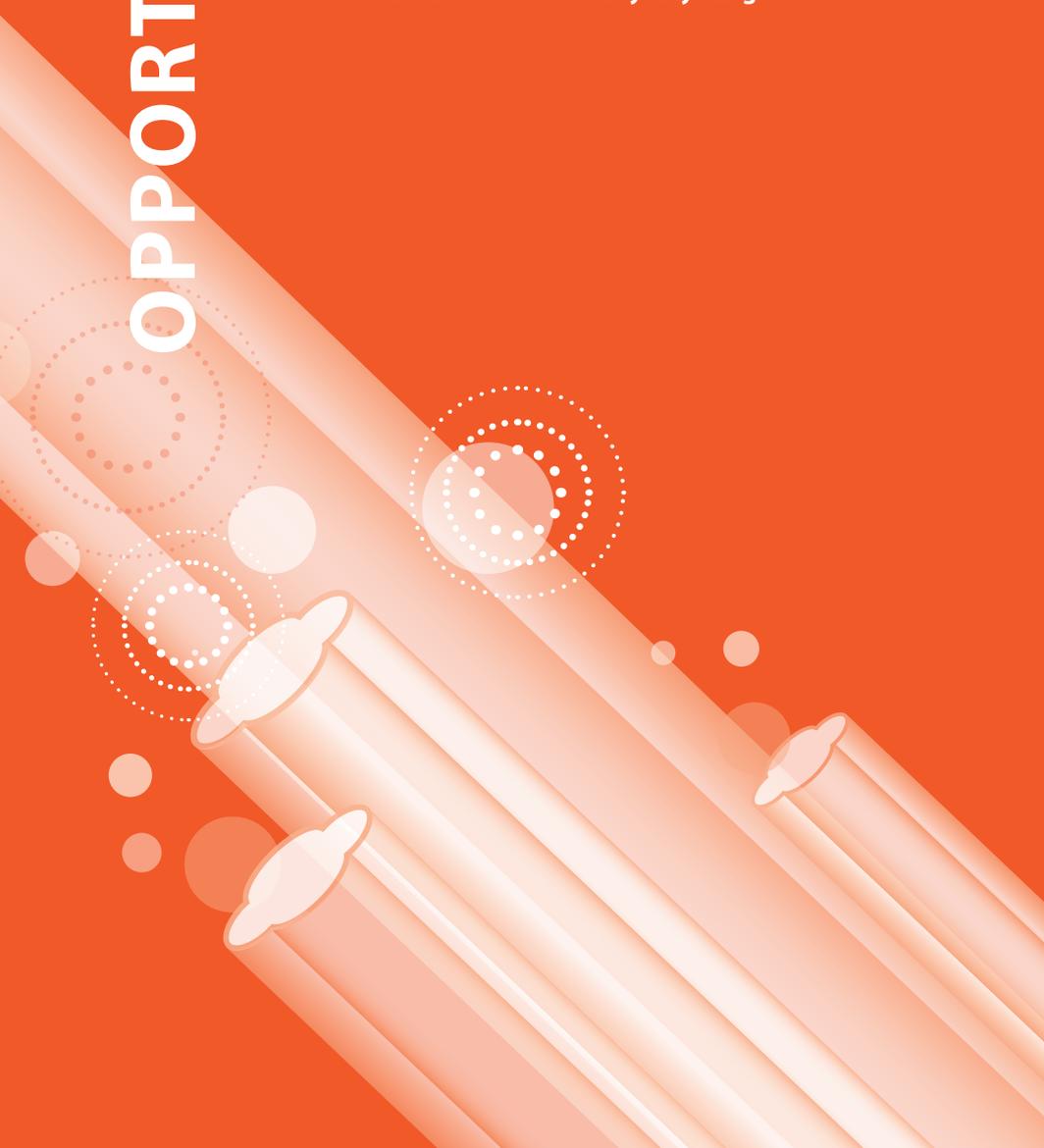


THE BUSINESS OPPORTUNITIES

**Where to Turn AI and Automation Loose
in Your Company**

Why Your Products Must Be Smart and Connected

Now You Can Simulate Nearly Anything



Where to Turn AI and Automation Loose in Your Company

Authors

Ashok Pai

Global Head, Cognitive Business Operations, Tata Consultancy Services

Krishna Mohan

Deputy Head, Cognitive Business Operations, Tata Consultancy Services

Artificial intelligence (AI), machine learning, and related technologies were once the realm of science fiction. Fueled by affordable computing power and ample supplies of data, these technologies now have reached the point where they can evaluate options, make decisions, and even take action to execute those decisions.

The opportunities are abundant. Technological improvements in data processing and sensors, coupled with better statistical models and algorithms, have driven recent advances in AI. Sensors nowadays are approaching near-human capabilities when it comes to image processing, voice (and accent) recognition, and sentiment analysis. AI systems today can correlate events, recognize patterns, and derive meaning from the data.

The combined power of these innovations has produced breakthroughs like driverless cars. Established automakers and industry newcomers such as Google, Uber, and Tesla

are pouring billions of dollars into creating autonomous vehicles. Toyota alone will invest \$1 billion from 2015 to 2020 to introduce AI into its cars and robots in its factories.⁶

But interest in AI extends far beyond the automotive sector. By that year, the companies surveyed expect that nearly half of the AI investments would be used for transformative change rather than incremental operational improvements.

The 2017 TCS Global Trend Study⁷ of more than 800 large companies across North America, Europe, Asia-Pacific, and Latin America found that 84% companies are using AI already, and 62% see the technology as important to staying competitive in the year 2020.⁸

Companies noticing these innovations are keen to find ways to bring automation to functions ranging from customer service to risk management to HR. Consumers, who already benefit from AI through the social media sites they use, car ride services, and other smartphone apps, represent another source of big demand.

⁶ The New York Times, Toyota Invests \$1 Billion in Artificial Intelligence in U.S., November 6, 2015, accessed July 17, 2017, <https://www.nytimes.com/2015/11/06/technology/toyota-silicon-valley-artificial-intelligence-research-center.html>

⁷ Tata Consultancy Services, Getting Smarter by the Day: How AI is Elevating the Performance of Global Companies, March 15, 2017, accessed August 04, 2017, <http://sites.tcs.com/artificial-intelligence/>

⁸ The 835 companies in the TCS Global Trends study had an average revenue of \$20 billion.

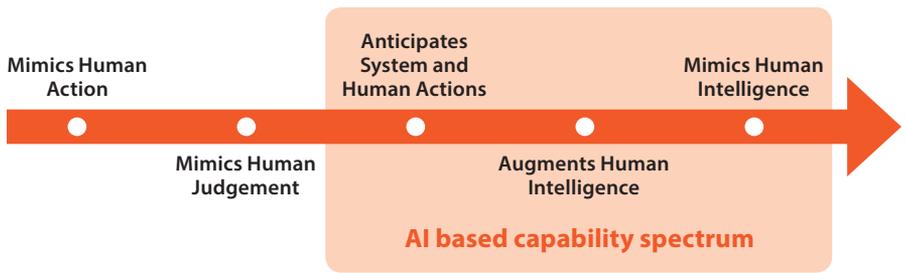


Figure 1: AI Imitates Human Action to Mimic Human Intelligence

Some companies have already generated big benefits from their AI initiatives. A global information services and publishing company used machine learning to dramatically improve its customers' ability to derive insights from thousands of legal documents they processed. A leading communication service provider has piloted an AI program to improve its network uptime by deploying a cognitive intelligent platform that combined machine learning, analytics, and robotic automation to predict and prevent network failures.

But even with such AI and automation success stories, most companies we know are not quite sure where to focus their AI investments. As a result, they proceed cautiously, while a distinct minority rushes forward. In 2016, the average annual AI investment among companies surveyed in our trend report was \$67 million, but the median spend was only \$3 million. Most companies (68%) were using AI to improve their IT operations, especially with the aim of detecting and deterring attempted intrusions into their computer networks and data centers. Significantly smaller percentages of the companies surveyed reported applying AI to their customer service (32%), sales (29%), and marketing (29%) functions. Looking to the future, 70% of the executives expect that by 2020, AI will have the greatest competitive impact outside of IT in functions such as sales, marketing, customer service, and HR.

Our experience shows these executives are not only correct, but that companies in a variety of industries see gains today along a continuum as shown in Figure 1. Market research firms are capitalizing on AI's image recognition capabilities by using it to

collect market data. Data providers use AI to analyze legal documents and identify potential problems. Telecommunications companies apply AI to diagnose network problems. CPG companies use AI to predict and prevent fraudulent invoices. And retailers use AI-powered chatbots to assist customers on internet.

A major airline provides another example. In this industry, on-time performance is a key customer experience indicator and flight delays are a huge concern. While an airline cannot control the weather, reducing the impact of delays and proactively communicating with customers can make a difference. For example, faster insights into upcoming delays can enable an airline to execute more precise schedules for airport gates, ground crews, flight crews, and other personnel.

One major airline used advanced machine learning techniques to build two predictive models—one for flight departure delays and a second for arrival delays—to anticipate whether a flight departing later in the day would take longer than scheduled. The resulting analysis led to a more precise understanding of the reasons (internal and external) for flight delays and the impact of delays on the flight network. The airline was able to improve operational efficiency by adjusting staffing and other resources for anticipated schedule changes, thereby strengthening brand perception.

Figure 1 shows that as AI increases in complexity and capability, it goes from imitating human action to mimicking human intelligence.

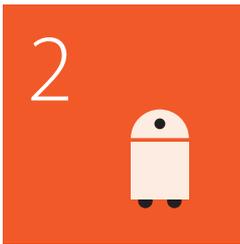
As the list of examples grows and as companies experimenting with AI gain experience, the question for both newcomers remains: Where should we begin?

Three AI Traps to Avoid

Before prioritizing their AI investments, executives should be wary about falling into three common traps:



The deep pockets trap. In most companies, the IT department spends the maximum possible on technology. IT departments can make a solid case for using AI to protect data centers and networks, but just because IT has the biggest technology budget, that doesn't mean that it necessarily deserves the lion's share of AI investments. In fact, a company might be able to get a greater ROI from targeted AI investments in finance and procurement functions to cut down on fraudulent customer transactions.



The robot trap. Beware the lure of shiny objects. Robots that can clean hotel rooms or answer questions at the front desk are alluring because they have a tangible, physical presence. An AI-powered tool that flags potentially fraudulent customer purchases may not have the same glamour as a robot, but it might have a much bigger benefit to a company's bottom line.



The pure insights trap. It's important to remember that AI is just a tool. AI applied to research and analysis can yield all sorts of insights, but executives should make sure that AI-powered research is focused on insights that are useful and applicable to the company's goals and needs. Connect AI to business value.

Pinpointing Your Company's Greatest AI Opportunities

Despite AI's potential to transform products and business processes, executives must not get caught up in the hype. Before they fund AI projects, they need to carefully consider where they can most likely get the greatest positive impact from AI in the organization. In the C-suite, each function head brings a point of view to the question. Chief operating officers typically look to trim costs. Most sales executives we know salivate over using AI to identify the best prospects and win the sale. Many corporate strategists view AI as a way to better understand the changing landscape of competitive moves and customer needs.

The key is to recognize failures quickly, cut your losses, learn from those failures, and make changes to improve the chances of success on future AI projects.

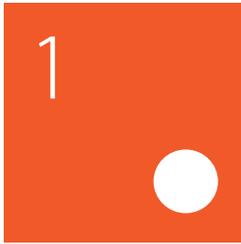
Starting out with AI means developing a sharp focus. For most companies, AI projects will not resemble the multi-year, billion-dollar 'moon shots' like the creation of a driverless car in the auto industry. Instead, C-suite executives should prioritize and fund agile, short-term (6 to 12 months) projects backed by a strong business case. Some failures are inevitable. When projects do succeed, companies can expand on those successes by pursuing additional related opportunities.

Figure 2 shows that enterprises typically start with Six Sigma/Lean and task-based automation, and then move towards more advanced stages based on AI.



Figure 2: Maturity Journey of an Intelligent Enterprise

A three-step approach to evaluating automation and AI opportunities can clarify an organization's best AI opportunities:

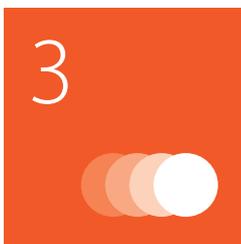


Isolate functions that require human intervention.

Any task a human currently performs, such as data entry or invoice processing, could theoretically be automated or performed by a system with AI capabilities. For example, a market research firm implemented a system that used machine learning, image recognition, and cognitive intelligence to interpret product images, and automatically capture product attributes to help its consumer packaged goods customers track the competitive marketplace. Instead of having people research and check the images and status of goods for sale, an AI-enabled system automated the process, saving considerable time and cost.



Remove from consideration during the pilot stage those functions that would be too costly to automate now. For example, if a telecommunications provider was exploring its first AI project, it would more likely look to an area like reducing customer churn or improving ARPU (average revenue per user), with proven results in the short term, rather than a multi-year program.



Automate functions with the greatest ROI potential. Companies should look to automate functions that require extensive amounts of manual labor—i.e., an AI system that analyzes insurance claims data and authorizes payments, or a credit card company's chatbot that communicates online with customers and sends out a replacement card to those who lose their cards. Companies in practically any industry could deploy HR chatbots to answer customer inquiries or collect data from job applicants (saving staff time to schedule final interviews).

The experience of a leading market research organization shows the benefits of a targeted approach. The company used advanced machine learning to automate the process of tracking consumer packaged goods to analyze their performance. The process uses a master product reference repository with a set of defined characteristics in multiple consumer product categories. Because of the volume and complexity of the data involved—there are more than 100,000 items that enter the market in a given month—it can take more than two weeks to code product entries for a few regions.

The company deployed advanced machine learning technology that automated multiple aspects of the process, including comparing existing and new products, predicting prices of goods for sale, and analyzing the text used to define the products. The system deployed an image recognition algorithm adapted to mimic the way the human brain interprets images on product labels. The system, which automates the capture of product metadata, yields faster insights

with fewer human interventions, so marketers can respond to market trends more quickly at a lower cost of operations.

How to Evaluate Potential AI and Automation Investments

This process of maximizing benefits from AI projects starts by taking a holistic overview of the company's strategic priorities and pain points. Consider the competitive landscape and determine where AI or automation can bring the company closer to attaining its strategic priorities. For instance, will AI and automation help the company accelerate time-to-market for its new products and services? Similarly, companies should determine which 'pain points', such as inefficient supply chains or poor after-sales service, stand in the way of high performance. Companies need to diagnose the root causes of those problems and should be able to identify which parts of their operations need improvement.

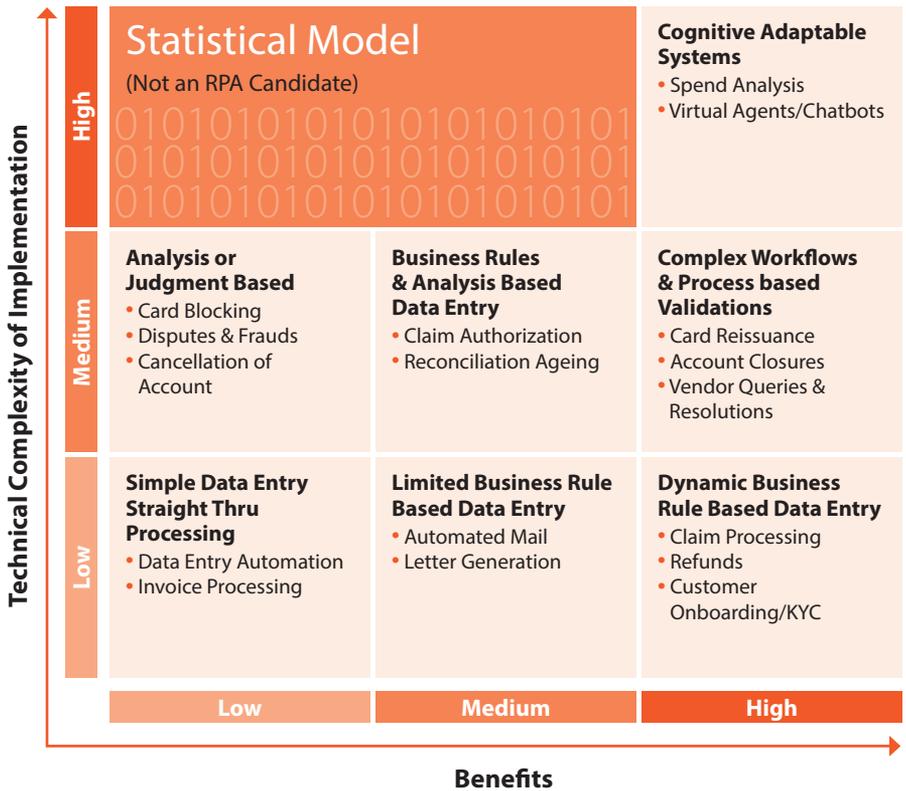


Figure 3: Technical Complexity of AI Implementation and Potential Benefits

As companies identify improvement areas, they can consider which ones lend themselves to automation and digitization. Are the processes predictable and repeatable? Is the IT environment stable or shifting? If the company is in the midst of a multi-stage IT transformation, it can be very complex to attempt to insert automation or AI technology into that precarious context.

Of course, companies should perform a cost-benefit analysis before embarking on any AI or automation project. Based on our experiences of helping companies implement such projects, we know that ROI typically requires balancing expected benefits against the technical complexities of implementation as shown in Figure 3.

To calculate the business benefits of an AI or automation program, companies should consider how many human transactions the new system will replace and the average time it takes to complete a process.

On the cost side, companies must consider the upfront investment of implementing an AI program, maintenance costs, and whether automation will deliver lower costs per transaction or such other savings.

The more judgment required, the higher-order the AI capabilities must be. For instance, a life sciences company trying to automate the process of reviewing reports from doctors, evaluating a drug going through clinical trials, would need a deep understanding of the industry.

Figure 3 shows that companies should assess automation projects based on both their technical complexity and potential business benefits.

Pulling the Right Lever at the Right Time

After identifying promising opportunities to deploy AI or automation technologies, corporate leaders still need to figure out which technology to pursue:



Artificial intelligence represents the highest level of business automation. True AI can sense, think, and act. This type of AI is necessary to power self-driving cars in complex, unpredictable environments. A medical robot might use AI to analyze human vital signs and give advice to doctors about diagnosis and possible treatments.



Cognitive computing systems also can sense and think. In a corporate context, such capabilities can enable people to do their jobs better, improve business processes, and increase profitability. Cognitive computing systems might automate actions people once performed or give people suggestions about their next action. Such systems typically have natural language processing capabilities to collect and analyze large amounts of text, documents, and other forms of unstructured data. For instance, a life sciences company could use such a system to scan records of millions of clinical cases involving its products, detect adverse events, and report them to regulators. Cognitive computing systems generally have machine learning elements that apply algorithms to find patterns in data. For instance, a marketing firm could analyze the consumption patterns of its many consumers. The predictive analytics elements of cognitive computing systems allow companies to analyze data from business processes and find recommended ways to improve results. For example, the system might review a company's existing process of delivering orders, and then provide recommendations on getting customers their products faster and with fewer errors.

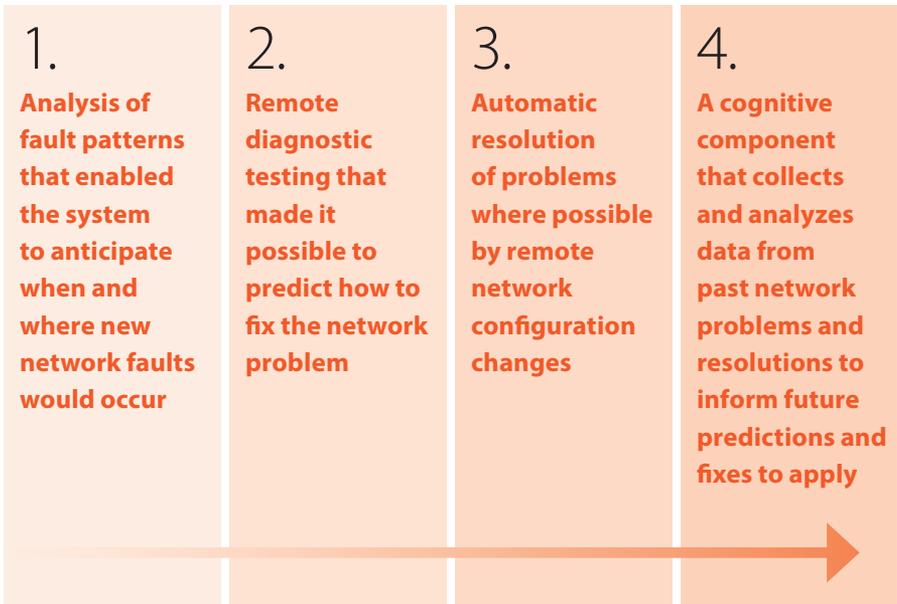


Robotic process automation gives companies a way to apply automation on smaller projects. Chatbots are still new, but they already can respond to customer queries about simple billing questions. Similarly, virtual private assistants make it easier for employees at professional services firms to make travel plans.

Assess Your Situation—Then Move

AI and automation are top-of-mind technologies. Companies around the globe are eager to take advantage of them.

Executives at a leading communication service provider were no different when they approached an opportunity to improve the uptime of their network. Providing superior connectivity depends on efficient functioning of telecom networks. The industry relies on manual identification and resolution of network incidents—caused by technical or environmental problems or human error. It is a time consuming and inefficient process. This service provider sought to improve network uptime and reduce costs while saving time and strengthening service. The project included four sequential phases:



By deploying a cognitive intelligent platform that dynamically combined machine learning, analytics, and robotic automation for network failure prediction, the company was able to automate portions of the network maintenance process.

Like the service provider's experience shows, incorporating AI into a company's operations is a tailored fit. Evaluating these opportunities requires a careful and candid assessment of a company's competitive landscape, its digital maturity, the effectiveness of existing business practices versus industry benchmarks, the potential for improvement, and the complexity of the technological context into which AI and automation would be inserted.

To get the most out of AI and automation, companies need to combine the right automation technology to the right situation at the right time. This process takes time, but there's no time to wait.