

Wipro Limited: Developing a Cognitive DNA

Teaching Case

Wipro Limited (hereafter Wipro) was a global IT, consulting, and business process services company headquartered in Bangalore, India. The company's key services included application implementation and maintenance, data center hosting and management, network and infrastructure provision and maintenance services, and business process outsourcing. Its customers were located on six continents.

In 2017, Wipro faced intense competitive pressures to maintain quality while reducing the cost of its services. This challenge had become particularly acute as a result of the increasing interconnectedness and complexity of the company's systems and infrastructures—as well as those of its customers, which were facing digital disruption in their operations. Despite these pressures, Wipro was anticipating exciting opportunities arising from a stream of technological innovations such as robotic process automation (RPA)¹ and artificial intelligence (AI).²

In early 2017, a senior Wipro executive described these conditions as “a white water world” that would lead to a “future that is likely to be incredibly different from what it is now.” Wipro's customers were looking to create massive, step-change innovations in their business processes. Wipro was enabling this innovation by providing its customers with service offerings enhanced with AI. To this end, Rohit Adlakha, who later that year was named Vice President and Global Head of Wipro HOLMES AI and Automation³ Portfolio, described artificial intelligence as “the biggest game changer that I've seen in the industry and the company in over twenty years.”

A Leader in Global IT Services and Consulting: Competitive Opportunities and Pressures

Incorporated in 1945, Wipro entered the IT services sector in 1990 and grew to become a leading broad-based IT service provider in the Indian IT services sector. Revenues from IT services were 7.7 billion USD in 2016-2017.⁴ Its key value proposition was to deliver efficient and high-quality IT services to its customers, many of them long standing. The company's key assets included its service delivery processes; process transformation capabilities; and employees' skills, capabilities, and intimate knowledge of customers' IT operations and processes.

Wipro's suppliers included manufacturers of computing and networking hardware, application software, and database software. Wipro's strategic partners included organizations such as SAP, IBM, Google, Oracle, and Microsoft, whose software and products they implemented for customers, and open source software communities, whose software Wipro utilized.

Wipro (see Exhibit 1 for a company organizational chart) was a matrixed organization composed of six profit-loss strategic business units and six service lines. The heads of the business units reported to Chief Executive Officer Abidali Z. Neemuchwala. The service lines, which provided technology services to

¹ “Robotic process automation” is software that automates repetitive clerical work by observing and then reproducing the work. It is often used to automate repetitive work involving more than one application, such as copying data from one application to another and executing workflows across applications.

² “Artificial intelligence” in this case study refers to computing techniques such as machine learning, deep learning, natural language processing, and image processing.

³ Within Wipro, the term “automation” includes the application of artificial intelligence techniques to service offerings and in use cases, and the use of scripts and robotic process automation.

⁴ Wipro Limited, *Presentation to Investors April–June 2017*, April 25, 2017, from the Wipro Limited website, p. 5, <https://www.wipro.com/content/dam/nexus/en/investor/quarterly-results/2016-2017/q4/Wipro-Investor-Presentation-Q4-FY17.pdf>.

business unit customers, were responsible for implementation and operations of client services, and delivery of services was an expense to the strategic business units. The heads of the service lines reported to Chief Operating Officer (COO) Bhanumurthy B. M. The Marketing, Innovation, and Technology group was headed by Milan Rao. This group included the CTO office (led by K. R. Sanjiv), CIO office (led by Raja Ukil), the AI and Automation portfolio (led by Rohit Adlakha), the CMO office for global marketing (led by Naveen Rajdev), and functions dedicated to intellectual property, sales, and advisory relations. In addition, there were C-level heads of functions such as strategy, finance, and human resources.

Artificial Intelligence at Wipro

Wipro had invested in AI applications early in the game, but to embed AI in its DNA and truly succeed, the company had to develop several new capabilities, such as a platform to deliver and deploy AI-based applications at scale, a workforce adept at AI-related thinking and delivery, the ability to develop and leverage use cases that highlighted the value of AI, and marketing messages for internally and externally promoting and positioning the platform.

The company developed its automation capabilities over several years, starting with tool-based task and process automation and RPA-based automation of IT infrastructure management and application support processes for both internal IT operations and service delivery. In 2012, under the leadership of Chief Technology Officer K. R. Sanjiv, Wipro began to develop AI capabilities in the company's technology incubator, building on research in areas such as linguistics, knowledge representation, software architectures for DevOps, machine learning, neural networks, and immersive experiences. Multidisciplinary teams consisting of computer scientists, data scientists, application developers, and user interface designers experimented with prototypes to develop AI-based applications.

Wipro's AI development efforts would lead to the launch of a proprietary platform called Wipro HOLMES⁵ in 2015.

First AI Success: The Internal Service Desk Application

Wipro first leveraged AI to enhance an internal help desk application the company developed to improve service for its employees. First, Wipro merged multiple help desks supporting different functions (e.g., finance, IT, sales) into the CIO's organization and onto a common application the company called Helpline. As part of a Lean initiative, members of the help desk organization found and eliminated redundancies and obsolete tickets, reducing the types of ticket from roughly 3,000 to 2,200.

Seeking further refinement, Chief Information Officer Raja Ukil asked the CTO group whether the new AI capabilities being explored might enable users to submit tickets in plain English. So the then-chief technologist of the HOLMES team developed AI-based logic to interpret and classify service requests, match them to successful solutions, and then either initiate automation scripts to resolve requests or route them to a human agent.

The CIO asked me, "Can you do something about this?" We said, "Yeah. Let's do it!" Pretty much in a stealth mode, we built the whole artificial intelligence application for the CIO organization.

—Chief Technologist of the HOLMES team (former)

The application had natural-language capabilities for taking inputs through the front-end user interface, as well as algorithmic intelligence, such as knowledge representation and contextual logic for processing the requests, at the back end. A major challenge was overlaying these AI and RPA back ends and front ends onto an already existing application without disrupting the operational processes. He described the integration challenge as "putting a high-speed train on a hundred-year-old railway track." The module was trained over a few months with several years of archived service request data.

⁵ HOLMES was a backronym for "Heuristics and Ontology-based Learning Machines and Experiential Systems."

In the process of understanding a request, the natural-language processing module could directly resolve some problems, such as alerting a user submitting a work order for hardware repair that such an order already existed. The classifier module could also initiate scripts to resolve some problems, such as those that involved repairing applications on remote hardware devices. Finally, for problems that could not be directly resolved, the classifier module created a service ticket for an appropriate service engineer who could solve the problem.

What delighted users was that they could describe their IT problems easily in everyday language. They found this experience so transformational and novel that initially the volume of tickets actually increased.

This was a surprising flip side. Everybody said, “Look now! That is something. Thank you!” That is what changed everything. Raising tickets was never this easy. Problem resolution was now automated with just a few clicks and with a minimum number of problem classification categories. We went live and everybody started using it, and that became the flagship, the torchbearer. This was the moment of realization—what we built with AI could transform the ordinary.

—Chief Technologist of the HOLMES team (former)

By 2017, only 10–12 percent of service requests would be passed to a human for classification and redirection—a “manual-by-exception” approach. At that time, the application would be used by all of Wipro’s 160,000 employees, who submitted 5000 tickets per day; 20 percent of these would be resolved without any human intervention, leading to an equivalent reduction in first-line service employees. User querying of standard problems by means of scripts could resolve a further 15 percent of tickets.

The success of the helpdesk application was a light-bulb event that captured the imagination of Wipro’s leadership team. Leveraging AI became one of Wipro’s key competitive strategies.

Whenever customers came, [the help desk application is] what we demonstrated to them. And that’s what helped build our own confidence in terms of “yes, there is reality beyond the hype!”

—K. R. Sanjiv, Chief Technology Officer

Growing Capabilities: AI Leads the Way to HOLMES™

In early 2015, Wipro made both significant investments to develop the capabilities of its AI platform and several organizational changes to expand the community leading the charge to leverage AI. Chief Technology Officer K. R. Sanjiv oversaw the ongoing development of the HOLMES platform. A new unit—Wipro HOLMES Delivery and Rollout, led by Vice President Suresh Bala under the aegis of the COO—was formed to deliver HOLMES-based solutions for customers and service lines. Two teams made marketing-related contributions to the strategic effort: One team—led by Rohit Adlakha—sought to engage with customers to identify opportunities for AI business development and develop a roadmap for HOLMES. Another team—under Ranjita Ghosh, who led global marketing for HOLMES—commenced a marketing campaign.

In 2017, additional organizational changes were made (see Exhibit 2 for the HOLMES organizational structure at that time) to ensure the wider adoption and enable scaling up of HOLMES. Rohit Adlakha assumed responsibility of Wipro’s Automation portfolio, which combined continued development and support of the HOLMES platform, automation-related consulting (“Automation Advisory”), and partner development (“Automation Ecosystem”). In addition to developing HOLMES-related business, engaging customers with the platform, developing and extending its roadmap, and identifying and developing new AI use cases, Adlakha was also responsible for developing partnerships with providers of RPA and other technology.

Additionally, K. R. Sanjiv, who as CTO headed the WIPRO technology incubator, continued to focus on leading-edge AI developments for potential addition to HOLMES; Suresh Bala continued to be responsible for delivery and rollout of HOLMES-based solutions and their post-implementation support. Ghosh, by this point the global head of marketing for Wipro’s HOLMES AI and Automation portfolio, drove positioning and marketing strategies for HOLMES, to increase its awareness and adoption among Wipro’s customers, partners, employees, and the public at large.

The HOLMES Journey

At the operational level, by 2017 the growing HOLMES core team consisted of around six hundred engineers, about half of whom developed and architected the HOLMES platform, while the other half developed and supported AI applications for IT and business. Senior and executive-level management administered the promotion and adoption of the HOLMES platform. Funding for the development and rollout of HOLMES was provided by the executive level.

HOLMES encompassed technologies for both AI services and workflow automation. Both were used to improve processes. In fact, in Wipro's view, the first layer of process improvements came from leaning processes through Six Sigma, process optimization, and elimination of repetitive tasks. The next layer of improvement was usually based on RPA-driven workflow automation. CTO K. R. Sanjiv noted that each of these approaches separately gave you "some cost reduction, but never in double digits"—while in contrast, AI-based improvements yielded "quantum leaps."

By "quantum," I mean something like a 25 percent improvement on cost. Taking this example, if you're looking for, let's say, 40 percent savings on cost, the first 20 percent will come from [a combination of] initiatives like Lean, Six Sigma, and workflow automation. But the next 20 percent comes from applying cognition.

—K. R. Sanjiv, Chief Technology Officer

Wipro had made dramatic progress in applying artificial intelligence to address its customers' IT services and business process problems, as well as its own IT service delivery and optimization challenges. The company's AI applications were implemented and deployed through the HOLMES platform. The platform comprised script-based workflow automation (e.g., RPA) services and AI services (e.g., natural language processing and machine learning models), as well as a super structure of governance modules that managed and tracked utilization of these services.

It is our aim to become the trusted AI and hyper-automation⁶ partner for our customers in their digital transformation journey by delivering "cognitive-first services" and driving the three E's of Efficiency, Economics, and Experience.

—Rohit Adlakha, Vice President and Global Head of Wipro HOLMES AI and Automation Portfolio

Solution Areas

Wipro leveraged HOLMES in two different solution areas, both of which could be found within Wipro and its customer organizations:

- HOLMES for IT: IT operations and IT services
- HOLMES for Business: non-IT business processes

HOLMES for IT encompassed many AI applications that increased the efficiency and decreased the cost of IT operations, while also improving the service quality, reliability, and availability of IT systems. Specifically, Wipro automated monitoring of network and end-point device operations and application performance, generating alerts as necessary on both predictive and reactive bases. The company then applied AI to recognize exceptions, identify and diagnose problems, call relevant scripts and, if necessary, execute proactive self-healing through automatic remote delivery of patches and fixes. The principle was to eliminate human intervention as much as possible, with a target of manually executing less than 10 percent of tasks, mainly exceptions.

Wipro began by simplifying its own IT management processes by applying AI to them, which showed the company that AI could enhance services for employees and reduce the cost of IT operations. After improving its own IT operations, Wipro applied AI in its IT services customer offerings, with the same

⁶ Wipro used the term "hyper-automation" to refer to process automation that combined RPA and AI.

positive results. As of 2017, HOLMES supported most of Wipro's large customers across a variety of industries. The AI applications provided natural language support for customer interactions and machine learning algorithms to diagnose and fix problems—improving customers' (and their customers') experiences.

For example, for one utilities customer, HOLMES enabled a 51 percent reduction in data center services alerts, a 48 percent reduction in batch failures, and a 30 percent cost reduction in operating expenses. And for one global technology company customer, close to 50 percent of all ticketed requests—which previously required a technician to complete—were being fulfilled or resolved through automation. The customer was responding to alerts generated by the monitoring systems twice as quickly, and completing service requests five times faster as a result of implementing elements of Wipro HOLMES.

With automation, you get speed. Speed is the secret to improving the overall quality of services to the organization.

—Wipro Global Technology Customer

HOLMES for Business focused on AI applications for business processes such as compliance, contract management, fraud and anomaly detection, and field service solutions, across customer domains such as supply chain management, contact and service center operations, product lifecycle management, and customer onboarding.

Wipro co-developed AI-based applications with customers. For example, Wipro worked with a large international bank to automate the bank's customer onboarding processes through an application called Enterprise Know-Your-Customer (E-KYC). This application used AI to examine financial and legal documents of new customers, the first step in ensuring compliance with regulatory requirements for customers in the banking and financial services sector. The HOLMES E-KYC application reduced KYC processing times from 240 to 20 minutes, with accuracy levels of around 95 percent. E-KYC won the 2017 Challenge the Future award for Best Outcome Delivered through Automation from Information Services Group (ISG).⁷

For a multinational construction services company, Wipro developed and implemented an AI-based application to detect payment leakages in the company's accounting processes.

The continuous monitoring platform enabled us to preempt leakages, eliminating the need for post-payment recoveries and significantly mitigating risks. Today, this has helped us streamline processes, prioritize checks, optimize the utilization of investigation bandwidth, and reduce risk in processes.

—Wipro Multinational Construction Services Customer

AI applications such as these created new value propositions and revenue opportunities for Wipro outside of the IT services domain.

Wipro also developed several AI applications to improve its own business processes, such as by reducing management costs associated with employee travel visas or time and effort in coordinating myriad approvals for internal processes.

Industry analysts covering the IT services industry, including at *CIORReview* and Everest Group, commented favorably on Wipro's AI initiatives.⁸

⁷ “Wipro Wins ISG's Challenge the Future® 2017 Award for Best in Class Smart Automation,” Wipro press release, April 26, 2017, on the Wipro website, <https://www.wipro.com/newsroom/press-releases/2017/wipro-wins-isg-challenge-the-future-2017-award-for-best-in-class-smart-automation/>.

⁸ “Driving the Enterprise Digital Journey with Wipro HOLMES,” *CIORReview*, June 23, 2017, p. 18–22, <https://www.cioreviewindia.com/magazines/artificial-intelligence-special-june-2017/>; Everest Group, *Everest Group PEAK Matrix™ for Business Process Services Delivery Automation: Focus on Wipro*, July 2017, available at <https://www.wipro.com/newsroom/press-releases/2017/wipro-recognized-as-a-leader-by-everest-group-in-automation-across-applications-infrastructure-and-business-process-services/>.

The Bots

In 2017, the HOLMES platform included script-based automation capabilities plus five AI capabilities, which Wipro referred to as five “pillars”:

- Natural language interaction, such as NLP and voice recognition
- Reasoning, such as statistical and computational logic
- Knowledge representation, such as ontologies and patterns
- Learning, such as finding new ontologies and patterns
- Algorithmic intelligence, used in updating ontologies and patterns

These capabilities were implemented in applications through “bots.” Bots were collections of microservices that enabled different use cases. They embedded AI models and ontologies. Bots—containerized and deployed through an API architecture—were modular, reusable, easily configurable, and pluggable across different applications. In an infrastructure management setting, for example, one or more bots would observe and interpret an alert, log it, and then decide whether to ignore the alert or to resolve it with a “human in the loop”—raising a ticket for a service person, for overall governance—or by invoking another script or bot. Some bots specialized in interpreting and/or curating unstructured data (e.g., images, sounds) so they could be processed by other bots.

Ideas for new bots came from delivery teams, partners, external technology trends, analyst input, academia, and customer requests. Each bot had an owner who established a roadmap for its development. The stages of bot development included ideation and design, development using agile coding and testing methods, proof of concept, pilot, and production/roll out. A combination of internally developed, open source (e.g., TensorFlow) and proprietary (e.g., IBM Watson) AI tools were used for developing the bot’s logic and models. Deployment of bots included testing for performance and security vulnerabilities, setting up procedures for data ingestion and curation, and coordinating release and life cycle management routines. Once a bot was stable, it became part of the HOLMES platform.

The HOLMES platform had about two hundred AI bots and many hundreds of RPA bots. A typical AI application called specific AI bots as services from the HOLMES platform using each bot’s API. Alternatively, some bots were integrated directly into an application. The HOLMES engineering team was responsible for the development of architectural standards for bots and their APIs that were key to making bots easy to deploy in customer environments.

Bots could continue to “learn” after implementation in their production environment in the sense that the model in a bot could be improved as more data became available. The bot owner supervised this learning by deciding when and whether to incorporate insights from new data into the bot’s model. In this way, the experiential knowledge of subject matter experts and customer process owners was embedded into the bots on a continuing basis. In fact, if there was not enough data to stabilize a bot when it was new, the application calling the bot would be run in a parallel environment until enough data had been accumulated to reach an acceptable accuracy level.

The bots belonged to a “Bot Library” and were leveraged in use cases across infrastructure, applications, and business processes. Bots were managed centrally through a configuration management tool that tracked versions and life cycles of bots from inception to retirement. The behavior and activities of each bot was governed by “Bot Govern,” itself a bot, which monitored bot activity and took corrective action in case of “rogue behavior”—that is, any bot activity outside the purview of the set of defined activities for a particular bot.

Wipro was developing the HOLMES platform into an “Automation Marketplace” for bot services. Along with the internally developed HOLMES bots, the marketplace also hosted bots developed by customers or at partner and vendor companies. This marketplace was available to all customers, who could employ bots from HOLMES as API-enabled services within their own applications or make their own bots commercially available to Wipro and the company’s other customers through HOLMES. Wipro also had a development environment, “Bot Studio,” that enabled the company to co-create bots with customers.

AI Use Cases

A key insight from the organizational response to Wipro's internal help desk application had been that specific use cases—working examples—were tremendously effective in helping employees and customers to understand what AI could and could not do. Thus, a key effort for Wipro was to develop a series of use cases based on applications of AI, usually for processes on which the company had already accumulated significant knowledge and data. Combining vivid use cases with demonstrable successes from them paid off dramatically in developing greater appreciation of AI.

Moreover, when a particular AI-based use case was implemented across a number of customers, the use case's validity increased and its knowledge representation improved.

We focus on certain types of use cases that are most relevant for our customers' businesses, and we do a fantastic job on delivering the three E's of HOLMES through them—Efficiency, Economics and Experience. This approach is exactly the opposite of force-fitting technology solutions backwards into a customer problem, which is what many [Wipro] competitors tend to do.

—Rohit Adlakha, Vice President and Global Head of Wipro HOLMES AI and Automation Portfolio

Wipro did not develop AI use cases “for the shelf.” Rather, after Wipro developed a use case and proved its value with a few customers, the company would deploy the AI capabilities in different applications and industry verticals. For example, the AI capability to extract information from documents, which originated with the E-KYC application for use in the banking and financial services sector, was enhanced for an application called Drawings2Data. This application, for use in the manufacturing sector, automated the digitization of engineering drawings, providing customers with nearly 60% reduction in cycle time and an 85% improvement in productivity.

Developing Cognitive Thinking

Beyond developing the HOLMES platform, bots, and use cases, Wipro realized that it was necessary to imbue its organizational rank and file with a new kind of thinking to create a strong pull for new uses of AI in both customer solutions and internal operations. COO Bhanumurthy B. M described this desired capability as “Cognitive Thinking.” Wipro developed a number of levers to produce this pull including:

- A cadre of champions for HOLMES
- Specific goals for process automation
- Preparation of employees for an automation-based approach to processes
- Forward-looking but realistic and clear guidance for customers and employees on the capabilities of AI

Champions

“HOLMES Champions”—ambassadors for HOLMES—attended a week of boot camp training on artificial intelligence, plus two or three training sessions on AI in their specific customer or service domain. HOLMES Champions worked with colleagues across service lines and business units to help them understand how HOLMES could be embedded into Wipro's offerings as well as the improvements it could offer over other solutions. Champions explained benefits the capabilities would confer in a customer's service-level agreement and ensured that responses to RFPs reflected savings to quoted price points that AI capabilities enabled.

Each business unit vertical and service line had a dedicated HOLMES champion, as did every major customer account. The champions were embedded in:

1. Customer-facing teams in customer accounts across the strategic business units.
2. Solution development teams for the different lines of service delivery
3. Delivery and rollout teams that were engaged in new application implementation for customers

As of 2017, more than one thousand champions had been trained and authorized to evangelize the platform's AI and other automation-related capabilities across the company. In addition to these specially trained champions, there were many more HOLMES-savvy employees who talked to customers, performed implementations, and trained colleagues.

Automation Goals

Wipro set annual HOLMES adoption performance goals for each strategic business unit and each service line. Responsibility for meeting these goals, progress on which was reviewed frequently, was held by specific leaders of each strategic business unit and each service line. For example, strategic business units had goals to improve customer efficiency and experience using AI-based automation. At the tactical levels, account-level champions were responsible for achieving strategic business unit goals by generating pilots, proofs of concept, and leads for new AI projects. Suresh Bala, head of HOLMES Delivery and Rollout, was responsible for establishing a customer "Automation Index": a comparison of the degree to which the customer's statement of work had been actually automated using HOLMES with what was judged to be the potential opportunity to automate that work.

HOLMES adoption was part of the reviews of the strategic business unit heads by CEO Neemuchwala, to whom they reported. In addition, senior executives provided updates and reports to the board of directors. A "strategic dashboard" published the executives' HOLMES adoption goals, their markers and metrics, and their achievement. It was available to all senior leaders in the company. The dashboard published planned and actual outcomes for AI uptake.

Preparing the Workforce

Wipro's workforce collectively had a wealth of experience in the design, development, and implementation of IT applications and infrastructure, and considerable domain knowledge of customers' business processes. The workforce's understanding of technology in general was also on the cutting edge. To maintain this edge, Wipro provided an e-learning platform called Top Gear for employees so they could enhance their knowledge and enrich their experience in different domains. The platform had courses on many technologies, including AI in general and HOLMES in particular. Employees were encouraged to enroll in courses on the HOLMES platform and its AI development environments as part of their personal learning plans. Gamification elements were added to Top Gear around completing AI-related certification, to create friendly competition, provide learning incentives, and increase the visibility of the HOLMES platform.

Efficiencies enabled by HOLMES permitted Wipro to grow its business with the same number of people. Virtually all of employees whose work had changed because of HOLMES were either upskilled or reskilled. Many such employees were redeployed into emerging areas such as user experience, cloud technologies, data science, and insight systems. Retraining, recertification, and redeployment were coordinated collaboratively by Human Resources and the strategic business units and service lines. The focus of redeployment was on upskilling for greater responsibility and competence in more complex roles. It was Wipro's hope that upskilled employees would become ambassadors for HOLMES, and the company planned to offer a blog-type vehicle by which redeployed employees could share their stories with colleagues.

Wipro also continuously crowdsourced new ideas internally for applying AI. By doing so, the company hoped that employees would envision opportunities for automation in their own work—what would they want a bot to do for them? In addition to running workshops with customers, HOLMES champions in customer account and service delivery teams were also expected to stimulate employee thinking about how to apply AI by soliciting ideas from them during floor walks. Suresh Bala referred to these ideas as "opportunities for automation." All employee ideas were taken seriously: they were evaluated for impact, contribution to top-line growth and bottom-line profits, customer or employee satisfaction—and ease of implementation.

To augment its supply of talent, Wipro acquired Topcoder, a crowdsourcing software design and development firm. This enabled Wipro to access the expertise of more than a million designers, data scientists, and artificial intelligence/machine learning specialists.

Augmenting our workforce through crowdsourcing helps us overcome the biggest challenge of AI use case development and adoption: talent. It helps us to build AI solutions on the fly, which translates into significant revenue impact through significant gains in time to market and time to value.

—Tapati Bandopadhyay, Head of Wipro HOLMES Practice and Market Making

Guiding and Educating Customers

Not all of Wipro's customers were equally ready to adopt AI-based applications, so the company realized that it needed to tailor its approach.

The level of maturity varies. Some customers have heard about automation, but you need to handhold them, taking baby steps. Others have done some automation, developed either internally or externally. Some have advanced automation and are looking at the next generation. You need to gauge the maturity of the customer.

—Rohit Adlakha, Vice President and Global Head of Wipro HOLMES AI and Automation Portfolio

An ideal customer for automation was one with which Wipro had a longstanding relationship and a high degree of trust; that was eager for big lifts in business value, revenue growth, and process innovation; that had already streamlined its processes; that possessed and was willing to share high-quality data; and that had few security- and compliance-related issues. Most important, perhaps, was a clear-eyed understanding (or willingness to learn) about what AI could and could not do.

It's about how much value a customer can get from AI. We spend quite a bit of time trying to understand that and define that.

—A Wipro customer representative

Wipro had excellent relationships with longstanding customers about whose IT-related processes and infrastructure (e.g., database use, network use) it already possessed a great deal of data, often going back many years. These customers had been the natural starting point for pursuing AI opportunities. However, even such customers' responses to HOLMES had varied widely. Some did not at first see the potential for them in HOLMES. Others had exaggerated expectations for AI, thinking it would be a panacea for all ills and automatically solve intractable process problems. Yet others saw great risks and worried about bots "going rogue."

For less AI-savvy customers, Wipro found relevant, proven use cases to be extremely instructive. The company organized tailored learning experiences for them. Typically, HOLMES account champions conducted an initial two- to three-hour workshop on existing use cases, which helped customers understand generally what AI could and could not do. This would be followed by a two-day proof-of-concept engagement, and perhaps a subsequent five-day pilot engagement using real data, if the customer began to see how HOLMES might resolve its pain points or yield big payoffs. When a customer asked for a new HOLMES-based solution, Wipro might co-invest and work collaboratively with them to develop the solution if components of the idea could be reused in other settings.

We realized early on that the commitment from top leadership on both sides was a key factor for AI success in the enterprise context. It was a leap of faith both for Wipro and our customers. To assure our customers, we ensure rigorous security and vulnerability testing in the lifecycle of every bot, from development to deployment to sunsetting. An important challenge is to articulate the outcomes and topline impact. We advise and engage with customers. We use tools like the balanced scorecard to define AI outcomes into the customer's strategic journey. Our focus is to drive change in the customer's organization through strong governance, risk management, and compliance practices.

—Rohit Adlakha, Vice President and Global Head of Wipro HOLMES AI and Automation Portfolio

Messaging and Communication

Wipro made significant investments in order to convey a consistent, clear message about HOLMES both inside and outside the company.

We want to drive a culture of meaningful discussions about AI, both internally and with the market.

—Ranjita Ghosh, Global Head of Marketing, Wipro HOLMES AI and Automation Portfolio

Employees were targeted with a raft of internal evangelization and marketing efforts designed to increase awareness of the HOLMES platform and of AI in general. They were encouraged to identify how AI might be applied to their own work. This was done in part through Wipro Buzz, the company's internal social media and messaging platform. Employees were first introduced to HOLMES in the middle of 2015 through the tagline, "Hello humans. I am Cognitive Computing.⁹ I am HOLMES". One objective of these campaigns was to get employees thinking about capabilities the HOLMES platform provided and encourage those in customer-facing account and delivery teams to make using AI and HOLMES an integral part of their conversations with Wipro's customers.

Also launched in 2015, Wipro's first external marketing campaign focused on benefits of automation, such as the potential for error-free processing, through tag lines including "Service Minus The Stress" for the automated service helpdesk application and "No Bad Apples" for the E-KYC application. Campaigns in 2016 and 2017 communicated efficiency, cost benefits, and improved user experience through tag lines such as "No More Complaints About the Job Being Too Tedious" and "Welcome to the HOLMES Advantage" (see Exhibit 3).

HOLMES leadership, as well the company's senior leadership, actively reinforced these messages in their engagement with customers, analysts, partners, and the media.¹⁰

The idea was to generate awareness about the transformational and game-changing potential of HOLMES for our employees and customers. Focused, simple, and clear messaging was key, given the highly crowded and competitive market that had several other AI offerings from other companies. It was also important for balancing the hype–reality equation and for providing a realistic picture of where and how the AI journey might start for our customers.... We believe our message found its target because industry analysts have recognized these value propositions of HOLMES.

—Ranjita Ghosh, Global Head of Marketing—Wipro HOLMES AI and Automation Portfolio

In May 2017, a new Wipro branding campaign envisioned the company as a digital transformation enabler for its customers and partners. HOLMES was integral to this vision, highlighted through taglines such as, "When your business meets the intelligence of the future."

⁹ In its initial messaging campaigns, Wipro sometimes used the term "cognitive computing" to refer to the use of AI.

¹⁰ Examples of media engagement by HOLMES leadership and Wipro senior leadership include Esther Shein, "Understanding Artificial Intelligence for Retail Customers," *TechTarget*, December 12, 2017, <http://searchhitchannel.techtarget.com/feature/Understanding-artificial-intelligence-for-retail-customers>; K. R. Sanjiv and Ram Prasad K. R., "Growing Your Business Using Artificial Intelligence; The Future Foundations of Every Company?" *ITProPortal*, March 23, 2017, <https://www.itproportal.com/features/growing-your-business-using-artificial-intelligence-the-future-foundations-of-every-company/>; CNBC TV18 interview with Abidali Neemuchwala, CEO of Wipro Limited: January 24, 2018, on the Wipro Limited website, <https://www.wipro.com/content/dam/nexus/en/newsroom/win/2018/wipro-in-news-cnbc-tv-18.mp4>.

From a Wipro perspective, digital and cognitive are the top two agendas we are driving across the organization. We believe they present a significant revenue and growth opportunity because of their disruptive potential.

—Naveen Rajdev, Chief Marketing Officer

The Future: Hopes and Dreams

AI was of high strategic importance to Wipro because the company's customers were looking to infuse AI in their key business processes. While the client's CIO organization had traditionally been Wipro's point of customer engagement, because of the focus on business processes, Wipro's focus of attention was shifting to clients' senior executives and business function leaders.

As we partner with more and more customers on their AI journeys, we realize that AI can be integrated with technologies like IoT and Blockchain to form the glue that binds [a customer's] business processes.

—A senior Wipro executive

Wipro also intended to develop IP in process ontology and learning models by leveraging insights it had gained from broad exposure to processes in use across customers (as it had in the E-KYC use case). The company was keen to develop reusable AI applications using these ontologies and learning models, and more generally, to devise how to transfer ontologies or models from one use case to another. Wipro was working on enhancing HOLMES with additional artificial intelligence capabilities, such as algorithms using a connectionist approach (i.e., neural nets) and algorithms related to "deep reinforcement learning" (e.g., conceptual learning, understanding motivations and goals). The company also had plans to use AI to enhance the quality of unstructured data (a process sometimes called "auto-encoding" and "data approximation"). In the long run, Wipro hoped to push the envelope of artificial intelligence into general intelligence for enterprises. Another emerging area of focus was the use of AI in application development, where Wipro was working on automating the elicitation of system requirements.

Of course, Wipro planned to continue to pioneer the development of strategic use cases, to generate top-line growth and to communicate the power of HOLMES to customers and employees, particularly in the areas of claims processing; remote maintenance support for automotive services; autonomous field services at remote and hazardous locations; and the e-retailing sector, where the company planned to exploit virtual reality applications. Given the opacity of deep learning AI models, the company sought to make future applications and user interfaces even more transparent by adding design features that could explain to users the logic behind the actions or decisions that were being suggested by the AI components.

Key initiatives Wipro hoped would enhance its ability to engage in the above included drawing on talent pools globally; working with academic AI research expertise; partnering with leading customers to envision novel AI opportunities; and creating an advisory board of customers, partners, and researchers as a vehicle for the requisite knowledge exchange.

Wipro believed that it had gained an early lead in its deployment and use of AI applications.¹¹ However, its competitors were thinking along similar lines and had their own AI initiatives.¹² The key factor likely to determine the success of HOLMES would be the speed with which the rank and file of Wipro's workforce incorporated the new knowledge, thinking, and skills that were required for fulfilling the promise of the

¹¹ Edd Gent, "Why Automation Could Be a Threat to India's Growth," *BBC*, May 19, 2017, <http://www.bbc.com/future/story/20170510-why-automation-could-be-a-threat-to-indias-growth>.

¹² For examples of AI initiatives of Wipro competitors, see Tata Consultancy Services, <https://www.tcs.com/ignio-wins-aiconics-award-for-best-enterprise-ai-application>; IBM, https://www-935.ibm.com/services/in/gbs/cognitive/?lnk=mse_bc_inen&lnk2=learn%C2%AO and Edgeverve, an Infosys company, <https://www.infosys.com/nia/>.

“HOLMES Advantage” that the company’s marketing campaign promised. Wipro’s strengths in the core IT service areas were being enhanced. Employees were already reimagining how IT service processes and customer’s business processes could be enhanced with automation. Eventually, this would become second nature to employees, as cognitive became part of Wipro’s DNA.

Today the number of people who truly understand cognition is limited. The future will depend on how fast Wipro employees can pivot to the new skills to be able to envision and build more new use cases.

—Bhanumurthy B. M., Chief Operating Officer

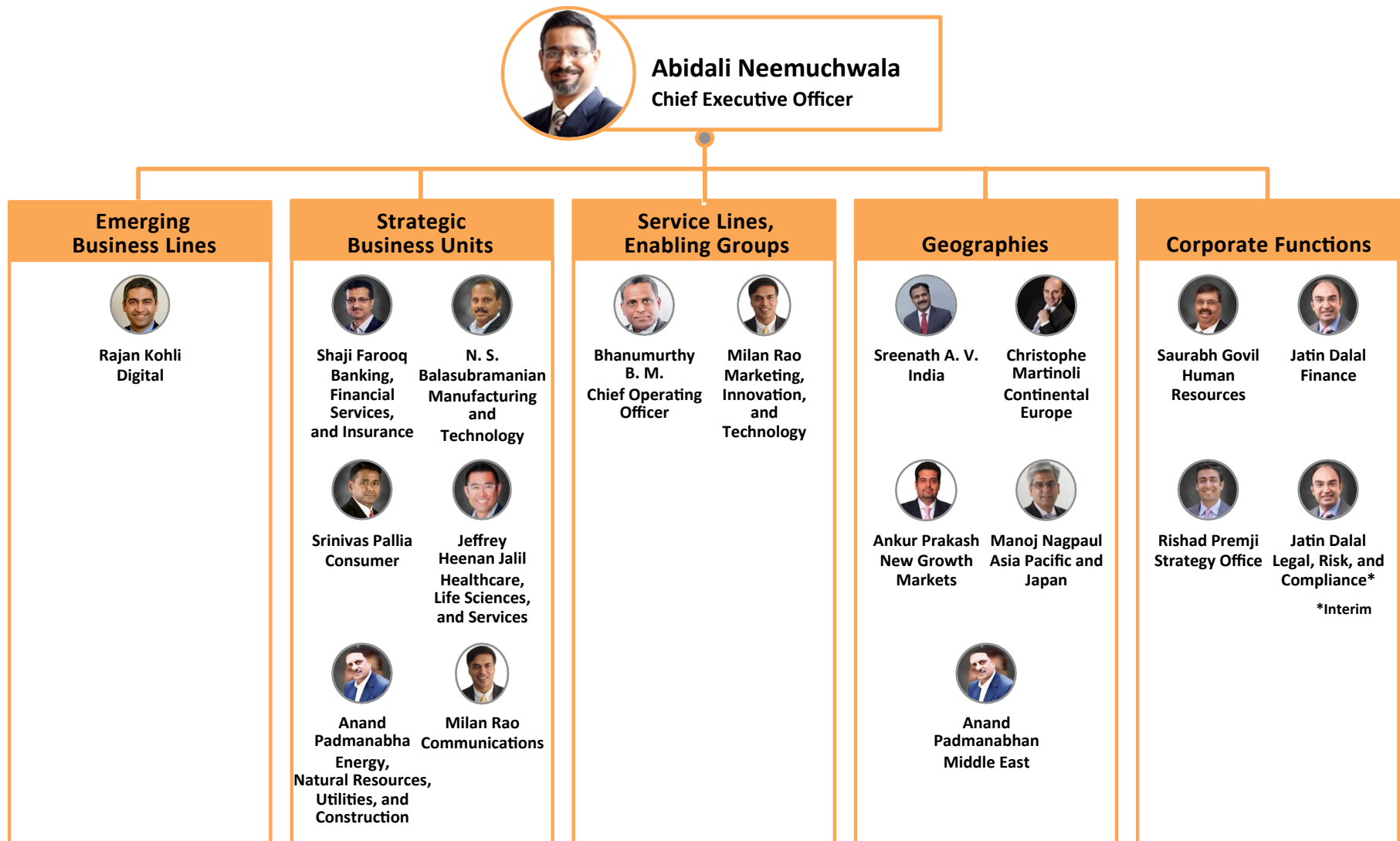


Exhibit 1: Wipro's Executive Leadership (Q2, FY18)

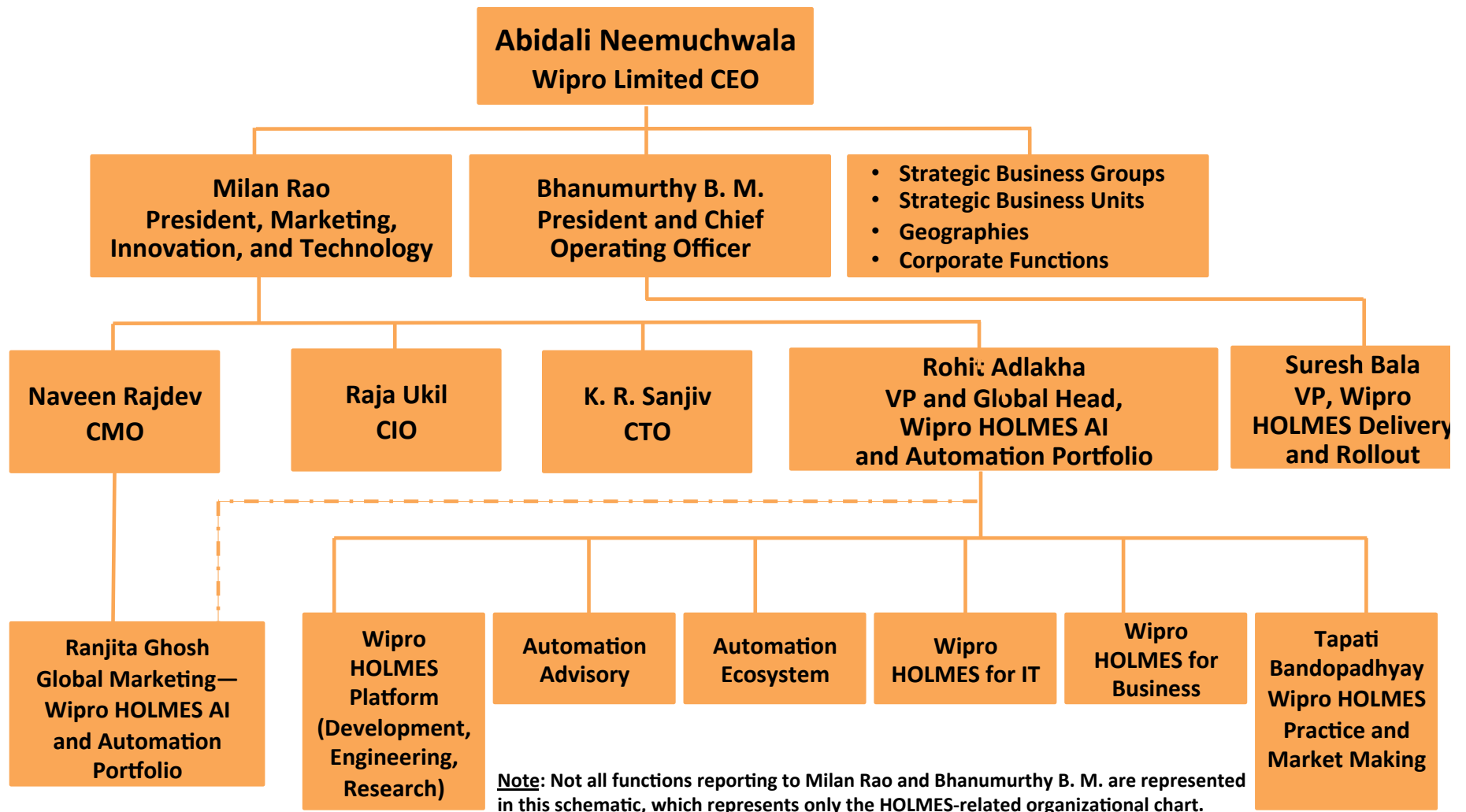


Exhibit 2: HOLMES Organizational Structure, circa 2017



NO MORE COMPLAINTS ABOUT THE JOB BEING TOO TEDIOUS.

Collating, validating, updating and safeguarding customer data on a continuous basis is no more an operational nightmare.

Wipro HOLMES is at the forefront of developing AI and cognitive technologies. And we have helped a leading global bank automate its "Know Your Customer" operations. Resulting in a substantial reduction in effort, productivity gains and improved accuracy. Hyper-automation leading to significant productivity gains, or as we love to call it - The HOLMES Advantage.

WIPRO HOLMES™
ARTIFICIAL INTELLIGENCE PLATFORM



Bangalore Airport branding

Exhibit 3: HOLMES Marketing Campaign 2016

Wipro Limited: Developing a Cognitive DNA

Teaching note

Case Synopsis

Wipro Limited, a global IT, consulting and business process services company, faced disruption in its internal operations and competitive pressures externally in the industry. The company turned to artificial intelligence (AI) to tackle these challenges and went about developing a 'cognitive DNA'. The case describes the company's AI journey and highlights key milestones such as identifying solution areas, developing use cases, creating a 'bot' architecture and developing a new way of thinking throughout its workforce. Wipro hoped that the new DNA would transform the capabilities of its workforce, enhance the value of its services to customers, and deliver a competitive edge.

Target Audience and Use

The case is intended for students and practitioners at a graduate (MBA or MSc/MS) or executive (EMBA or Executive Education Program) level in courses that deal with strategic IT, IT management, business value of IT or strategic AI applications of IT. Students need not have a technical background. In conjunction with the case, material on the concepts of AI and robotic process automation (RPA) as indicated in the References section at the end of this note would be helpful. The case provides an in-depth look at a company's efforts to prepare their organization to leverage AI. In addition to IT management students, the case could be of interest to human resource or organization behavior students. For general management students, the case brings out the importance of an enterprise-wide grasp of a new technology as a necessary basis for its effective use and exploitation. Moreover, the case helps students understand how people learn what new technologies can and cannot do by being exposed to use cases.

Teaching Objectives

Overall, the case illustrates the complexity associated with successful AI initiatives in organizations. Specific learning objectives for students include understanding and analyzing the following:

- How AI is deployed (planned and implemented) in organizations.
- How AI is transforming the IT services industry
- How companies can make their workforce AI ready
- How leaders guide companies through technology-enabled transformations.

Suggested Assignment Questions and Teaching Plan

The following questions are intended to guide the class discussion. For the purpose of planning, time allocation is provided for each question. The allocation assumes a total class time of 90 minutes.

- | | |
|---|--------|
| 1. Why does Wipro consider AI strategic? | 15 min |
| 2. How is the AI used in Siri different from or the same as AI used in business processes at Wipro and its customers? | 20 min |
| 3. Why are use cases valuable in demonstrating the value of AI to employees and customers? | 20 min |
| 4. How can organizations make themselves AI ready? | 20 min |
| 5. How does the organization's IT maturity affect the success of AI? | 15 min |

Discussion of Assignment Questions

Below is a discussion of the assignment questions and suggestions for running a class discussion around the questions.

Why does Wipro consider AI strategic?

To set the scene, the instructor can begin by asking – What is automation? This question provides an opportunity to insure that students understand the difference between AI (natural language processing, machine learning, machine vision, etc.) and RPA. It sets the stage for a discussion that is based on reasonably clear definitions – an important requirement for this type of case given the plethora of understood and less understood terms. Students are likely to come up with different terms and the instructor can engage with that to point out the differences between scripted automation such as RPA and machine learning/AI-based automation.

The instructor can then guide the students toward a discussion of the industry Wipro is in, who its competitors are, and what kinds of disruptions its customers are facing. Exhibit TN1 can be used as an aid to trace out the development of the company and the industry. This is an opportunity for those students with experience in the IT industry to help others understand what Wipro offers its clients, how they do that, and how its core business processes are being transformed by RPA and AI based automation. Students who have worked in firms whose IT or other business processes were outsourced to Wipro or one of its competitors (e.g., Tata Consultancy Services, Infosys, and HCL headquartered in India, but also EDS and IBM in the US) can describe the positives and negatives of outsourcing, which can help students understand the customer's point of view. This would help analyze the disruptions that customers face in terms of, for example, greater process digitization and availability of data. The instructor can then ask – what can Wipro do to tackle this situation? This would lead to the discussion as to why AI might be considered strategic for Wipro. The References section below includes some sources that can be used as supporting material.

How is the AI used in Siri different from or the same as AI used in business processes at Wipro and its customers?

In our experience in doing the research for this case, we have found that it is often difficult for even seasoned managers to understand the difference between embedding AI in products such as in Siri and in business processes such as loan approval. Discussion of this question should help students understand the complexities of embedding AI functionality in a business process – such as understanding what types of workflows the process entails, whether it has specified business rules and what kind of data it uses. The instructor might begin by mapping out the help desk process and then discussing where there would be opportunities to exploit natural language processing (where there would be lots of examples of strings of speech and a codified reduction of the speech) or to exploit machine learning (where there is lots of input data associated with more or less predictable outputs). It is worth discussing how data is generated in the helpdesk application (i.e. reporting of machine faults), what data is required for fault resolution (i.e. device manuals), and why an AI application would need both these types of data. The instructor should ask – How is Wipro going to get all this data into the AI application? Does the data need pre-processing? It is also fruitful to think about the repetitive aspects of the helpdesk process (e.g., back up a server, apply a certain patch, and then reboot the server) and how RPA might be applied to automate that. Through these two discussion foci, the student should be able to (a) understand the difficulties of preparing (e.g. tagging) the data, and (b) appreciate the importance of having a repetitive and high volume processes for AI applications to be possible and effective. A good reference for the instructor here is Ross et al (2016).

We also find that both graduate students and practicing managers are unclear about concepts relating to supervised and unsupervised learning. This is a good point in the case to begin that discussion. The instructor can guide the discussion by asking, "What is the AI application 'learning'?" In our experience, students are likely to say things like: "How a fault should be resolved," or "What the user means when they say 'My laptop screen is blue'." The instructor can then explain how this learning takes place, that is, by training the AI application on historical data that Wipro has on faults. Then the instructor can ask, "What happens when the AI application 'discovers' a new relation, for example, two faults consistently happening together?" Should the application add this knowledge automatically to its existing set of rules

or should a human process expert decide that?’ This approach is likely to lead to a rich and lively discussion of supervised and unsupervised learning, bring out myths and misconceptions, and give the class the opportunity for clarification around this very important aspect of AI applications in business. Moreover, it is worthwhile to think about what kinds of events would disrupt a trained model and cause it to "go rogue," i.e. to behave in undesirable ways. The instructor could refer to the recent fault with Alexa (the AI home assistant from Amazon), and ask the following questions – Why do you think Alexa started to laugh in that horrible way without any reason? What would be the equivalent of Wipro’s helpdesk application behaving similarly? Wong (2018) would be helpful here. Such a question can generate an interesting discussion about the advantages and disadvantages of supervised and unsupervised learning.

The E-KYC process is another process that can be discussed to help students understand how AI can enhance business processes and augment workers. In Wipro's E-KYC process, parts of the process are automated and others require humans. Students can be asked to imagine how the work might best be divided between a person and a machine. For the work they think a machine could do, they can be asked how the machine would be trained (e.g., what data would be needed). You might ask students to think about how they would determine whether the student next to them is truly who he/she says he is, especially if the students are from different countries and carry identification cards in different formats.

Why are use cases valuable in demonstrating the value of AI to employees and customers?

Wipro is very clear that developing use cases is the most effective way of communicating the value of AI to both employees and customers. This is a good point in the case to discuss what a use case is. The instructor can call upon students with experience in IT projects, from either the technology or the business side, to explain what a use case is. From this discussion, the instructor should guide the class toward the specific use cases that Wipro has developed and ask students to describe them. The instructor can ask, "What does the employee or customer ‘see’ through the use case?" He or she should then elicit answers regarding the different business variables in the AI model, the computational logic that connects them, where the learning components are embedded, the process value from the learning components (e.g. greater speed or accuracy), and the ultimate business benefit. From our experience of discussing use cases with process owners and data scientists, such a discussion can quickly become very technical, with the business aspects getting lost, especially if there is technical experiential knowledge in the classroom. The instructor should strive for a balanced discussion and ask business related questions, such as for example, what process parameters will improve, if the technical aspects take over the discussion. The discussion can be redirected by asking questions such as, "In this use case, what would be the risks, if the process owner does not supervise the new patterns that the AI application discovers?" At this point of the discussion, other topics of discussion around use cases might also arise, such as what makes a good use case (typically, lots of good data and high repeatability) and for which processes in the company should use cases be developed (strategically high impact processes, operationally inefficient processes). A good reference for the instructor here is Tarafdar et al (2017).

How can organizations make themselves AI ready?

One of the most important takeaways from our research has been that successful implementation of AI applications requires the full gamut of organizational levers and not just isolated efforts. This is a good place to discuss those levers. It is natural for companies to think that the key element of AI is data science and algorithms. This is a good place in the case discussion to bust that myth. The instructor can begin by asking, "Has anyone in the class been involved in AI projects? From which other departments were the project team members from?" This should set the stage for a discussion on the roles of all the different kinds of people and expertise needed in an AI implementation effort: process managers/owners, customers, domain experts, data scientists, AI experts. The instructor should then focus on why each of these different types of people are needed and what they do. Employees/process owners need to be incentivized to think of possible use cases; technical experts need to be on a constant cutting edge of technology understanding; and customers need to be offered the chance to attend workshops to understand Wipro’s AI offerings and work collaboratively with Wipro employees to generate ideas for possible use cases. All of this should highlight the importance of co-creation of use cases and applications by all of these roles rather than isolated development by the data scientists alone.

This is a good point for the class to pause and reflect on the nature and extent of transformation that infusing AI in business processes can bring about. The instructor can ask, "What sort of changes do you see in Wipro's internal business processes and in their offerings to customers?" Exhibits TN2 and TN3 can be used to generate a discussion on the role of messaging and communication. Further, an ethics related discussion can be generated to highlight the issue of reskilling and redeploying of employees whose jobs might change as a result of such a transformation.

How does the organization's IT maturity affect the success of AI?

A key finding in our research on enterprise AI has been that companies often under-estimate the importance of technology maturity in successful AI implementation. There seems to be a general idea that one can just bring in AI and run with it. The instructor should use Wipro's Bot architecture as a springboard for this discussion. The instructor can begin by asking, "Do you think Wipro is a technically mature company? Did that help them on their AI journey." Those students with IT experience are likely to talk about legacy applications, data and integration. Those with process experience are would come at this from the point of view of process integration and maturity. The instructor can fruitfully combine these perspectives to highlight the value of prior architecture and data that Wipro has, as a helpful and necessary basis on which to build and manage AI applications. The importance and role of the IT department is another point of emphasis here.

Bringing it all together

Instructors may want to spend a few minutes at the end to highlight the need for companies to bring it all together. They can wrap up by showing that companies need to have all of the following to be good at leveraging AI: (1) strong technical/data science talent; (2) AI-literate process owners and functional experts; (3) AI-enthusiastic customers; and (4) a mature IT architecture (process and data). They might call upon those in the class with experience in AI projects, either in an IT or in a user role, to speak to the difficulty of achieving all of these together.

Board Plan

Figure 1 depicts the board plan that instructors can follow to go in sequence through the different discussion points in the case.

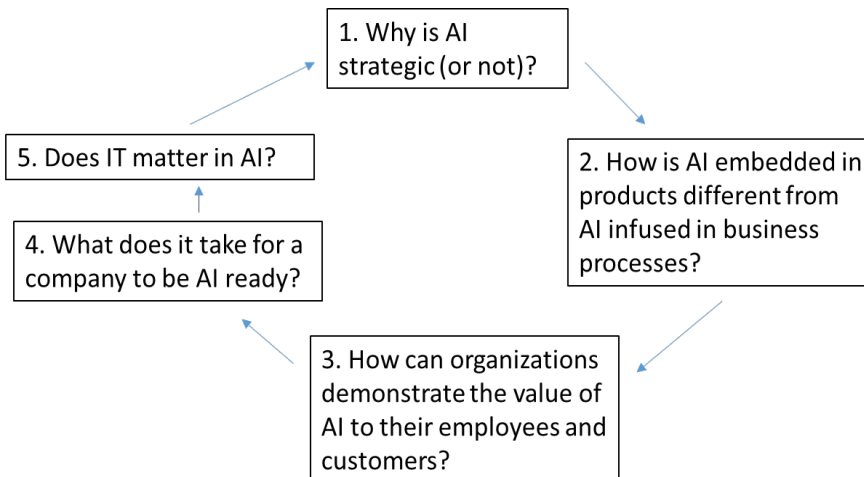


Figure 1: Board Plan

References

- Le, James, 2018. "A tour of the top ten algorithms for machine learning newbies," Jan 20, 2018. <https://towardsdatascience.com/a-tour-of-the-top-10-algorithms-for-machine-learning-newbies-dde4edffae11>
- Robinson, David. 2018. "What's the difference between data science, machine learning and artificial intelligence?" *Variance Explained*, Jan 9, 2018. <http://varianceexplained.org/r/ds-ml-ai/>
- Ross, J. W., Beath, C. M., and Tarafdar, M. 2016. "Five Things You Should Know About Cognitive Computing" (with Jeanne Ross, MIT, and Monideepa Tarafdar, Lancaster U.) MIT CISR Research Briefing, Vol. XVI, No. 12, December, 2016.
- Tarafdar, M., Beath, C. M., and Ross, J. W. 2017. "Enterprise Cognitive Computing Applications: Opportunities and Challenges," *IEEE IT Professional* (19:4), pp. 21-27.
- Wong, J. C. 2018. "Amazon working to fix Alexa after users report random burst of 'creepy' laughter," *The Guardian*, March 07, 2018. <https://www.theguardian.com/technology/2018/mar/07/amazon-alexa-random-creepy-laughter-company-fixing>
- Two possible sources on RPA:
- Lhuer, X. 2016, "The next acronym you need to know about: RPA (robotic process automation). *The McKinsey Quarterly*. <https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/the-next-acronym-you-need-to-know-about-rpa>
- Boulton, C. 2017. "What is RPA? A Revolution in business process automation," *CIO Magazine*. <https://www.cio.com/article/3236451/business-process-management/what-is-rpa-robotic-process-automation-explained.html>

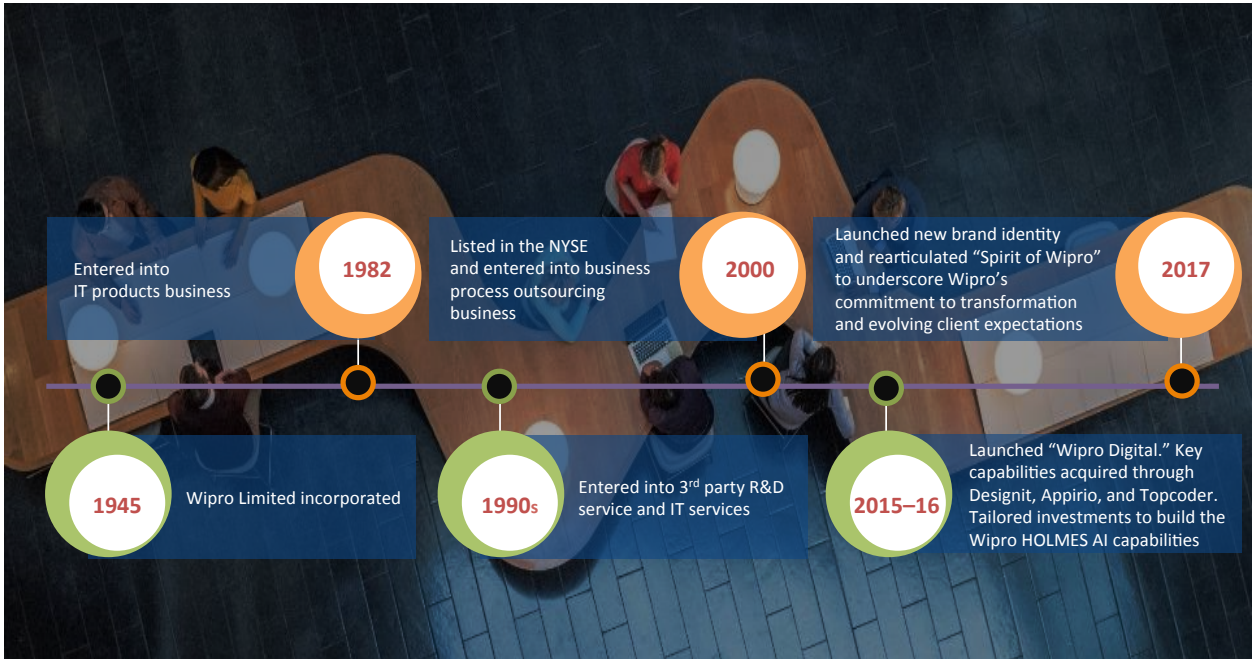
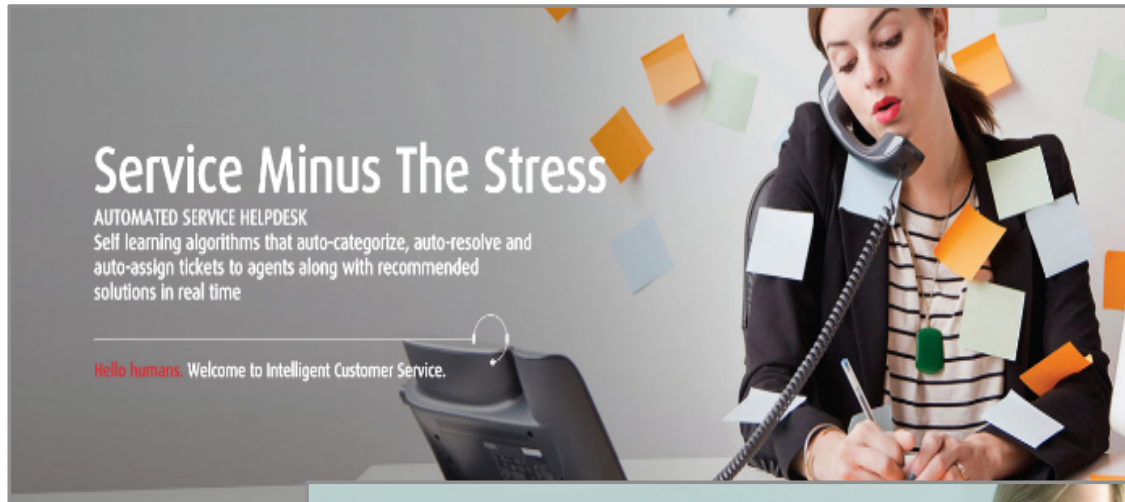


Exhibit TN 1: Wipro's Key Milestones



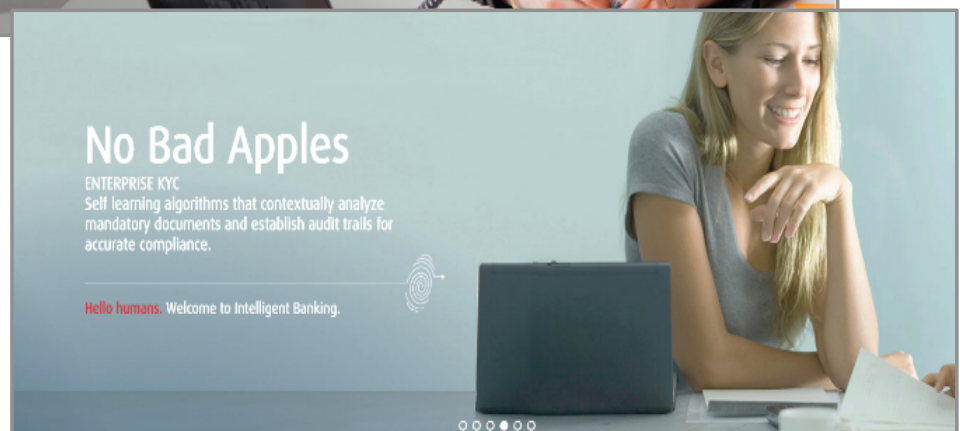
Exhibit TN 2: HOLMES Internal Messaging Launch -- 2015



Service Minus The Stress

AUTOMATED SERVICE HELPDESK
Self learning algorithms that auto-categorize, auto-resolve and auto-assign tickets to agents along with recommended solutions in real time

Hello humans. Welcome to Intelligent Customer Service.



No Bad Apples

ENTERPRISE KYC
Self learning algorithms that contextually analyze mandatory documents and establish audit trails for accurate compliance.

Hello humans. Welcome to Intelligent Banking.

Exhibit TN 3: HOLMES Marketing Campaign -- 2015