Ready, set scale:

Chart your intelligent automation journey with Cognitive Automation Patterns™

New method enables automation across the enterprise
Intelligent automation as a competitive advantage, not a guessing game

Intelligent automation has the potential to transform knowledge workers and make them even more productive and creative. These technologies take the robot out of the average employee, automating mundane and repetitive work. They augment workers and enables them to use their innate ingenuity so companies can open doors to new products, services, and ways of working.

Enterprises are finished experimenting. The landscape is littered with proofs of concept. Scaling requires a programmatic approach to navigating intelligent automation opportunities within the enterprise. Choosing the best knowledge work patterns to automate is critical. While not easy, making the right automation choices may be the difference between lagging or leading in the digital world.

Anything that follows a pattern is a prime target to be automated.

— Dave Coplin, ex-Microsoft Principal Technology Evangelist

DEFINITION:

Intelligent Automation represents the overall umbrella of technologies to enable the transformation and automation of business processes by leveraging any combination of software robotics, cloud, artificial intelligence, and smart machines.
Various market indicators point to an imminent inflection point in enterprise intelligent automation. For example, the value of major RPA vendors has increased based on how well positioned they are to capitalize on thousands of bots operating for clients. Investors recently valued UiPath at more than $3 billion based on its growth from $1 million in revenue to $100 million in less than 21 months. UiPath boasts it has 1,800 enterprise customers and claims to add 6 new clients each day.

The AI-as-a-service industry is also growing and maturing quickly. Signs point to rapid artificial intelligence applications development as the technology continues to evolve. According to the CB Insights artificial intelligence deals tracker, approximately $41 billion has been invested in artificial intelligence startups across about 5,000 deals over the last five years, and that number is only growing. Adoption estimations are also strong. IDC estimates that by 2021, 75 percent of enterprise applications will use artificial intelligence.

While adoption indicators are strong and technology options grow, most organizations are still in the early stages of knowing what cognitive automation opportunities to prioritize, how to invest and scale deployments, and ways to measure their true benefits. The results of our recent executive survey reveal broad plans to adopt intelligent automation. Nearly two-thirds of respondents indicate plans to fully implement robotic process automation (RPA) within three years. Nearly half intend to use cognitive automation at scale within three years.

Organizations struggle to understand how cognitive automation can meaningfully impact their business. The answer? Rather than focusing on technologies or piloting a single solution, they should take a holistic perspective and ask, “How do I want to transform my business?” Business and technology executives need to collaborate with a simple language and framework. Business users, practitioners, and technologists should be able to use this language and framework to identify and prioritize automation opportunities and then design, build and deploy technical solutions.

This article introduces KPMG’s Cognitive Automation Patterns—a new and useful methodology to identify where and how to use artificial intelligence and cognitive technologies to automate or augment knowledge work. The method uses straightforward language that demystifies the technical elements of artificial intelligence, which enables business leaders to design new knowledge work patterns. Technologists then use Cognitive Automation Patterns as building blocks to architect solutions to augment or automate work.

We anticipate all companies will need to transform existing knowledge work with cognitive automation to remain competitive. We illustrate how executive teams can formulate a strategy and roadmap for how cognitive automation can be practically applied to support effective and timely business transformation. Cognitive Automation Patterns enable organizations that have completed proof of technology and proof of value experiments to scale. These patterns bring together business and technology teams to collaborate using a simple methodology to programmatically address advanced intelligent automation opportunities.

94% of companies believe that AI is key to to competitive advantage.

Source: Enterprise World (January 24, 2018).

1 in 20 companies have extensively incorporated AI in offerings or processes.

A compass for using intelligent automation to transform the enterprise

To successfully compete in a digital world, some business processes and functions need to be reimagined. Much like how global outsourcing prompted business leaders to redesign target operating models, intelligent automation can enable new, radically different operating models. The value will come from reengineering business processes and knowledge work.

All companies establish and manage knowledge work patterns to document how they run their organizations and deliver for customers. Cognitive Automation Patterns are simple, repeatable knowledge activity and technology design patterns as illustrated in Figure 1. We describe these patterns in business and knowledge work terms rather than technologies such as machine learning, deep learning, or artificial intelligence. Business executives and technologists can use these patterns to think about their processes in the context of digital transformation and identify advanced intelligent automation opportunities.

Figure 1: Cognitive Automation Patterns

Figure 2 shows 10 high-level knowledge activity Cognitive Automation Patterns. Each represents most people- and process-oriented enterprise decision-making activities. Most business processes can be represented as some combination of these knowledge activity Cognitive Automation Patterns.

To level-set the definitions, intelligent automation is not a single technology but rather a portfolio of capabilities that can be used to automate and augment enterprise business processes. KPMG has identified three categories of software robots, as illustrated in Figure 3, that enable intelligent automation based on their underlying approaches to enabling automation.

At the basic level, RPA technologies enable rules-based bots that drive basic automation within enterprise functions such as finance, procurement and human resources. These bots help automate routine business processes where humans currently execute well-established, repetitive rules. Organizations are investing heavily in basic automation and are seeing improvements.

Cognitive automation is at the next level. This is where knowledge work within the enterprise is either automated and/or augmented by bots capable of learning, reasoning, improving, and reaching conclusions much like how humans
Enabling a business with cognitive automation capabilities is where big transformative opportunities lie. It is also where organizations struggle the most today. As they seek to accelerate their intelligent automation efforts, companies’ executives encounter a variety of challenges across their organizations. In our recent executive survey, about half had struggled to define clear goals and objectives for intelligent automation deployment and accountability for results and ROI.

Figure 3: Types of intelligent automation

Source: KPMG LLP, 2018

ACT
like a human

Cognitive Automation

Rules
Automation based on documented process rules

Learning
Automate when comfortable with model accuracy

Reasoning
Automate when confident with evidence-based rationale

THINK
like a human

Source: KPMG LLP, 2018
Here’s how business executives can use Cognitive Automation Patterns to understand advanced automation opportunities in customer care

Customer care illustrates a relatable scenario where business executives and technologists can use knowledge activity Cognitive Automation Patterns to better understand advanced automation opportunities.

Most companies have a customer service or customer care function they staff internally or outsource. The 2016 U.S. Bureau of Labor Statistics puts total call-center employment at 2,784,500 and growing by 5 percent annually, which does not include more than 2 million working in offshore call centers. 7

With recent cognitive automation technology advances, organizations can partially or fully automate many customer care processes. There is potential for significant cost savings and a superior omnichannel experience. Virtual assistants or chatbots have been a popular choice in this area. However, these technologies are not the remedy some believe. There are as many stories about failed projects as there are successes. Many failures can be attributed to misunderstanding between business and technology teams on where and how these technologies are best deployed. Cognitive Automation Patterns can help bridge between the business and technologists to set up for success.

Customers engage with companies for a variety of reasons. They place orders, ask questions, seek help for problems, or register complaints. These engagements originate from many channels including email, voice, chat, virtual assistant, search, social networking posts, or in person.

Agents typically apply highly structured knowledge work patterns to respond, engage, and deliver customer care. The structured patterns make customer care an ideal target for cognitive automation.

As illustrated in Figure 4, first an agent determines why the customer is engaging. Next they attempt to understand the potential up-sell opportunity for sales-related interactions. For other issues, agents try to read the severity or degree of importance. The agent consults the playbook to find the possible responses and finally recommends the best one.

All of the agent’s actions can be represented by a series of linked Cognitive Automation Patterns. Initially, the agent focuses on extracting meanings from what the customer says and interpreting those insights to determine their intent. Do they want to make a purchase or are they complaining? Assessing the opportunity size or problem severity can be represented by the classifying and diagnosing patterns. Last, agents follow the retrieve and recommend patterns to locate possible interventions based on intent and severity and recommend the best possible course of action for the customer.

This example demonstrates how organizations can use KPMG’s Cognitive Automation Patterns to portray an enterprise function or process as a series of knowledge work steps. Using this approach, the business stakeholders are better equipped to engage technologists in an intelligent automation conversation.

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Figure 4: Customer care automation example

What is the customer calling about?

Extract

Interpret

Classify

Diagnose

Retrieve

Recommend

Customer Intent

Severity/Opportunity

Possible interventions

Best action

Source: KPMG LLP, 2018
Recently, we explored how Cognitive Automation Patterns could be used across our own businesses. Like all of our clients, we had experimented with different RPA and artificial intelligence technologies and proved we could extract value through new capability development. We convinced ourselves the advanced intelligent automation technologies—machine learning, artificial intelligence, and natural language processing—can be adapted to automate and/or augment our knowledge work activities. In order to scale across the KPMG enterprise, we used Cognitive Automation Patterns to determine the recommended approach to our digital transformation.

As an audit, tax, and advisory firm, we frequently review large amounts of structured and unstructured data. Then we formulate opinions and recommendations that drive action. We observed the knowledge work our professionals perform and translated that using knowledge activity Cognitive Automation Patterns.

Before we embarked on solution development, the business team made an important decision on an approach that was better suited to scale. Figure 5 suggests two options. First execute end-to-end cognitive automation one case at a time, for example Loan Portfolio Review, Revenue Recognition, etc. Alternatively, look across the use cases and strategically focus on intelligently automating the Extract and Interpret pattern that can be leveraged across multiple use cases. This option enables a scaled approach to enterprise automation.

We now have substantially implemented cognitive automation to improve efficiency and quality of extracting and interpreting key information from large volumes of unstructured data across many aspects of our business. This was successful simply because the business prioritized the approach as a consequence of looking at common knowledge activities across different services using the Cognitive Automation Patterns approach.

KPMG solution developers can access the technology design Cognitive Automation Patterns as accelerators within the KPMG Ignite platform and quickly assemble solutions. This approach enabled us to better plan and execute our intelligent automation enabled transformation with consistency and at scale. We learned with our own test that taking the mystery out of the process democratizes intelligent automation use—not just with technologists—but also within business units and across the enterprise. Visit https://advisory.kpmg/us/services/data-analytics/artificial-intelligence.html to learn more about KPMG Ignite.

KPMG professionals trained to use Cognitive Automation Patterns are actively engaging with many of our clients to help them systematically identify, prioritize, and intelligently automate core business processes. With these processes, including order-to-cash, procure-to-pay, and recruit-to-hire, knowledge workers constantly review artifacts, extract relevant information, analyze, make conclusions, and take action.

KPMG works with clients to conduct workshops to brainstorm ideas for intelligent automation, develop a strategy and implement a program around our clients’ digital transformation journey. KPMG’s Cognitive Automation Patterns helps break down enterprise business processes with language and templates that both business and technology people can easily use. The method includes a process, a foundational question, technical strategy, and software.

Figure 5: KPMG capabilities examples represented using knowledge activity Cognitive Automation Patterns

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KPMG’s Cognitive Automation Patterns are also used to simplify the available technology offerings by translating them into reusable technology design patterns as shown in Figure 6. Technology design Cognitive Automation Patterns can use different vendor technologies to realize the ultimate functionality. For example, technologists can use IBM Watson Tone Analyzer, Google Cloud Natural Language, or Amazon Comprehend to realize the Sentiment Analysis pattern. Technologist can use these patterns as building blocks to design and develop solutions.

“Intelligent automation can be made much more accessible if we spend less time thinking about which technology we want to leverage and more time thinking about what functional capabilities we need from the technology. Being able to articulate what process functions you want to optimize, such as data extraction, interpretation and recommendations, can help create intelligent automation solutions with broad applicability.”

– Elena Christopher, Research Vice President
HfS Research
Executives have hundreds of automation options related to knowledge work, but lack methods and tools to identify where these options can and should be applied to generate new value in their business.

– Matt Bishop, U.S. Service Line Leader, Technology Enablement, KPMG LLP
A path to digital transformation across the enterprise

Figure 7 combines Figures 2 and 6 showing each knowledge activity Cognitive Automation Pattern mapped to a combination of technology design Cognitive Automation Patterns. Thus, we use Cognitive Automation Patterns to enable business leaders and process owners to identify a path to digitally transform people- and process-centric enterprise activities. At the same time solution architects and developers are able to embed cognitive and artificial intelligence technologies into enterprise systems and solutions.

Business leaders and solution architects that embrace this approach are able to successfully collaborate so they can more effectively pursue enterprise-wide intelligent automation opportunities.

Figure 7: Using Cognitive Automation Patterns to bridge demand and supply

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<th>TECHNOLOGY “SUPPLY”</th>
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<td>Natural language processing, machine learning, computer vision, conversation</td>
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Source: KPMG LLP, 2018
Get the biggest impact and secure competitive advantage

Early adopters of cognitive automation can earn a competitive advantage. How? They must identify areas where cognitive automation can have the biggest impact. Then successful implementation is critical. KPMG’s Cognitive Automation Patterns can help organizations do both. To start:

- **Secure a common “future of” vision enabled by intelligent automation.** Develop the destination and end goal, and then secure consensus. A common digital transformation view with your business leaders is critical to maintaining sponsorship and support throughout the journey. Our Innovation Lab can help business and technology leaders envision the future, including how market disruptions and emerging technologies might have an impact.

- **A clear strategy, roadmap, and associated-benefits hypothesis provides a strong anchor to a sustainable digital transformation journey.** Translating technology hype to be simple and easy for business leaders and employees to use is critical for buy-in. We help clients in multiple industries establish foundational business value hypotheses to underpin their digital transformation journeys. Using tools and frameworks such as the Cognitive Automation Patterns, our skilled team can help establish a strategy and journey roadmap that aligns with the vision.

- **Engage employees.** Cognitive Automation Patterns demystify artificial intelligence. They are expressed in terminology everyone can understand. They also present an opportunity to engage almost everyone in thinking about how intelligent automation can augment their individual effectiveness. Understanding eliminates most fear and anxiety people have about bots replacing them. We successfully use hackathons and boot camps to educate employees. While there, our professionals brainstorm on how cognitive technologies can augment their knowledge base and help everyone work smarter.

- **Establish a center of excellence.** Talent is in short supply and likely to remain so for the foreseeable future. A center of excellence enables organizations to concentrate talent use that talent optimally. A centralized approach maintains consistency, reinforces learning, and helps focus on the highest priorities. It also leverages expertise, solutions, and leading practices across the enterprise.

- **Think strategically—beyond operations.** Cognitive technologies can automate or augment knowledge work and take cost out of the business. Visionary companies will also take advantage of the many intelligent automation opportunities to grow with new products and services and also improve employee and customer experiences.

- **Choose the right collaborators.** Technology providers release new tools so quickly it’s difficult to adopt them enterprise-wide fast enough. That speed can be the competitive differentiator, so choosing the right collaborator is critical. Joining forces with a company that deeply understands technology capabilities, has engineering and R&D relationships with these providers, and is able to incorporate those capabilities can speed up a successful digital transformation journey. More than 1,000 of our business and technology team members are experienced Cognitive Automation Patterns users. KPMG has strong relationships with IBM Watson, Microsoft, and Google. These relationships allow us to tap into capabilities and leverage our accelerator portfolio to instantiate the Cognitive Automation Patterns.

References

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