India have been the early adopters of AI in **diagnosis and treatment**. This application is in its nascent stages, and will mature in the next 18 months, as hospitals build and are able to leverage effective data management strategies. RV Metropolis, a diagnostic chain based out of Bangalore, has partnered with an AI startup in healthcare to use AI for screening and identifying samples. Only samples indicting a risk of cancer would be sent to experts for further examination. This significantly reduces the time taken to screen samples and allows experts to concentrate on the ones requiring proper expertise.

E: DIVIDENDS FROM COGNITIVE ADOPTION

Our research shows that AI is already impacting Indian organizations in four key areas: Business Efficiency Enhancement, Revenue Augmentation, Insights from Data, and Transformation of Customer Experience (See Figure 5).

Business Efficiency Enhancement

71% organizations are looking at Increased process automation as a key benefit and almost equal number of firms (69%) are looking at increased employee productivity across several business functions.

- Financial services, Healthcare & Life Sciences and Manufacturing organizations are keener on improving business efficiency. 84.2% of the manufacturing organizations surveyed are looking at increased process automation as a key benefit for AI adoption
- ICICI Lombard has implemented automation to boost insurance underwriting and customer service processes and has been instrumental in achieving enhanced data accuracy by 25% and increased revenue by 4%.

Revenue Augmentation

Businesses, particularly in retail (including e-commerce), and telecommunications are exploring mechanisms to boost their revenue by using AI for better targeting of offers and improved sales processes.

- Several e-tailers in India such as Tata Cliq, and The Label Life are working with Mad Street Den that offers visual search technology, product recommendations, and personalized home pages based on the tastes of individual shoppers, among other features. This helps in improving customer experience considerably, and in turn, leading to greater conversions.
- General Electric (GE), used a software called TAMR to integrate business data. GE which has multiple business units in multiple locations including India buys lot of materials and products from many suppliers. The problem was that these different operating units often source the same part from the same supplier, but don't know that other operating units within the company are doing so. TAMR took hundreds of thousands of GE supplier records and identified where multiple records were from the same supplier. Through the use of TAMR across a few divisions has helped GE save the $80 million over the past few years.

Insights from Data

Organizations across verticals are routinely processing high volumes of data to extract meaningful insights. In retail sector, companies typically use it to gain customer insights. In manufacturing, organizations try and capture data from every touch point to improve the overall manufacturing process. In healthcare while in healthcare, doctors/hospitals can use it for patient specific treatment plans by analyzing data using AI.

- Manipal Hospitals has adopted IBM Watson for Oncology, a cognitive computing platform, to help physicians identify options for individualized, evidence-based cancer care across India. Watson for Oncology draws from an impressive corpus of information, and, to date, more than 300 medical journals, more than 200 textbooks, and nearly 15 million pages of text.

Transformation of Customer Experience

Transforming customer experience to improve their loyalty ranks high on the list of benefits for retail and banking organizations. Banks have led the innovation journey as far as transformation of customer experience is concerned.

- Since its launch in February 2017, iPal, ICICI bank's artificial-intelligence powered Chatbot has engaged with the bank's 3.1 million customers and answered close to 8 million queries with a 90% accuracy rate. These interfaces are being preferred by the customers for ease of use, quicker resolution, and convenience.

- HDFC's chatbot, OnChat (launched in 2016) has made an impressive connect with the customers already. As a part of a conversational banking initiative, it allows customers to transact for bill payments, mobile recharges, booking travel, and has so far enabled over 2.4 million messages with 89.6% accuracy rate.

- Bharti Airtel Ltd. has recently announced a strategic partnership with Amdocs to bring AI based services to its customers in India. Amdocs by leveraging its innovation centers, delivery expertise, and its ecosystem of startups, will deploy machine learning and advanced Artificial Intelligence (AI) based technologies across Airtel's multiple lines of business to help pre-empt and self-heal operational issues, introduce smart-bots into digital channels, and quickly launch and activate new services, thereby enabling a seamless customer experience.

FIGURE 5

Benefiting Indian Organizations
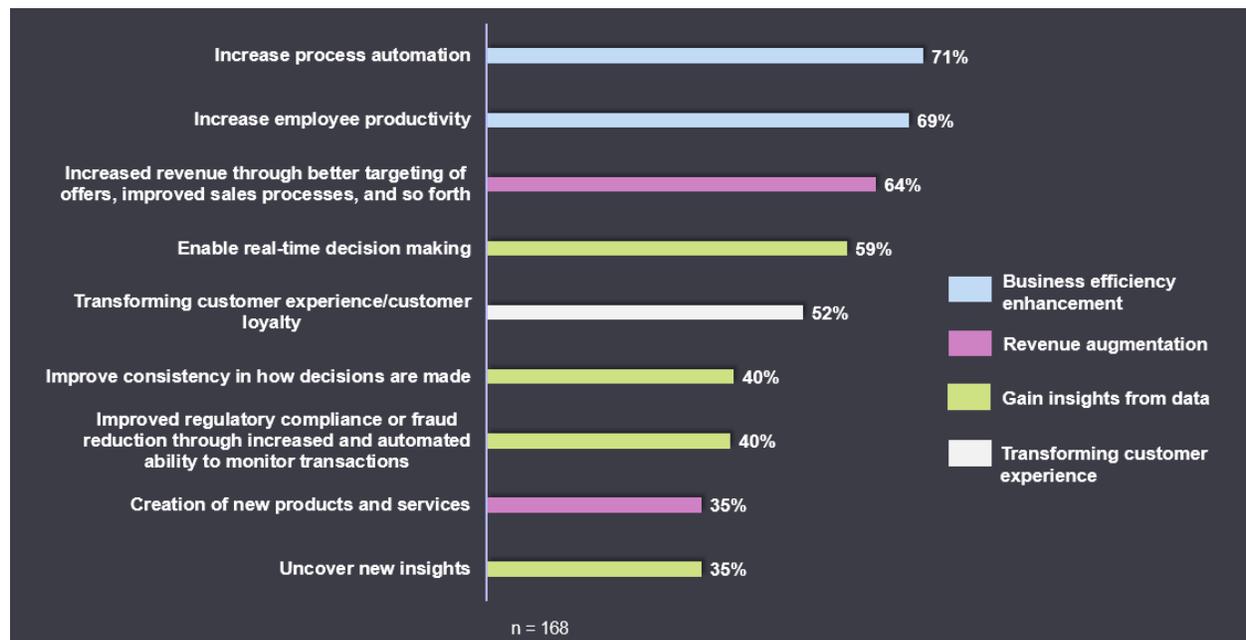
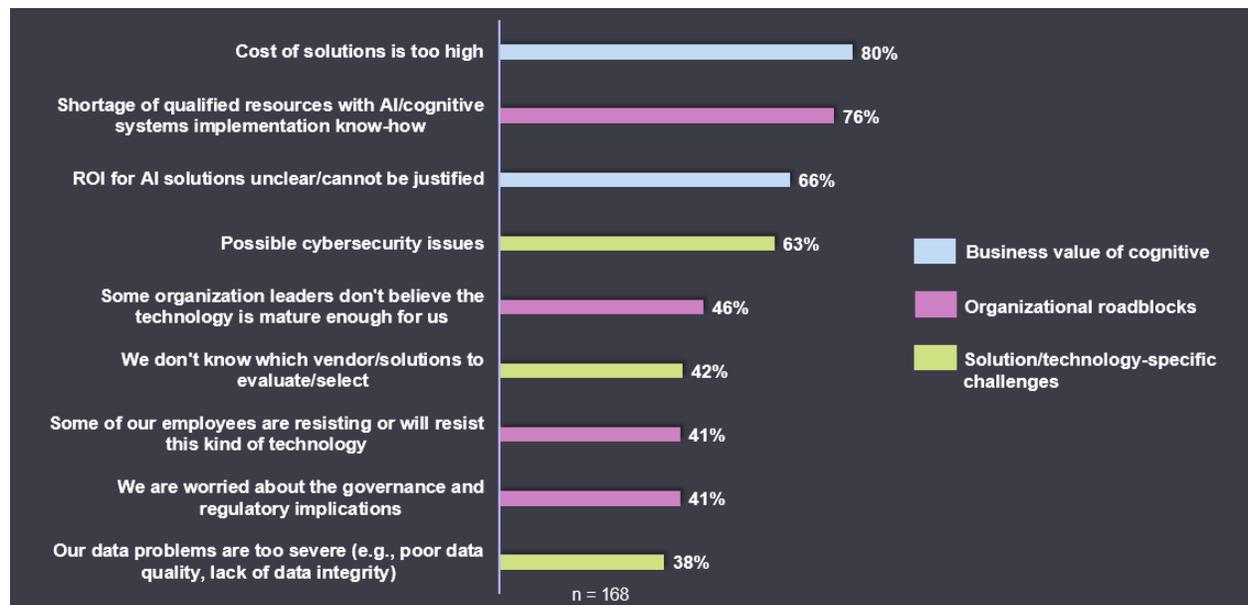Source: IDC, 2017

F: BARRIERS TO COGNITIVE ADOPTION

As Cognitive/AI technology deployment is at a nascent stage there may be what can be largely classified as "Fear of the Unknown". Across verticals, 80.4% of the organizations surveyed deem cost of Cognitive/AI solutions to be very high while 66.1% feel that ROI still not clear and justifiable to higher management (See Figure 6).

Shortage of adequate talent with implementation knowhow of AI technologies is the 2nd biggest challenge which Indian organizations are facing with 76.2% organizations claiming shortage of skilled resources as a barrier.

For organizations that have already implemented AI solutions, or are considering the implementation in next 12 months, cybersecurity and talent issues take priority over cost of solutions; while, for organizations that are still exploring AI without any implementation timeline, leadership mindset and cost of the solutions are the major barriers.

FIGURE 6

Barriers for Cognitive Adoption

Source: IDC, 2017

G: AI SOLUTION/VENDOR SELECTION CRITERIA

Organizations can be overwhelmed by the huge variety of vendors and AI solutions on the market and runs the risks of choosing the wrong partner, possibly resulting in significant monetary expenditure with no clear result and an unsolved problem statement. A vendor can have a single domain/vertical solution or a cross domain/vertical generic solution. While it may be in Tech Buyer's interest to opt for a vendor with generic solution so that they don't have to deal with multiple vendors, they should also consider multiple other factors as well. For example, some vendors may be able provide the appropriate AI software solutions but may not have sufficient capabilities to impart training to its client's employees. It is also important that some of these solutions are simple enough for functional staff to use in their day to day activities and their use is not restricted to just data scientists or technically skilled professionals only.

Some important criteria for organizations when considering AI solutions is that it must have strategic alignment with their business objectives and implementation and integration with existing IT infrastructure should be smooth and easy. (See Figure 7).

Additionally, tech buyers, when considering vendors for cognitive solutions, look for strong AI advisory and implementation capabilities in the partner. Additionally, buyer should also keep in mind the amount of support they require from the vendor. Sometimes, a buyer might have trained staff within its payroll who just need onboarding training while in other cases, organizations may need hand holding at every step of deployment.

AI can have a positive impact on an organization and provide tangible benefits as long as organizations it follows a balanced approach when vendors or solutions.

FIGURE 7

Cognitive Solution Selection Criteria

1. Effort of implementation and integration with existing IT
2. Technology superiority
3. Strategic alignment with business objectives
4. Cost competitiveness and flexibility in commercial terms
5. Availability of skilled resources to work on the solution
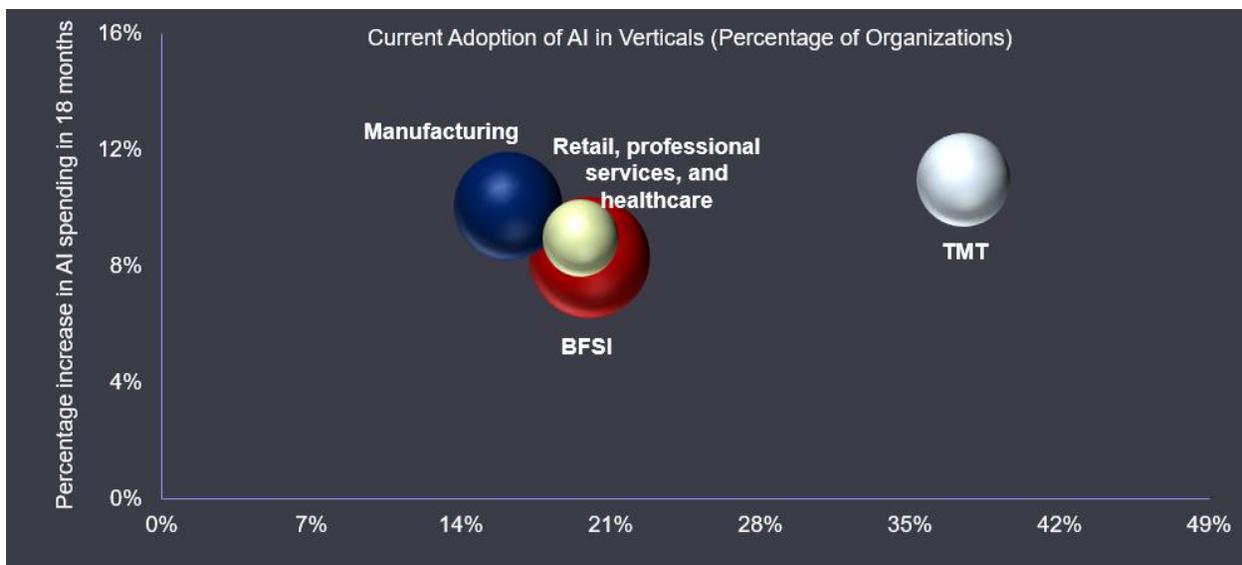
Source: IDC, 2017, n=168

H: INVESTMENT OUTLOOK ON COGNITIVE SYSTEMS BY INDIAN ENTERPRISES

Indian organizations spent, on an average, around 2.84% of their overall IT budget on Cognitive solutions in 2017. In line with the IT and digital maturity levels, TMT led the industry verticals with 3.64% spend on cognitive solutions from their IT budget while manufacturing where cognitive systems is largely in exploratory stages accounted for least spend on AI i.e. 2.05% of the overall IT budget (See Figure 8).

In next 18 months, IT budget spend on AI is likely to increase in the range of 8-11% across all verticals with manufacturing likely to be only 2nd to TMT. This is indicative of the rise in importance of the Cognitive systems in India and reaching mainstream adoption in the next 18 months.

FIGURE 8

Investment in AI Spending in the next 18 months

Source: IDC, 2017, n=168

I: IDC GUIDANCE FOR TECH BUYERS

With many positive outcomes already being realized, cognitive/AI is quickly moving into the enterprise. However, without proper due diligence, cognitive/AI can bring adverse and unforeseen consequences that can exert significant disruptions on workers, customers, and business leaders. Cognitive/AI presents opportunity as well as a dilemma for CIOs and their businesses.

On one hand, the technologies are irresistible – offering the promise of greatly expanded productivity, enhanced decision making and, above all, the ability to do things that are impractical or impossible using only human workers. On the other hand, there can be potential downsides: cognitive/AI applications could "demote" or replace workers, potentially make biased or inaccurate decisions based on flawed algorithms or data, produce decisions that can't be "audited," and create highly personalized experiences that startle and alienate customers.

Cognitive has widespread implications for the Indian organizations and promises real benefits for the companies which have been quick to adopt the solution. Business leaders should have a clearly defined roadmap to realize the potential that Cognitive/AI technology can bring to the enterprise.

To do that, they should note the following:

- Develop a cognitive computing/AI strategy that identifies key technologies, its applications, and use cases. Review the strategy periodically and update it to accommodate new and emerging technologies and the products, services, and experiences they can provide.
- Create a framework that helps identify drivers and inhibitors so that the former is pushed forward and the latter are allayed adequately.
- Define key metrics/goals to achieve from AI solution implementation.
- Develop a strategy and plan for identifying, collecting, curating, and using the data that will be used to drive cognitive/AI applications and services

Organizations should adopt the approach of deploying AI for simple small scale projects in multiple areas/departments so that risk of failure or substandard results is minimal. Organizations also need to be patient with AI and opt for long term projects with substantial long term benefits.

AI can provide significant benefits everywhere across an organization. However, organization should have a clear idea of what value they are looking to get for themselves and their customers by implementing AI.

J: CONCLUDING REMARKS

Cognitive systems will not just change business processes within organizations but it will change the entire business-models that most organizations currently follow. It is no longer a question of "if" or "when" anymore, organizations need to start working on a strategy and roadmap for AI deployment immediately. Organizations that are in "wait and watch" mode with AI will be left behind while early adopters reap the benefits. AI has tons of momentum and organizations implementing an AI strategy today will be suitably placed to take advantage of the opportunities to come in times to come.

K: APPENDIX

### What is Cognitive/Artificial Intelligence?

IDC defines cognitive/artificial intelligence systems as a technology that uses deep natural language processing and understanding to answer questions and provide recommendations and direction. The system hypothesizes and formulates possible answers based on available evidence, can be trained through the ingestion of vast amounts of content, and automatically adapts and learns from its mistakes and failures.

Cognitive/artificial intelligence software platforms are a subset of the overall cognitive/artificial intelligence systems market and work primarily with unstructured and semi-structured information to build up curated information bases and knowledge graphs that can be mined and analyzed by various artificial intelligence techniques and algorithms such as machine learning, neural networks, and deep learning. Recommendations, predictions, and advice based on this artificial intelligence provide users with answers and assistance in a wide range of applications and use cases.

FIGURE 9

Defining Cognitive Systems

- Content Analytics
  - Text Analytics, Video Analytics
  - Categorizers and clustering engines
  - Speech Recognition, Language analyzers
- Discovery
  - Enterprise search engines, information access platforms, and applications for browsing and navigation
  - Knowledge Base/Graph Generation
  - Rich media search
- Cognitive Systems
  - Digital assistants
  - Automated advisors
  - Artificial intelligence, deep learning and machine learning
 - Automated recommendation systems
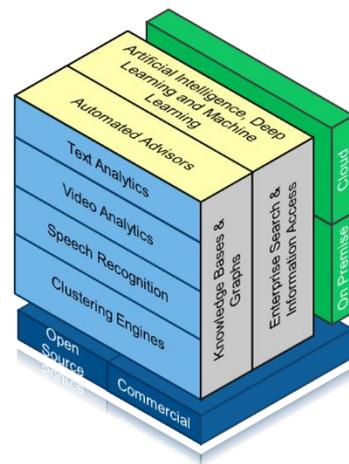
Source: IDC, 2017

IDC expects that a wide range of cognitively enabled applications and products are going to become available over the next several years. These cognitively enabled applications will require two major components:

- Cognitive software platforms using a wide array of user/data interaction, knowledge representation, machine learning, reasoning, and processing. Content and data that will be used by the cognitive software platforms to fuel the learning and recommendation process based on statistical, semantic, and inferential methodologies.
- Some of this content and data will come from first-party sources inside the organization, and some will come from third-party sources. However, access to the content and data is crucial for the cognitive software platforms to work effectively.

Cognitive software platforms provide the tools and technologies to analyze, organize, access, and provide advisory services based on a range of structured and unstructured information. These platforms facilitate the development of intelligent, advisory, and cognitively enabled applications. The technology components of cognitive software platforms include text analytics, rich media analytics (such as audio, video, and image), tagging, searching, machine learning, categorization, clustering, hypothesis generation, question answering, visualization, filtering, alerting, and navigation. These platforms typically include knowledge representation and automated reasoning tools such as knowledge graphs, triple stores, or other types of NoSQL data stores. The platforms also provide for knowledge curation and continuous automatic learning based on past experiences, both good and bad.

FIGURE 10

Cognitive Solutions Ecosystem
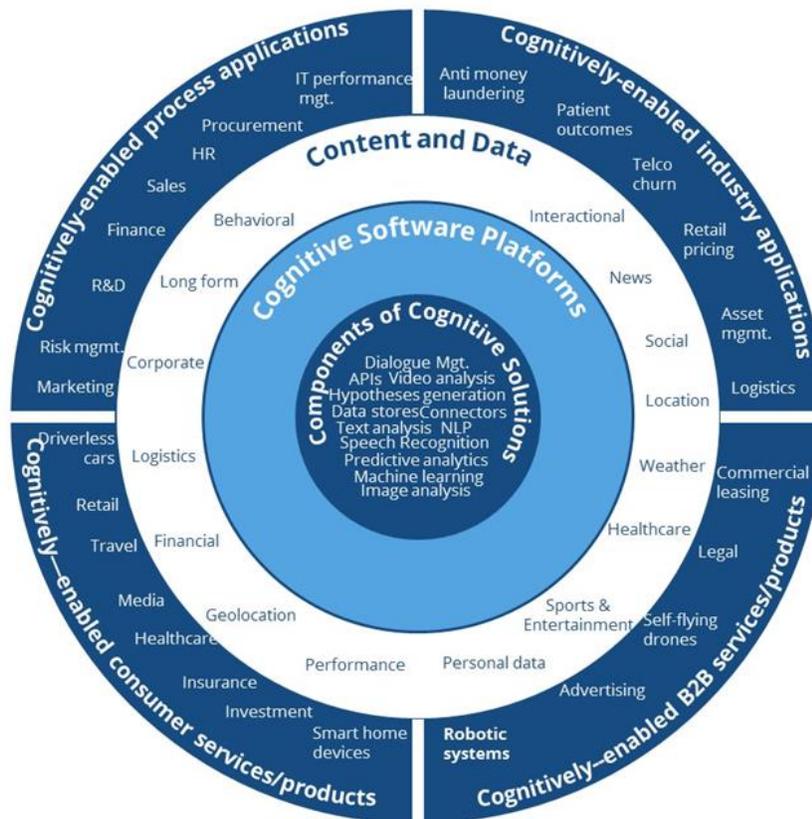
Source: IDC, 2017

DEFINITIONS

Worldwide Semiannual Cognitive/Artificial Intelligence Systems Definitions by Industry Use Case, 2017

Industry	Use Case	Description
Banking, Insurance, Securities and Investment Services	Fraud analysis and investigation	Detection of illegal/illicit financial acts involving intentional deception and/or misrepresentation across different areas (i.e., operational and financial) of an organization; cognitive/AI systems will utilize rule-based learning to identify transactions that indicate fraudulent activity or the heightened risk of fraud; systems automatically learn the rules to identify numerous banking-related fraud schemes from bank employees and customers alike; these include but are not limited to corruption (i.e., money laundering), cash thresholds, billing fee waivers, check tampering, larceny, and financial statement fraud
	Program advisors and recommendation systems	Utilization of embedded cognitive/AI computing capabilities to help businesses capture and extract detailed information and insight from enterprise documents such as processing of loan/mortgage applications needs and requirements; automatic classification and understanding of the document – including format structure, words, and numeric information; integration with recommendation systems (intelligent filtering engines that narrow the decision-making process) for the purpose of identifying best matching financial products or services
	Automated claims processing	Automated and intelligent data capture and analysis for investigators and adjusters to investigate and adjudicate insurance claims
	Regulatory intelligence	Allows companies to more efficiently address their immediate regulatory compliance; moving beyond the use of traditional structured data to leverage unstructured information and external data; this can be applied in real time to help deliver actionable insights, limit exposure, and reduce the impact of compliance and conduct issues that arise
Discrete/Process manufacturing	Quality management investigation and recommendation systems	Cognitive/AI manufacturing systems that perceive out-of-spec changes in the manufacturing process; these process changes could be detrimental to the quality of the product; cognitive/AI systems recognize and know how to respond to these dynamic fluctuations by adapting the production to stay within quality targets
	Regulatory intelligence	Allows companies to more efficiently address their immediate regulatory compliance; moving beyond the use of traditional structured data to leverage unstructured information and external data; this can be applied in real time to help deliver actionable insights, limit exposure, and reduce the impact of compliance and conduct issues that arise
	Automated preventative maintenance	Machine log data from various sources that contributes to a model that in turn will predict and alert of potential maintenance needs
Healthcare & Lifesciences	Diagnosis and treatment	Extract insights from the intersection of diverse data sets including medical records, lab tests, clinical studies, and medical images to assist in diagnosis and personalized treatment at the individual patient level
	Pharmaceutical research and discovery	Cognitive/AI systems aimed at finding correlations among genomic, clinical trial, and electronic medical records to assist with research and analysis of pharmaceutical research and discovery
Retail	Expert shopping advisors and product recommendations	Automated tools to learn about prospective customers and make shopping recommendations based on knowledge about those individuals; cognitive/AI natural language tools search through millions of social media conversations, blogs, forums, ratings and reviews, and reason to identify, measure, and recommend products
	Merchandising for omni-channel operations	Retailers are meeting the new customer demands by deploying specialized cognitive/AI analytics to make sure the right product is in the right place at the right time
Telecommunications	Smart networking	Design and implementation of rules and parameters governing the routing of inbound calling through the network; expanded use of real-time analytics to make the network smart, which includes rules to specify how calls are distributed according to the time and/or date of the call as well as the location of the caller; cognitive/AI systems provide a customized experience for the caller and maximize the efficiency of inbound call handling
	Program advisors and recommendation systems	Cognitive/AI systems' use of natural capabilities to assist applicant interaction or processing by matching the needs and requirements of the individual with the correct level of telecom products and services
Automotive	Asset/fleet management	Cognitive/AI infrastructure for visibility of assets and control systems, remote management, and real-time operational intelligence offering route optimization; actionable responses to vehicle condition (remote diagnostics) and driver behavior (tracking of idle or stopped time)
	Freight management	Freight management logistics (air, rail, land, and water) combined with supply chain logistics intelligently monitors and provides end-to-end visibility; optimizes truck loads, container management, spare parts planning, dock availability, and customer experience management; provides intelligent insight to suppliers on the type of product, place, and time of delivery to guarantee best pricing

	Automated preventative maintenance	Machine log data from various sources that contributes to a model that in turn will predict and alert of potential maintenance needs
Cross industries:	Sales process recommendation and automation	Cognitive/AI computing engines that can work with CRM systems to understand customer context in real time and recommend actions to the sales agents that are most relevant to the specific interactions and recommend the next best action the sales process to try and qualify or close a sale
	Supply and logistics	Enterprise cognitive/AI systems that augment ERP capabilities, resulting in improved global visibility across the downstream and upstream portions of the supply chain; the combination of advanced algorithms with subtlety of human reasoning will anticipate supply and demand imbalances and make the daily recommendations for schedule adjustments across process silos; ultimately, this will optimize automated warehousing, delivery schedules, and logistics
	IT automation	Cognitive/AI/AI-enabled systems to orchestrate the linking of IT systems to become self-acting and self-regulating; automate mundane software maintenance activities; the automation engine can perform decision-making and execution tasks of IT system; new events are learned from IT human operators, not programmed by software programmers; examples may include automation of fixed price projects from IT service companies
	Intelligent process automation	Intelligent automation of specific knowledge worker processes; the system learns to do more complex workflows, excluding non-intelligent robotic process automation such as screen scraping
	Automated threat intelligence and prevention systems	Systems that process the intelligence reports, extract the critical pieces of information, structure them in a fixed format, and push the information into the pipeline; connect the dots between different pieces of information; threat to database, systems, website, and so forth
	Digital assistants for enterprise knowledge workers	Digital assistants help workers answer questions, predict future events, and provide recommendations internal to the workplace; digital assistants help surface information related to a knowledge worker's ongoing daily efforts; examples may include a worker completing a presentation with the help of a digital assistant going through existing files, notes, and presentations to provide additional content; these intelligent systems leverage machine learning on large data sets, enabling innovation, collaboration, and higher employee productivity – maximizing return on information assets
	Automated customer service agents	Provide customer service via a learning program that understands customer needs and problems; reduce the time and resources spent in achieving customer issue resolution in each specific industry

Source: IDC, 2017

About IDC

International Data Corporation (IDC) is the premier global provider of market intelligence, advisory services, and events for the information technology, telecommunications and consumer technology markets. IDC helps IT professionals, business executives, and the investment community make fact-based decisions on technology purchases and business strategy. More than 1,100 IDC analysts provide global, regional, and local expertise on technology and industry opportunities and trends in over 110 countries worldwide. For 50 years, IDC has provided strategic insights to help our clients achieve their key business objectives. IDC is a subsidiary of IDG, the world's leading technology media, research, and events company.

IDC India (Delhi)

304 Solitaire Plaza
MG Road, Near Guru
Drona Metro Station
Gurgaon 122002
Delhi, India
91.124.476.2300
Twitter: @IDC
idc-community.com
www.idc.com