Business Systems & Technology

How Cognitive Computing Unlocks Business Process Management's Performance-Enhancing Virtues

Extending process management to business logic offers enterprises increased flexibility, agility and adaptability in evolving and complex business ecosystems.

Executive Summary

The ability to successfully maintain momentum in any economy requires processes that can sustain growth at scale. To achieve such status, supporting technology and IT administration must be evaluated in the context of present and future states.

What's more, how business processes manage complex activities, while also supporting continuous awareness of situations and real-time decisions, requires a seamless partnership between humans and the machine environments in which they operate.

By extending process management from process logic to business logic, a cognitive approach to business process management (BPM) offers flexibility, agility and adaptability in evolving and complex business ecosystems. This white paper describes a systematic approach to achieving cognitive BPM.

BPM & cognitive computing in a nutshell

BPM refers to the systematic method to improve business processes. More often, it involves cohesive systems that go beyond the management of people and information. BPM experts study, recognize, manage, optimize and monitor business processes that support enterprise goals.

Over the years, these activities have evolved significantly to include systems that can learn at scale, employ logic and reason, and interact naturally with human beings. We call this extended form of BPM "cognitive computing."

Cognitive computing systems (referred to variously as robotic process automation, intelligent process automation, cognitive automation, cognitive agents, etc.) are not explicitly programmed, but instead are trained like humans. They gain experience and hone processes over time, and manage both structured and unstructured data using artificial intelligence (AI) and machine learning (ML) algorithms. They can also adapt to new usages and formats in real-time, just as humans do.

Cognitive computing accelerates, enhances and scales human expertise by:

- **Understanding natural language** (or sensory data) and interacting naturally with humans.
  - > It provides non-biased advice, autonomously.
- **Reasoning** (forming hypotheses, making arguments and planning).
  - > It interacts with and assists users by analyzing both content and context.
- **Learning** (sensing and applying meaning).
  - > It creates new insights and value.
- **Offering progressive support.**
  - > It improves operational efficiency.

Cognitive systems can simulate human brain activity to solve the most complex problems in business process management.

Defining cognitive process

A cognitive process is one that makes BPM more dynamic and probabilistic by enabling decision management systems to understand, evaluate and comprehend business events.

For instance, cognitive data management can fuel process automation with machine learning, offering businesses the potential for massive returns. In conjunction with social, mobile, analytics and cloud (SMAC), smarter processes are more than just a tool for planning and execution; they are an intelligence engine that delivers cognitive decision-making based on operational insights in context.

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Combining business processes with machine learning produces cognitive solutions that can enhance customer experiences. These solutions compare the data that business activity generates with data from other sources, enabling dynamic and context-sensitive decision-making. This opens the door to an entirely new level of straight-through processing. For example, in a predictive maintenance process, machine-learning algorithms can be applied to sensor data to identify situations, which indicate that a machine breakdown is imminent. The cognitive business solution ensures that insights from various devices are processed efficiently and that the field service team is utilized in the best possible way. These insights also help to optimize the process by automatically releasing a remote patch to a device, or by providing guidance to customers with self-service steps.

The evolution of business process management is synonymous with the decades-long evolution of the automobile industry. Just a few years back, driverless cars seemed like fiction, but now they are nearing reality. In the same way, basic workflows are evolving into cognitive automated processes (see Figure 1).

The evolution of workflow automation

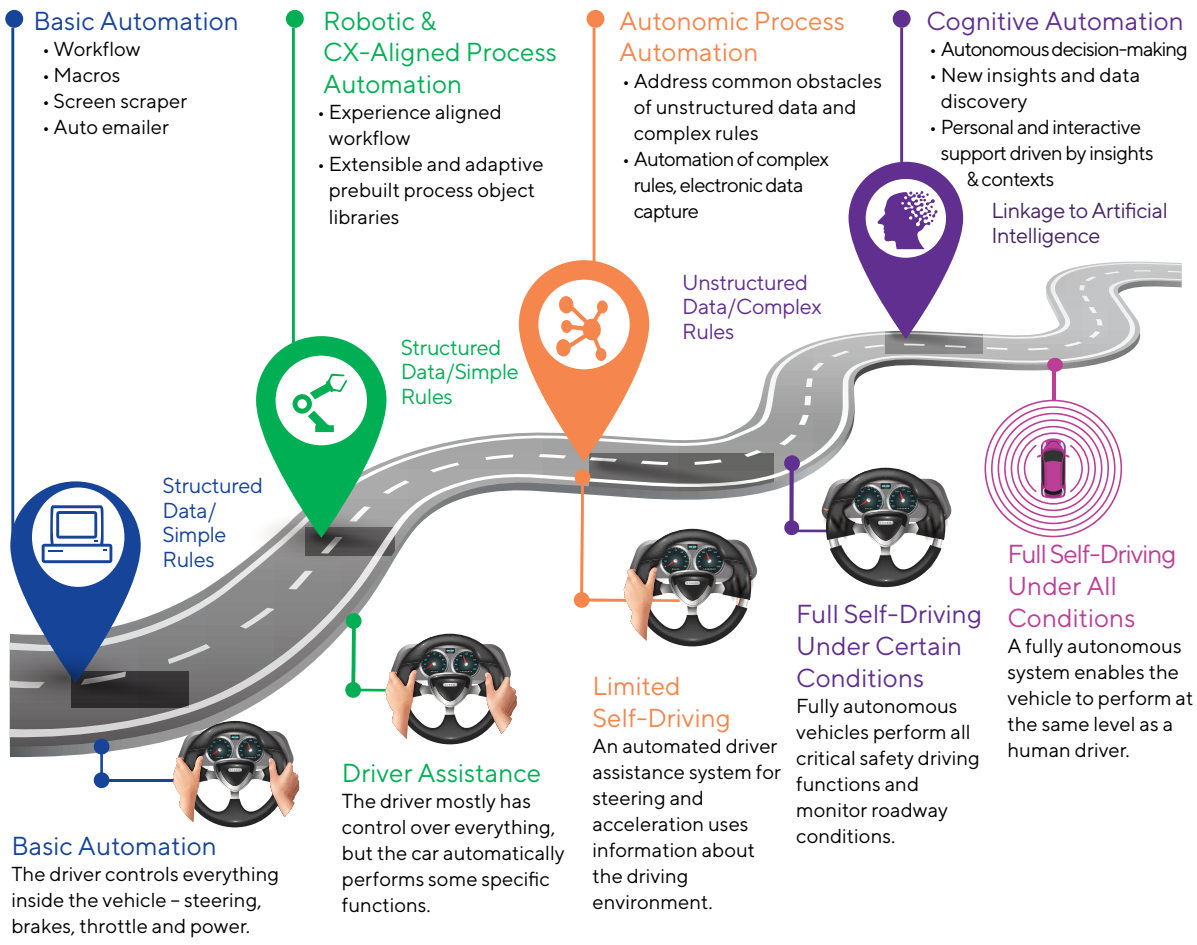

Figure 1

Raw materials that fuel cognitive computing

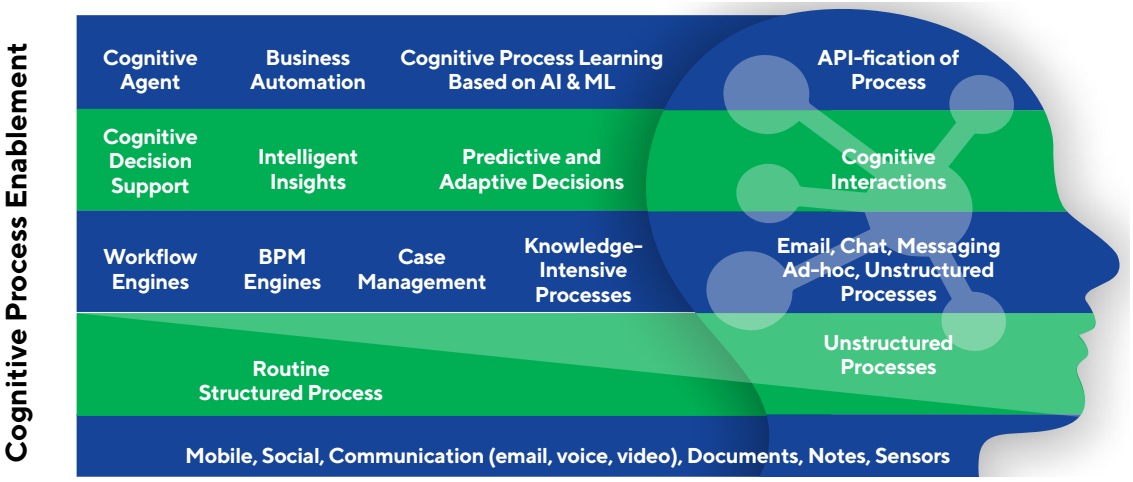

Figure 2

Specifically, these capabilities can be bifurcated by:

- **Enhanced decision-making and optimization:** Cognitive computing enables a business process to make decisions on behalf of humans based on rich experience and large amounts of unstructured data. By digesting a myriad of unstructured information, cognitive systems can inject intelligent insights into the decision-making process. Using predictive and adaptive decision capabilities, they also add value to preventive decision-making. Cognitive interaction improves channels of communication by supporting new channels and devices. For instance, the system can guide an individual through a process or conversation and effectively leverage that person's channel preferences. After the interaction, it can then communicate the results for a clear and orderly post-analysis.

- **Advanced intelligent automation**: Cognitive agents can process human interactions over any preferred communications channel. Using AI and ML, these systems can effectively capture insights and codify process specifications, revealing new automation opportunities that can be leveraged using robotic process automation (RPA) to augment and mimic human intelligence. When combined with application programming interface (API)-enabled business processes, existing assets can be made available to business partners, supporting innovative business models that shift the step cycle from "define-execute-analyze-improve" to "learn-plan-act."

Cognitive process automation patterns

Cognitive decision support, cognitive interaction, cognitive process learning and cognitive process enablement help to automate business processes. Figure 3 explains several high-level patterns of cognitive business automation, including:

- Robotic desktop automation.
- Automated decision-making based on rules and analytics.
- Robotic process automation.
- Deep integration to automate system steps.
- Smart integration to leverage cognitive services and organizational APIs.
- Seamless hand-off between machines and humans.
- Cognitive agents for contextual conversations and anytime, anywhere interactions.

Deconstructing cognitive process automation

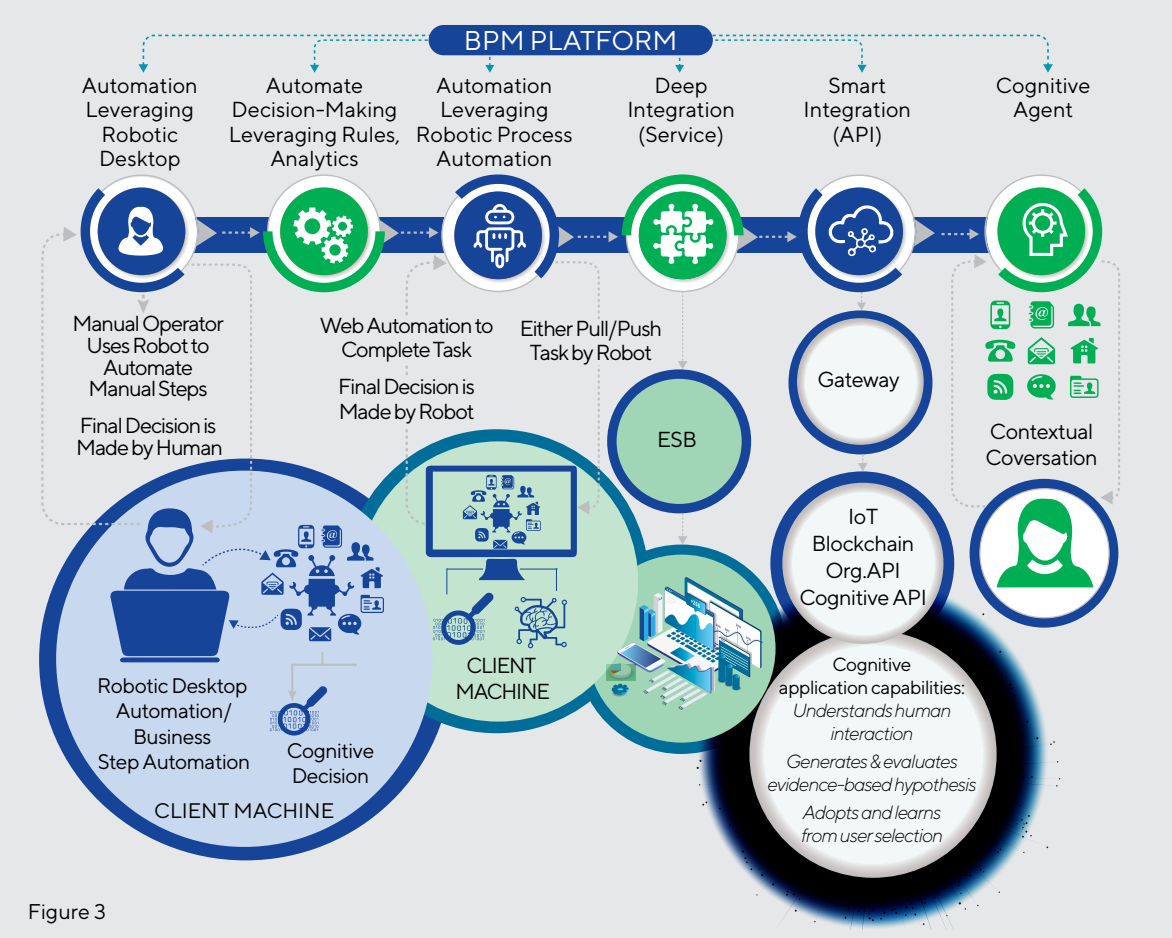

Figure 3

Cognitive process: A case illustration

The concept of cognitive BPM can best be understood through the lens of a real-life retail example. Consider a retailer that has automated an inventory system to manage stock inventory at a given time. The retailer uses BPM and operational decision management to carry out the operations. Additionally, it maps business events to the process to capture the data required for monitoring the activity and preparing reports. All these help the retailer's inventory manager understand, in real time, historic information and, eventually, make better business decisions. This can be summarized as follows:

Let's say an inventory manager applies business processes, decision management and reporting capabilities to determine present stock and future reorder levels. What happens if the manager wants this system to also make informed decisions based on customer feedback about a product? He may deploy a cognitive system to analyze internal data and social media content, such as Twitter, Facebook, Instagram, etc. to formulate a response. Based on that response, he can then modify the cognitive process to either place an order for additional stock or suggest a better line of products to enhance the operations. Consequently, key benefits of this process include incorporation of customer-centric decision-making, enhanced customer satisfaction and smarter investment in products by companies.

The automated natural processing journey

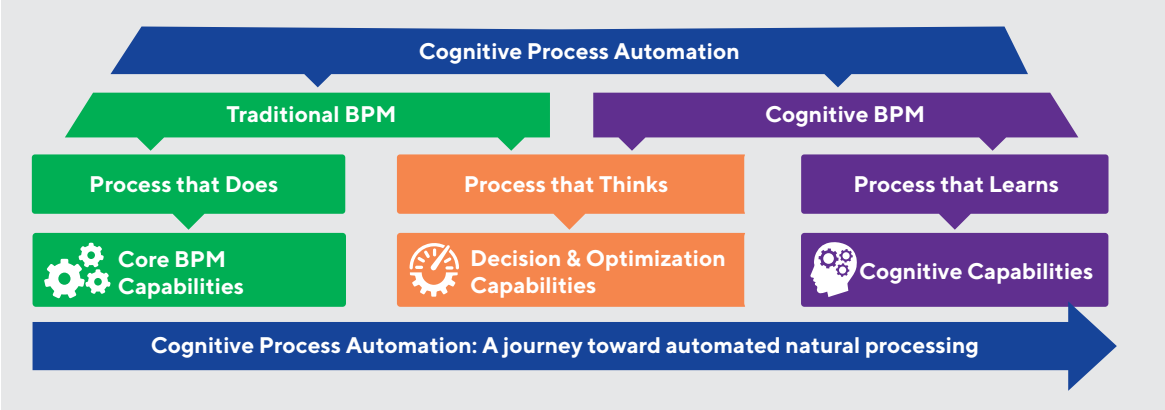

Figure 4

Cognitive process transition and adoption

Transition from traditional business processing to cognitive business processing requires systematic execution and adoption. Figure 4 describes our proven roadmap to cognitive BPM.

To be cognitive, the process must think and learn on top of the traditional framework. We break this down into processes that:

- **Do**, by enriching the traditional process with knowledge.
- **Think**, by enhancing the system with decision-making.
- **Learn**, by expanding the business with insights.

The overall approach can be subdivided into four high-level phases:

- Discover: On a high level, the journey to cognitive processing starts with collaborative discovery to learn and define existing business processes in a launch workshop (the "do" part). This requires assessing organizational readiness and identifying process candidates through a cognitive opportunity assessment.
- **Define:** The next phase is to define actionable insights captured from actual process usage and business pain points. These findings will help catalog potential areas for cognitive capabilities, leading to plans based on the list and associated technology needs.
- **Design:** In the design phase, the future cognitive process model is identified along with a strategy to extract insights ("think" and "learn") from non-structured data. The "think" strategy integrates available input sources and decision modules to support timely decisions based on relevant data. The "learn" strategy depends on capturing decision outcomes and leveraging those insights to rectify issues.
- **Develop:** Finally, the identified, recognized and explored capabilities are implemented using prototypes for testing in real-life use cases.

A transformation approach to cognitive processes

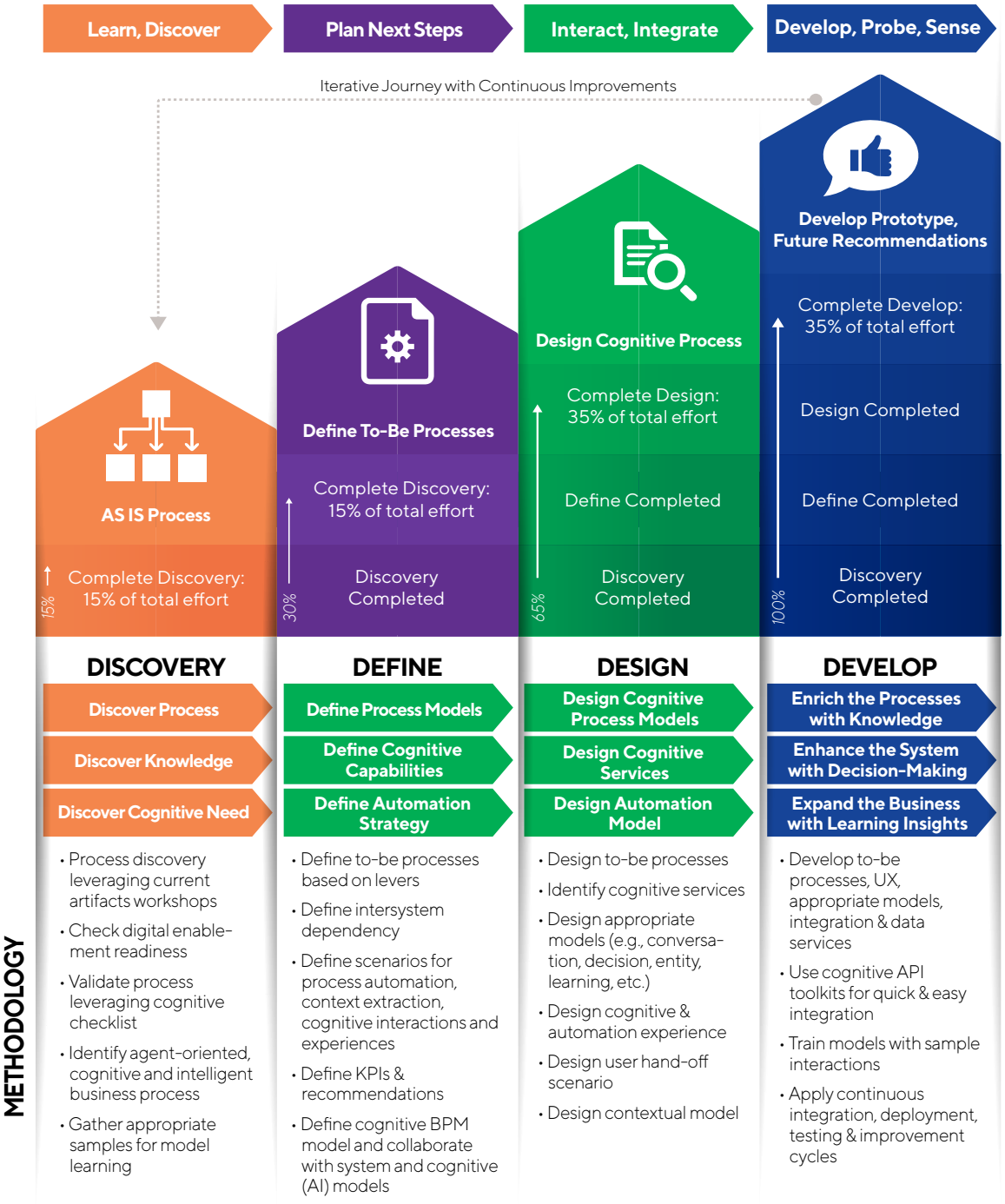

Figure 5

From here, the iterative journey repeats the discover, define, design and develop cycle, enabling continuous improvement (as revealed in Figure 5).

Automation maturity levels

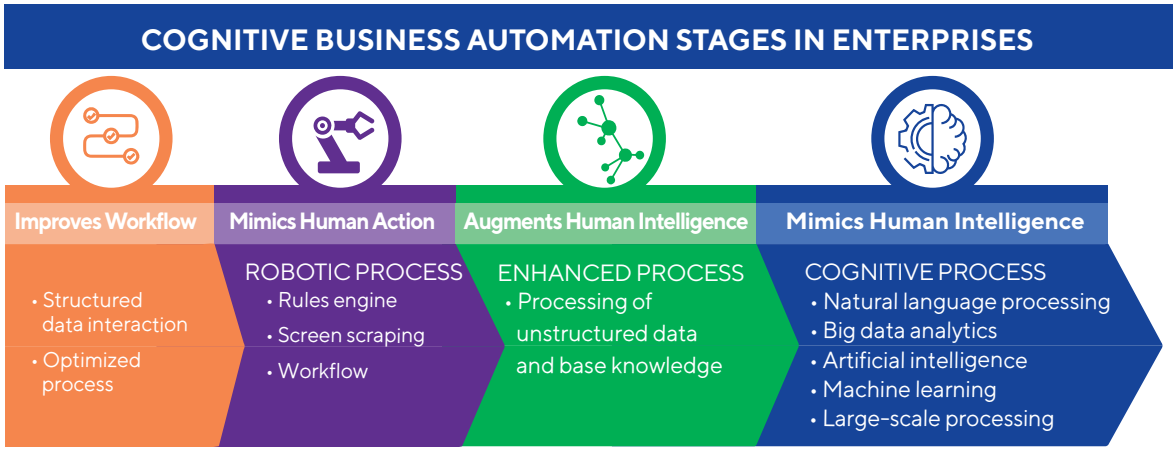

Figure 6

Business automation is integral to the improvement cycle and requires four additional steps, including:

1. Optimized and integrated processing.
2. Robotic processing to mimic human action.
3. Enhanced processing to augment human intelligence.
4. Cognitive processing to mimic human intelligence (as depicted in Figure 6).

Figure 7 highlights the steps and actions necessary to go from traditional business processing to cognitive, automated business processing.

A recipe for process automation

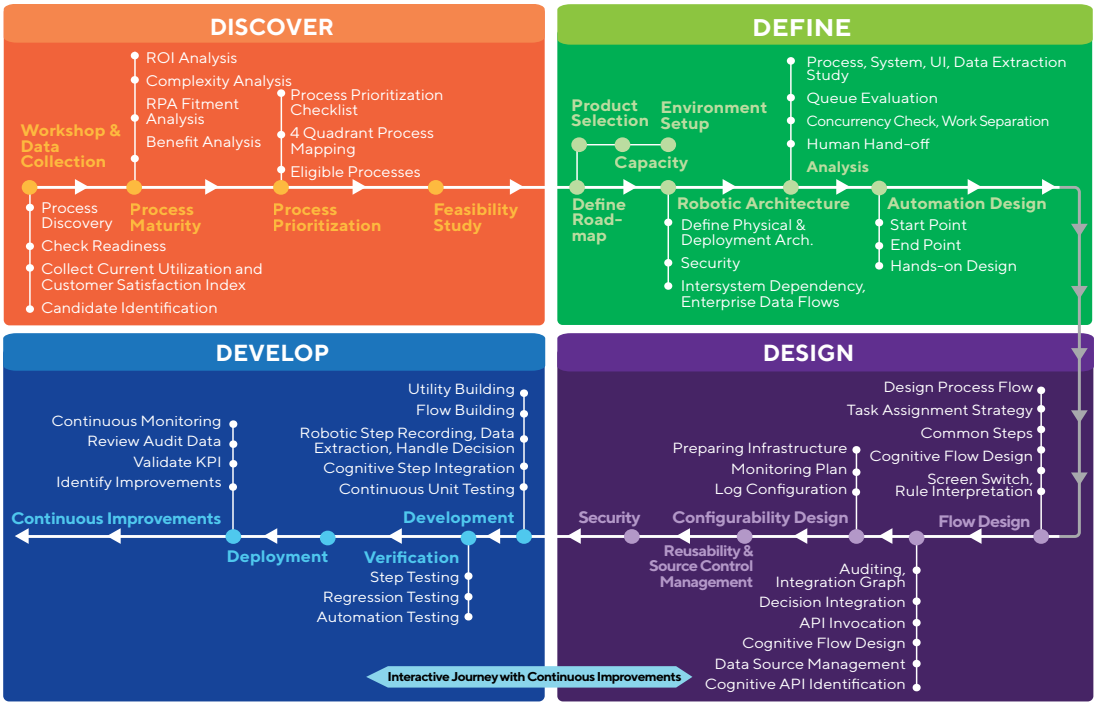

Figure 7

Cognitive business processes applications

Cognitive business operations can be applied across industries and functional areas of an enterprise. For example: Cognitive business operations can be applied across industries and functional areas of an enterprise. For example:

- **Healthcare**. Hospital care management systems can leverage data from social media to examine the spread of diseases and track the outbreak of epidemics. For example, during the outbreak of dengue fever in a city, hospitals can monitor Twitter feeds to identify symptoms experienced by the public. Technologies such as geolocation can identify local tweets; natural-language processing can be applied to determine which tweets concern a particular ailment. Such real-time analyses can help health insurance providers to track and predict outbreaks and take proactive measures, such as urging community members to get vaccinated or stock up on supplies.
- **Banking.** In the field of banking, cognitive BPM is widely used to determine customer satisfaction. For example, when customers are approved for a loan, they are directed to the bank's loan-servicing department, which ensures proper payment collection, as well as any changes to the payment plan. This involves inbound and outbound calls that generate call transcripts. By applying cognitive analysis to this process, the bank can then determine whether its employees are asking the right questions, how polite they are, and whether they are working efficiently. The net result is inevitably a better experience for the customer and the bank.
- **The human touch.** Companies can use cognitive technologies to analyze information from customers in the form of letters, email or other communication. For instance, when handling customers with strong negative sentiments, companies can deploy sentiment analysis. This will help direct those customers to the employees who can best serve them, which will in turn boost customer satisfaction. In traditional BPM systems, this process eats up hours of labor, but with cognitive BPM, it can be automated and expedited.

For example, our digital contact center solution uses cognitive automation to provide intelligent assistance and preemptive capabilities to proactively anticipate customer grievances. It delivers a superior customer experience, enhanced cross-selling insights and reduced customer churn.

- **Improved decision-making.** In recruiting, managers faced with hundreds of applications for dozens of openings typically spend enormous amounts of time trying to identify the best candidates, using just simple intuition and other limited tools. Cognitive BPM can change all this, as it looks beyond the formal attributes of candidates (such as their degrees or years of work experience) and incorporates more modern techniques of data collection. By integrating IBM's Watson Personality Insights API – which uses linguistic analytics and personality theory to infer attributes from a person's unstructured text – with IBM BPM, a candidate's digital fingerprints (or Code Halo as we call it) can be quickly analyzed for character traits and potential red flags. This information can help managers zoom in on the right candidates, quickly.

The "think" strategy integrates available input sources and decision modules to support timely decisions based on relevant data. The "learn" strategy depends on capturing decision outcomes and leveraging those insights to rectify issues.

Quick Take

Applications in use across industries

One of our banking customers is leveraging cognitive capabilities such as cognitive interaction and expert bots as part of a contact center makeover that has reduced average call handling time by more than 8%, while supporting 5,000 users and 400,000 interactions per month. Cognitive BPM is helping the organization to reduce new agent training time by more than 20%.

Similarly, we helped a healthcare organization in leveraging decision-making capabilities based on historical insights to assign claims to appropriate processors who can better serve similar types of claims more accurately and in less time.

An insurance customer is applying cognitive process automation for payment processing. In this case, bots are interacting with various downstream systems such as mainframes, as well as machines running Windows-based applications such as Microsoft Excel, to reduce claims processing times.

Cognitive process: Goals and benefits

Cognitive BPM supports self-learning and adaptive BPM systems, enabling seamless interaction between systems and humans to achieve better results. Cognitive BPM achieves this in the following ways:

- Connecting customers, contexts and content through omnichannels.
- Implementing an anytime, anywhere and anything (AAA) process model.
- Developing automated, adaptive and predictive decision-making capabilities.
- Establishing intelligent, connected and contextual interactions with users.
- Automating agent-oriented processes.

Organizations that have successfully implemented cognitive computing can expect the following benefits:

- **Improved productivity and reduced costs:**
  - Automation leveraging decision-making and smart integrations.
  - Contextual digital agent advisor for augmented work capability.
  - Process automation leveraging cognitive agents.
- **Increased revenues:**
  - API-fication of business assets such as processes and rules.
  - Intelligent business model leveraging cognitive capabilities.
  - Support for additional workloads without increasing SME headcounts.
- **Better results and customer experiences:**
  - Accurate real-time process insights based on events across the enterprise.
  - Removal of manual errors and discretion.
  - Aggregation of process insights across channels, devices, systems, geographies and lines of business.
  - Connected and personalized customer experiences.

The question is not *whether* organizations should adopt cognitive computing, but how. To achieve success, organizations must identify existing in-house expertise in the context of an opportunity assessment, define areas where cognitive computing can add value, clarify use cases to leverage these systems across the enterprise, build a business case around the application, assess technology vendors that understand cognitive services, and then implement and integrate the solution with existing business processes to modernize platforms and applications.

Cognitive technologies make automation possible across all enterprise domains. The organizations that adopt these technologies today will have a distinct competitive advantage once the cognitive BPM revolution spreads.

Looking ahead

Traditional workflows based on predefined process logic offer little support in today's complex and dynamic business environment. Now, in the cognitive era, BPM extends beyond traditional process automation and optimization, and is vital to the digital business goals of both large and small organizations.

To get ahead with cognitive BPM, companies must have advanced end-user interfaces (UIs), and access to large volumes of business data that can generate the cognition capabilities necessary to scale human expertise.

The continuous awareness, gradual learning and real-time decision-making of a cognitive approach are essential to managing modern business needs, and can drive any process automation, no matter how complex.

Software vendors offer cognitive capabilities that keep BPM platforms informed, innovative and intelligent. Seamless integration of current systems with platforms, such as IBM Watson, can truly digitize BPM. Through high-volume data analysis, rational thinking and self-learning, these technologies can unlock benefits previously unattainable for businesses.

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Endnote

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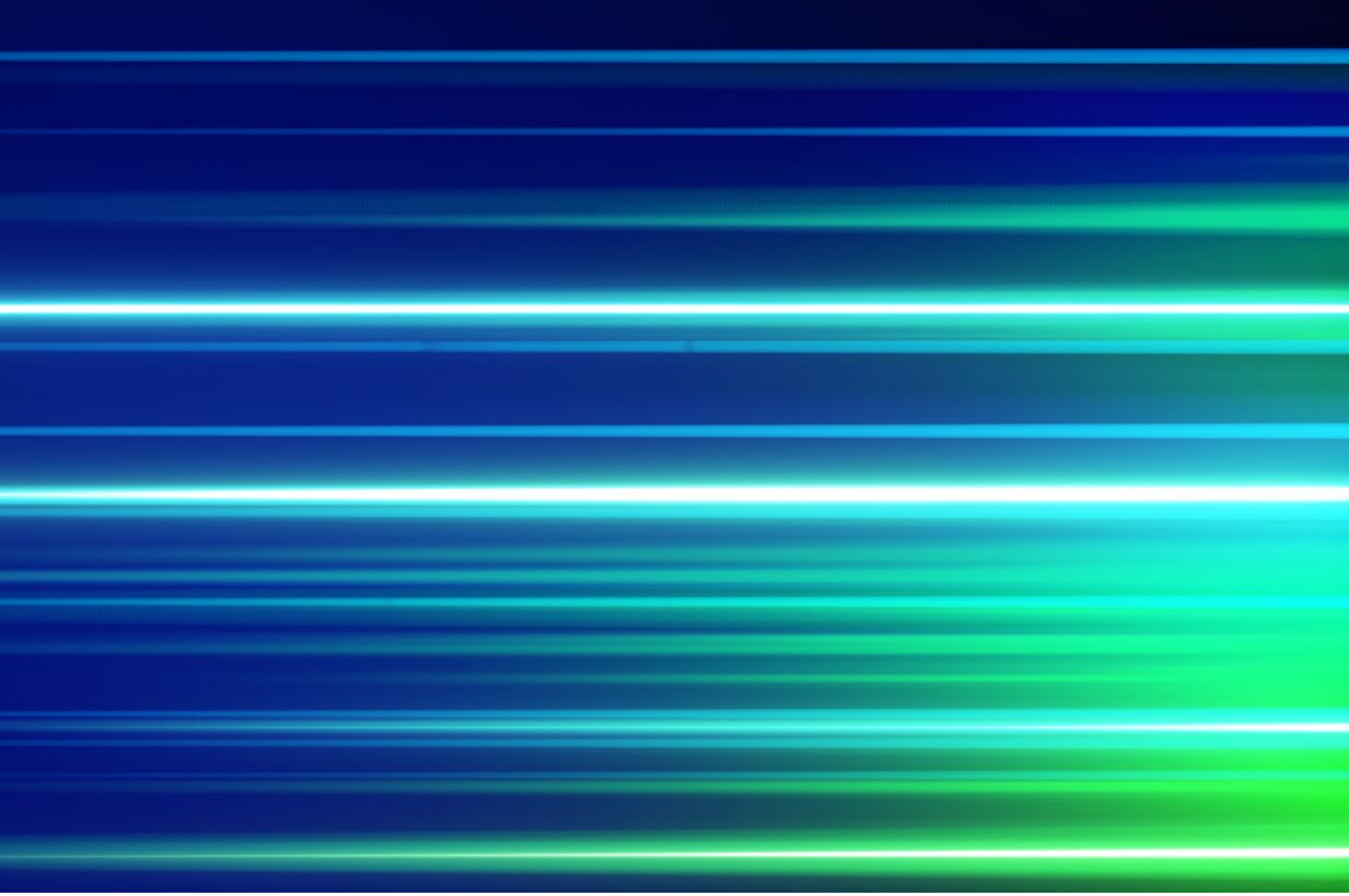

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