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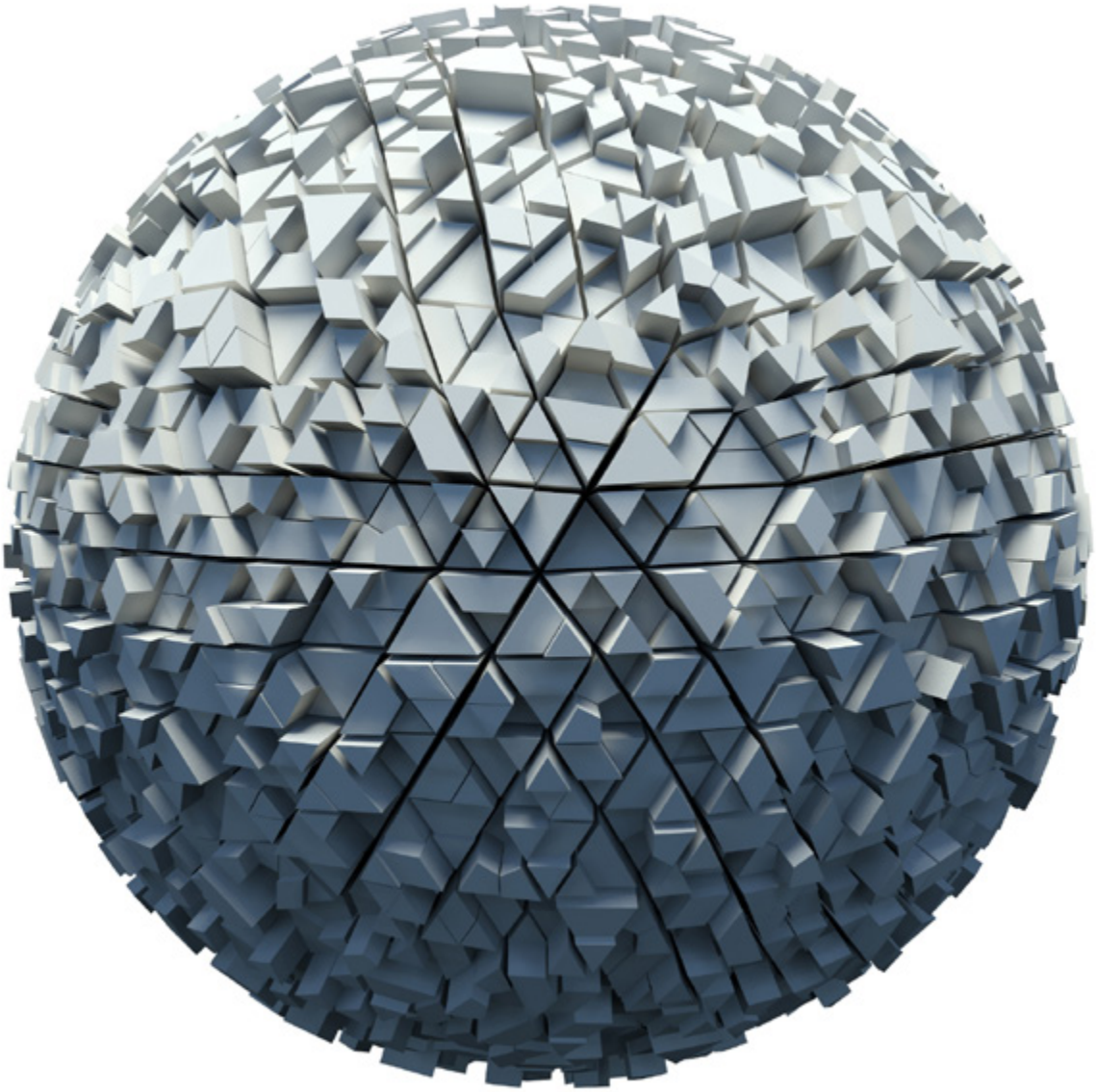

Artificial Intelligence – Next “bold play”

Why businesses need to pay attention to Artificial Intelligence?

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Artificial Intelligence & Cognitive systems

A useful definition of artificial intelligence (AI) is the theory and development of computer systems able to perform tasks that normally require human intelligence. This isa significant change from the earlier definition of AI as computer systems that could think the same way as humans did.

Press coverage of the topic has been breathless, fuelled by the significant investments and amid concerns that that computers may eliminate jobs by being smarter than humans. Amidst all the hype, there is significant commercial activity underway in the area of AI that is affecting or will likely soon affect organizations in every sector. Business leaders should understand what AI really is and where it is heading.

For us, a useful definition of AI is the theory and developmentof computer systems able to performtasks that normally require human intelligence.Examples include tasks such as visual perception,speech recognition, decision-makingunder uncertainty, learning, and translation between languages.

Defining AI in terms ofthe tasks humans do, rather than how humansthink, allows us to discuss its practical applicationstoday, well before sciencearrives at a definitive understandingof the neurological mechanismsof intelligence.

We distinguish between the field of AI and the subset of technologies that emanate from the field. The individual technologies by contrast, are getting better at performing specific tasks that only humans used to be able to do.We call these “cognitive technologies”.

I. Components of cognitive technologies

Cognitive computing solutions offer various capabilities compatible to human brain, which enable the above technologies to perform tasks as a human brain will do. The individual technologies are getting better at performing specific tasks that only humans could do earlier.

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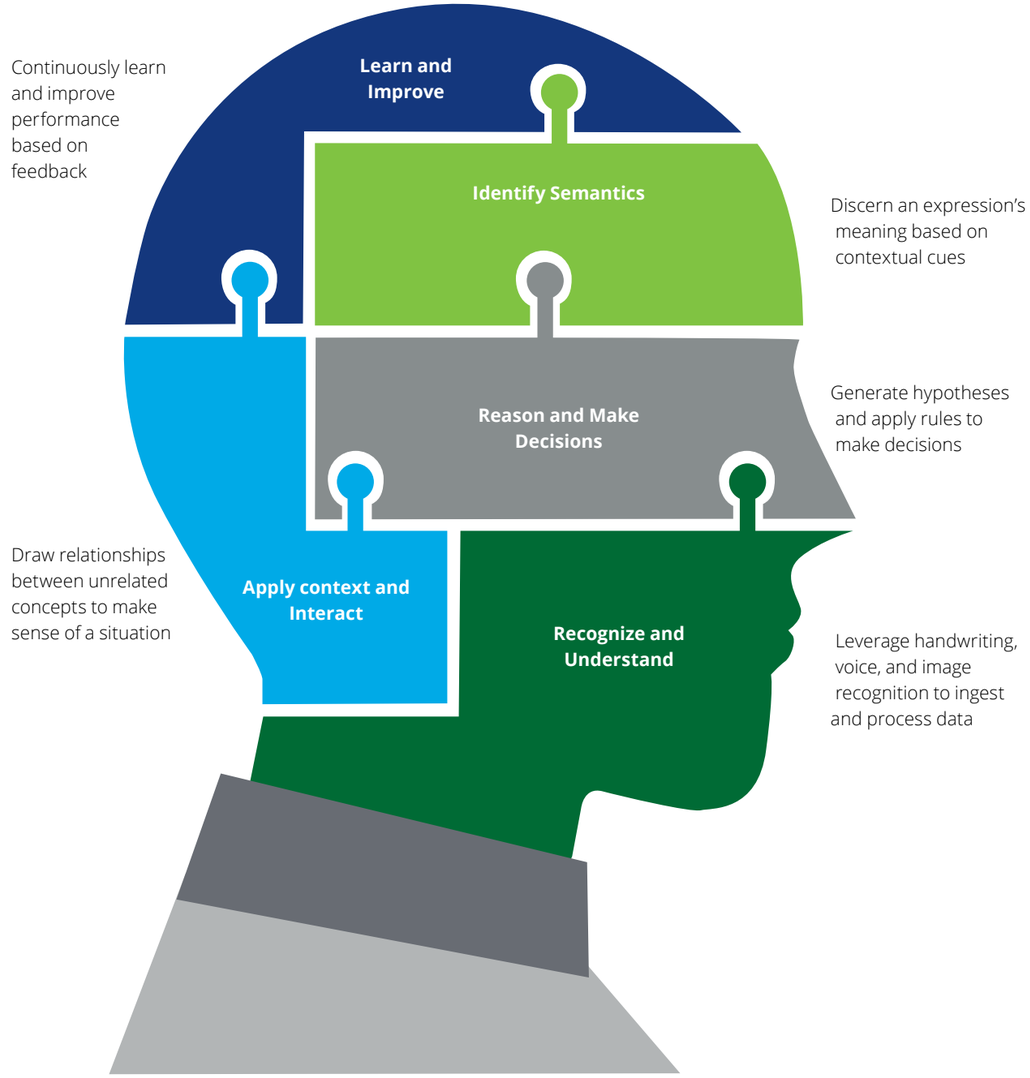
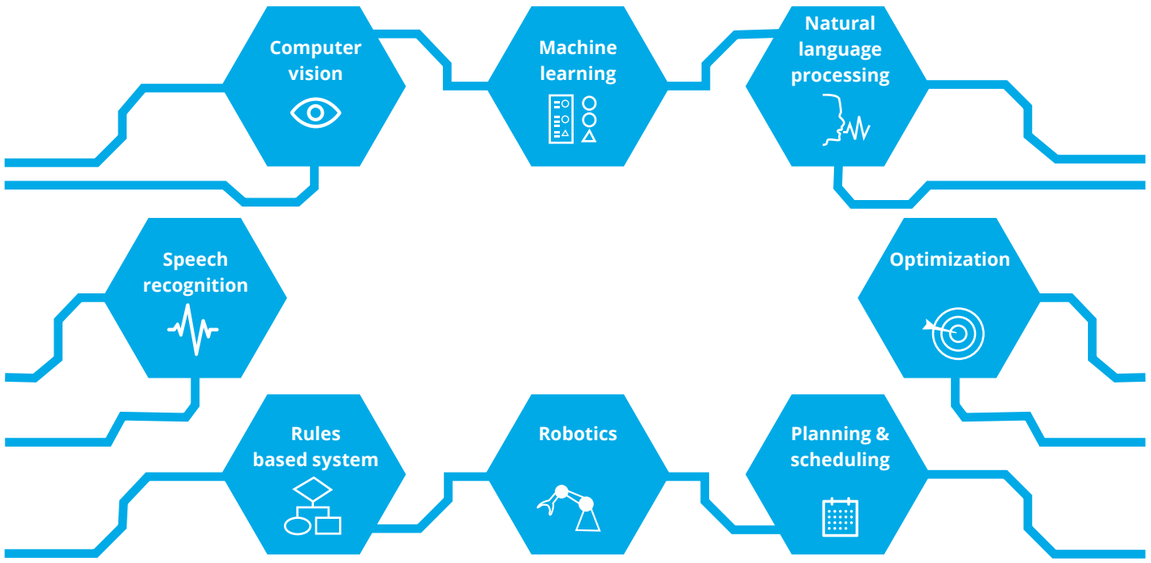


Source: Data Science Summit Cognitive Breakout

We call out these cognitive technologies (figure 1), and it is these that business leaders may focus their attention on.

Figure1: The field of artificial intelligence has produced a number of congnitive technologies



Graphic: Deloitte University Press | DUPress.com

Source: Demystifying Artificial Intelligence; http://dupress.com/articles/what-is-cognitive-technology/

Below we describe some of the most important cognitive technologies—those that are seeing wide adoption, making rapid progress, or receiving significant investment.

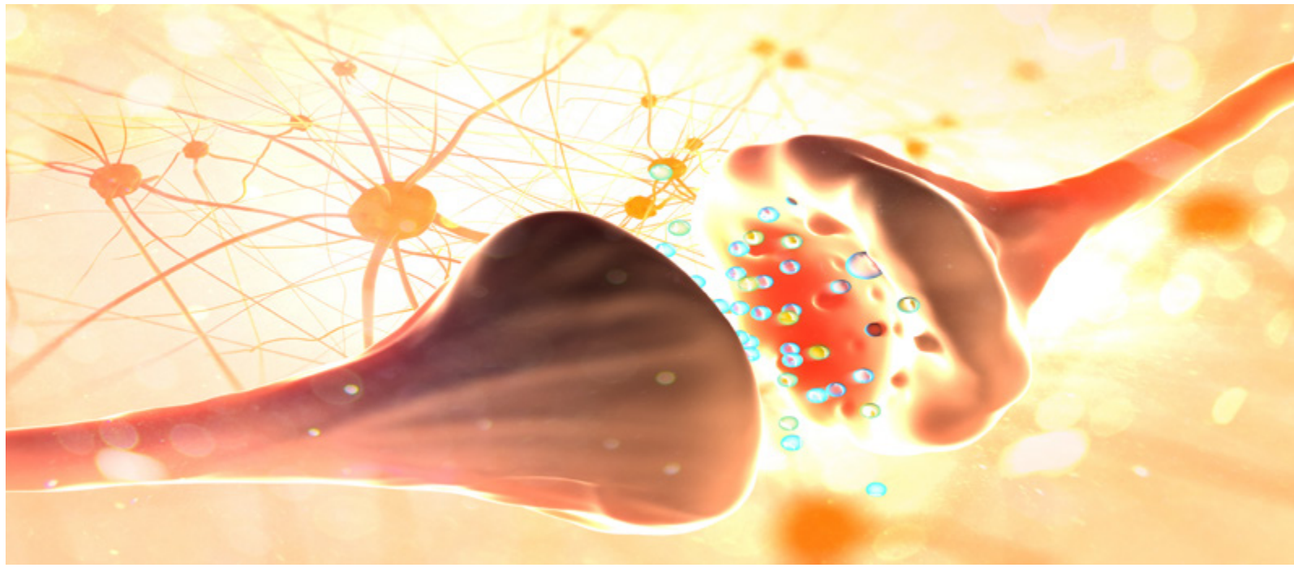
Machine learning refers to the ability of computer systems to improve their performance by exposure to data without the need to follow explicitly programmed instructions. At its core, machine learning is the process of automatically discovering patterns in data. Once discovered, the pattern can be used to make predictions.

Natural language processing refers to the ability of computers to work with text the way humans do, for instance, extracting meaning from text or even generating text that is readable, stylistically natural, and grammatically correct.

Speech recognition focuses on automatically and accurately transcribing human speech. The technology has to contend with some of the same challenges as natural language processing, in addition to the difficulties of coping with diverse accents, background noise, distinguishing between homophones, and the need to work at the speed of natural speech.

Computer vision refers to the ability of computers to identify objects, scenes, and activities in images. **Machine vision,** a related discipline, usually refers to vision applications in industrial automation, where computers recognize objects such as manufactured parts in a highly constrained factory environment.

Robotics Integrating cognitive technologies such as computer vision and automated planning with tiny, high-performance sensors, actuators, and cleverly designed hardware, has given rise to a new generation of robots that can work alongside people and flexibly perform many different tasks in unpredictable environments.



II. How cognitive technologies are used in organizations across industries

Organizations across industries of the economy are already using cognitive technologies in diverse business functions.A few use cases are illustrated below, where we try to portray both by technology and sector-wise implications:

Applications of **machine learning** are very broad, with the potential to improve performance in nearly any activity that generates large amounts of datawhich needs to be analysed and used for predictive models. While a significant effort is being spent in financial services around Fraud, Risk and areas such asKYC and AML, we are also seeing applications insales forecasting, inventory management, oil and gas exploration, and public health.

Applications of **natural language processing** often address relative narrow domains such as analysing customer feedback about a particular product or service, automating discovery in civil litigation or government investigations (e-discovery), and automating writing of formulaic stories on topics such as corporate earnings or sports.

Computer vision has diverse applications, including analysing medical images to improve diagnosis, and treatment of diseases; face recognition, used by Facebook to automatically identify people in photographs; in security and surveillance to spot suspects; and in shopping—consumers can now use smartphones to photograph products and be presented with options for purchasing them.

The **potential business benefits** of cognitive technologies are much broader than cost savings that may be implied by the term “automation.” They include the following:

- Faster actions and decisions (automated fraud detection, planning and scheduling)
- Better outcomes (medical diagnosis, oil exploration, demand forecasting)
- Greater efficiency (better use of high-skilled people or expensive equipment)
- Lower costs (reducing labor costs with automated telephone customer service)
- Greater scale (performing large-scale tasks impractical to perform manually)
- Product and service innovation (adding new features to creating entirely new products)

Real business opportunities for Cognitive technologies can be classified into:

Cognitive Insights
Detect key patterns and relationships from billions of data sources in real-time to derive deep and actionable insights.

E.g. Build a deep understanding of customers through segmentation, customer 360 profiles, personalized insights, predictive analytics, pattern recognition, etc.

Cognitive Automation
Automate repetitive, knowledge & natural language rich, human-intensive decision processes.

E.g. Enable employees to improve the quality, accuracy, and timeliness of service by seamlessly scanning large amounts of data for answers.

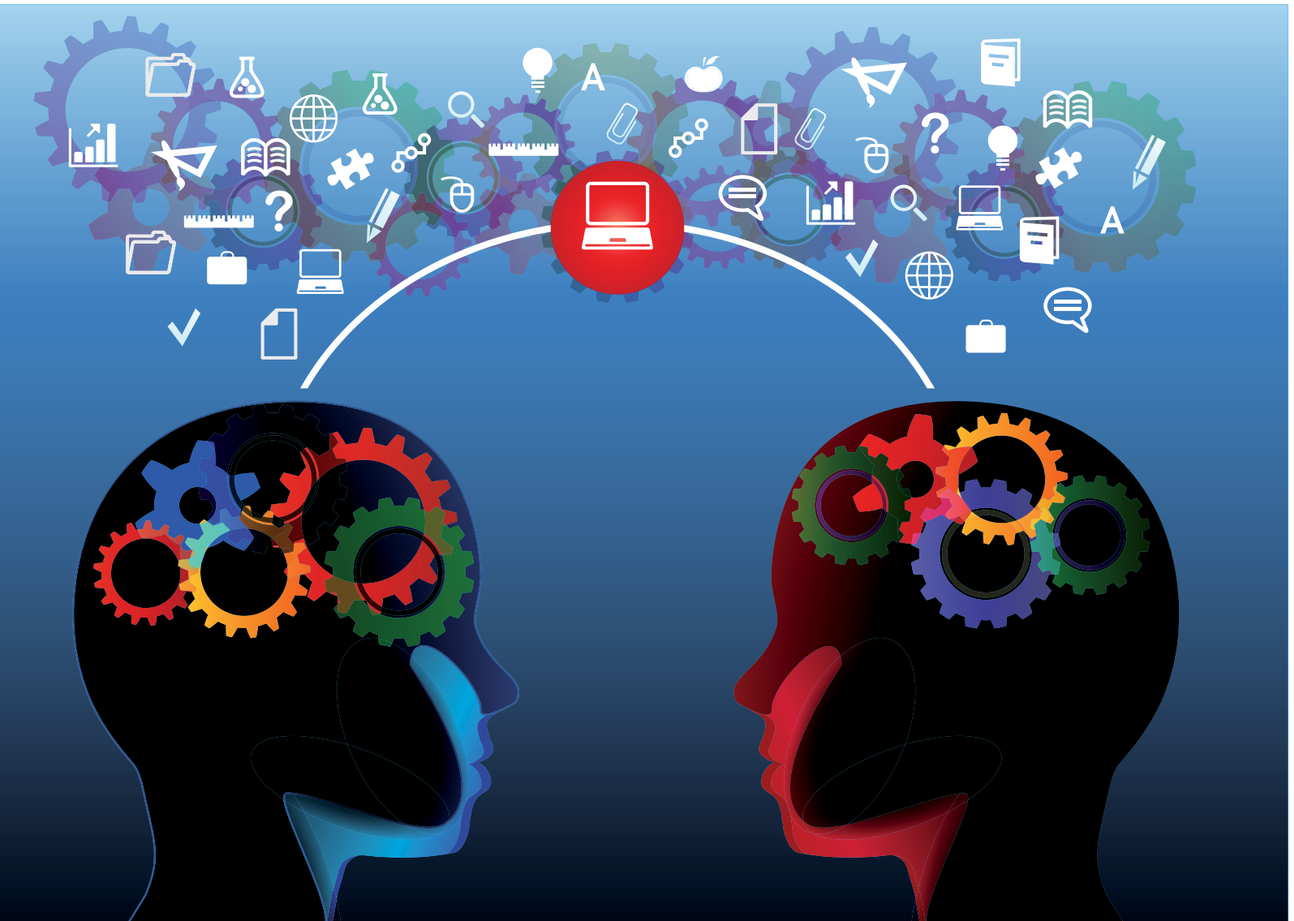
Cognitive Engagement
Improve customer understanding and activation through mass personalization, influencing desired actions.

E.g. Improve health outcomes and costs for patients by integrating real-time data to monitor and engage stakeholders at moments that matter.

Cognitive Sensing & Shaping
Build a deep understanding and knowledge of company, market dynamics, and disruptive trends to shape strategies.

E.g. Identify a disruptive trend before it happens by delivering relevant insights to the user based on the continuous, real-time analysis of data.

Source: Data Science Summit Cognitive Breakout



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Brief snapshot of some of these cognitive use cases across industries is illustrated below:

	Machine Learning	Speech / Voice Recognition	Natural Language Processing	Computer Vision
Financial Services	Automated fraud detection systems - Reduce AML false positives and thereby reduce cost to fast track regulatory processes	To automate customer service telephone interactions	Generating portfolio commentaries using natural language generation.	
Life Sciences Healthcare	To predict cause-and-effect relationships from biological data and the activities of compounds, helping pharmaceuticals companies identify promising drugs	For transcribing notes dictated by physicians is used in around half of US hospitals		To automate the analysis of mammograms and other medical images
Telecom Media Technology	To enhance products or create entirely new product categories, such as the Roomba robotic vacuum cleaner or the Nest intelligent thermostat		Companies are using data analytics and natural language generation technology to automatically draft articles about data-focused topics such as corporate earnings or sports game summaries	To enhance products or create entirely new product categories, such as the Roomba robotic vacuum cleaner or the Nest intelligent thermostat
Oil & Gas / Natural Resources	Wide range of applications, from locating mineral deposits to diagnosing mechanical problems with drilling equipment			Autonomous fleets deployed in mines / deep sea drilling using robots with image recognition capabilities
Retail	To automatically discover attractive cross-sell offers and effective promotions		Contextual intelligence from unstructured text and image understanding technologies can analyze huge amounts of crawled data cycles from fashion blogs, articles, and images, and provide tools to detect, track, and forecast fashion fads and also give insights into how the industry is moving.	

Source: http://dupress.com; Secondary sources

III. Adoption of Artificial intelligence / cognitive technologies across the globe

Now that we have seen the components & use cases of these technologies, let’s walkthrough commercial adoption by global organisations across functions

How Artificial Intelligence Can Boost Audit Quality - One specific area in which auditors are taking advantage of the benefits of cognitive technologies is document review. Reading through stacks of contracts to extract key terms has traditionally been a time-consuming, manual process. Cognitive technologies are already being deployed by forward-thinking firms to largely automate this process. Natural language processing (NLP) technology reads and understands key concepts in the documents. And machine-learning technology makes it possible to train the system on a set of sample contracts so that it learns how to identify and extract key terms. Using cognitive technologies, auditors may soon be able to provide clients with new ways to uncover risk hiding in plain sight in financial statements. Today, our professionals use tools that parse financial statements automatically, making it easy to find footnotes and conduct thorough peer comparisons.[i]

Clever banking with artificial intelligence, Smart machines and technology can turn data into customer insights and enhance service provisions, bringing the digital experience closer to the human interaction for consumers. Banks and FinTech companies already use machine learning to detect fraud by flagging unusual transactions, as well as for other purposes. It’s far more efficient than human manual monitoring and is expected to become the norm in banking and finance [ii]

Global online e-commerce or fashion retailers use machine learning methods which can build recommendation engines that can factor in the personality type, gender, age, occasion, current season, weather, the current fashion trends, current wardrobe, user style history, culture, affluence, browsing pattern, and maybe the current mood.[iii]

Global mining giants turning to autonomous fleets / drills in their mining fields. This follows a similar trend across a wide range of industries, from car manufacturing to computing, whereby robots or artificial intelligence are increasingly taking roles traditionallyperformed by humans.[iv]

AI-Driven Virtual Assistant powers Mobile-Only Bank. The virtual assistant can anticipate and answer thousands of customer questions and also help customers perform banking transactions in real-time.[v]

IV. Conclusion

Understanding how to obtain the maximum benefit from cognitive technologies requires a careful analysis of an organization’s processes, its data, its talent model, and its market. The use of cognitive technologies is not viable everywhere, nor is it valuable everywhere. In some areas, it will become vital. We think the greatest potential for cognitive technologies is to create value rather than to reduce cost. And we believe that for most organizations and most applications, cognitive technologies will restructure work and make it more efficient, perhaps restraining the growth of jobs in certain areas, but not leading to large-scale reductions in workforce.

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