# Reinventing the Business with Cognitive Digital Labor

November 2016

By Jim Hurley

A research report prepared by:

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Publication sponsored by:

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IPsoft funded the publication of this report and has been granted the right to reprint and electronically distribute it through its website until May 31, 2018.

Lead author for this report is Jim Hurley. Design and layout is by Cynthia Batty.

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# Introduction

Digital labor is reinventing business – from the back end to the front end of business operations – and, in so doing, it is redefining the way businesses practice, use and leverage IT for the 21st century. The new cognitive digital labor:

- Replaces and augments repetitive lower-skilled labor using digital labor
- Continuously improves when learning from subject-matter experts
- Is the foundation for reinventing business IT
- Is the competitive market advantage of 21st century digital business.

Early adopters are charting new ground with cognitive digital labor. Everything about it is new; from the way it is conceived and used, to the ways it is put into practice. It is the new digital business and the new face of digital business IT. It uses human-like virtual digital agents to learn from people, makes intelligent assessments about what comes next, and turns to subject matter experts for guidance when it is stuck. It learns from these "teachable moments," and never stops learning or improving. Knowing what constitutes best practices, best processes and effective business use will be as important, and perhaps more important, than the black boxes that power digital labor.

Moreover, cognitive digital labor puts the enterprise on a fast track to a digitized future that will change the nature of competition and market opportunity. In the process, it forever changes business and the practice of enterprise IT from a technology-focus to that of a market-focused selling, producing and delivery machine of end-to-end business processes that learn, scale and adapt rapidly to market conditions as needed.

The era of cognitive digital labor means growth and competitive advantage are no longer constrained by availability of labor as much as by talent and skill that will increasingly define winners and losers in the market. Cognitive digital labor enables enterprises to scale business results up and out by leveraging and using the highest skilled performers to light the way in every facet of the business. One of the key differentiators in the market will become the talent that trains and immerses itself with cognitive digital

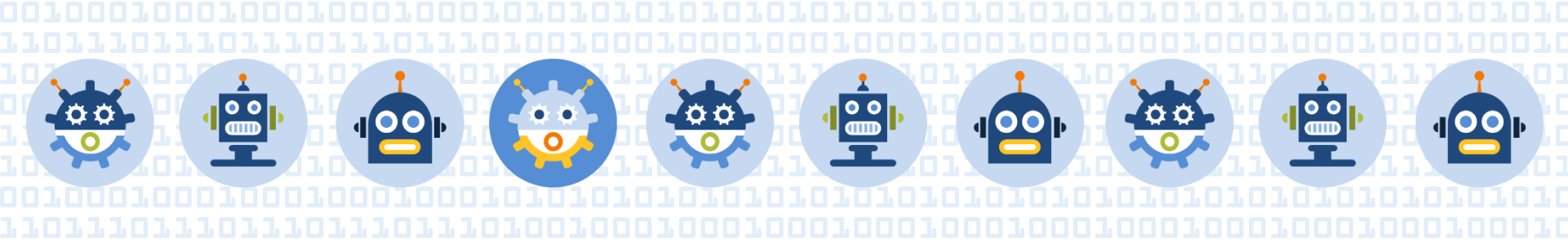
Talent and skill will increasingly define winners and losers in the market, and cognitive digital labor will further magnify and amplify this marker of competitive advantage.

labor. Enterprise performance results will reflect the human skills that work alongside cognitive digital labor.

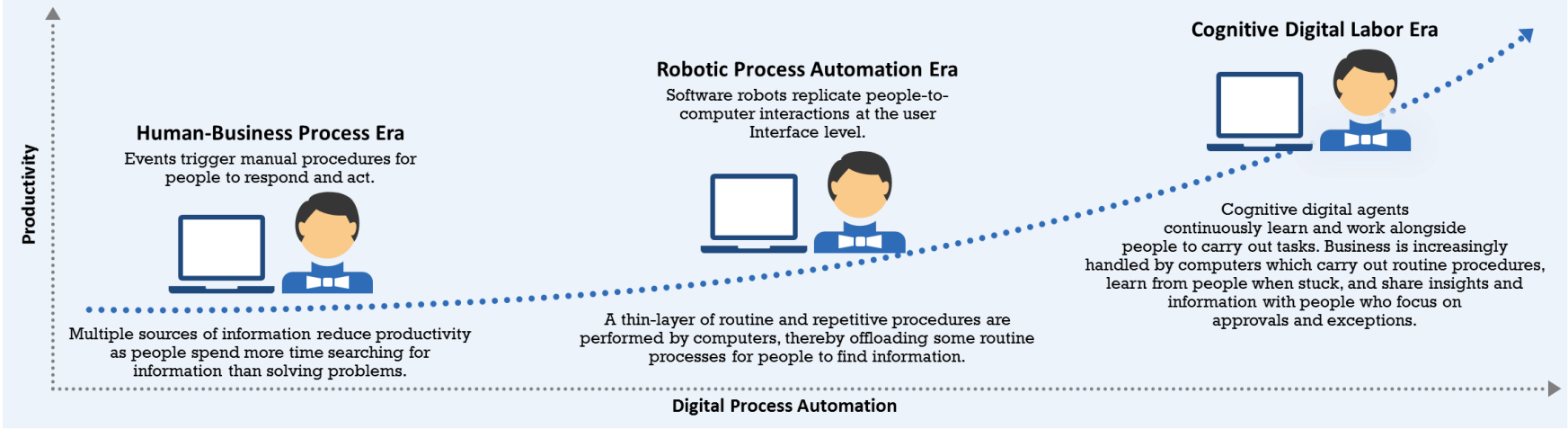
The ability to respond to market change – whether seasonal or otherwise – means businesses also can deploy and employ virtual digital agents as needed to act on market opportunity, test new market adjacencies at a much lower cost, fulfill growing market demand and respond intelligently to softening market demand. Moreover, the adaptability of this approach to business means the enterprise does not have to wait on multi-year outsourcing contracts or hiring delays to respond to market demand: instead, it can adapt to market change dynamically and electronically.

Initial forays into automating labor often take place with the use of robotic process automation (RPA), whereby software robots take the place of people who are filling in and editing data on legacy forms-based applications. RPA replaces keyboard and mouse strokes with rules-based processing for user interactions involving data-in and data-out. This form of user-interface-layer digital labor is an attractive automation opportunity because it does not require application upgrades or testing by IT while it reduces the costs of some operations. However, the benefits of RPA are short-term and narrow.

The new digital labor – cognitive digital labor – is more expansive and makes it possible to reinvent the business, not just at the mechanical thin-layers of keyboard-human interactions that define the legacy of IT. Rather, cognitive digital labor provides business leaders the opportunity to have computers learn – using natural language – what people do, when, why and with whom, under real-life conditions, and have these same systems work alongside an increasingly empowered workforce that is freed-up to continually adapt and innovate.



## Figure 1: The Era of Cognitive Digital Labor Is Here




| | Human-Business Process Era | Robotic Process Automation Era | Cognitive Digital Labor Era |
|---|---|---|---|
| Productivity | 1x | 1.25x to 1.5x | 4x to 6x |
| Scalability limitations | People labor | Defined processes | Human talent |
| Agility/Adaptability | Skill-based | Skill-based | Unlimited |
| Growth | Constrained | Industry norm | Unconstrained |
| Process automation | Limited | UI / predefined | Cognitive/ongoing |

*Source: ISG Research, 2016*

The result of using cognitive digital labor for its early adopters includes increased market responsiveness and agility for digitized business processes that are continuously being improved and made more efficient. Companies using the new cognitive digital labor also cite an interesting and unexpected benefit. While people were formerly searching for information among diverse applications and databases to close deals, service customers and deliver products, the opposite is now occurring. Cognitive digital labor systems are now searching for the right people with which to share insights.

The operational characteristics of the emerging cognitive digital labor era include higher productivity and performance results that elevate performance across the board. This change to the business will push the boundaries of productivity higher at the marginal cost of virtual digital agents.

"I keep telling people that they need to think about these systems differently. Digital labor systems are searching to share their insights with the right people instead of people searching to find the right information."

*— Director of Strategic Automation, Banking Industry*

This change in production from human labor to electronic cognitive digital labor will likely unleash distortions in markets. It could enable smaller organizations to scale out and deliver consistently higher-quality customer experiences typical of larger enterprises. For all organizations, it is likely to provide new opportunities to chase new business using a virtually unlimited supply of digital labor agents that will redefine competition and market rivalry in the coming decade.

## Employees: an Endangered Species

Employees are not yet an endangered species, at least not in the near future. However, some alarming reports do trumpet warnings about the computerization of labor and the future of employment. One of these, **The Future of Employment: How Susceptible Are Jobs to Computerization**, published by Oxford University, cites 47 percent of total US employment is subject to high risk of computerization. The authors assert that developments in cognitive machine learning will risk a substantial share of employment in the future.

Jobs that may be more prone to automation from cognitive digital labor in the near and medium term are likely to be repetitive and mundane positions operating at lower skill levels in follow-the-script business

processes. For example, customer service Service-to-Resolution business processes revolve largely around the effectiveness of many front-end (Level 0 and Level 1) employees who are backed up by far fewer highly skilled (Level 3 and Level 4) subject-matter experts. In the past, some of this labor has been outsourced, offshored or otherwise contracted. The cost of digital labor – based on initial research interviews – is cited at between $5,000 and $25,000 per year. If this remains the case, it means some – and potentially many – level 0 and 1 positions can be automated at a much lower cost using digital agents than human labor no matter where it is located.

## Labor Cost Estimates

### Cognitive digital labor estimates:

- ➔ Up to 50% of the cost of Business Process Outsourcing (BPO) FTEs
- ➔ Up to 50% reduction of IT Outsourcing (ITO) FTEs
- ➔ $5,000 to $25,000 per year per FTE

## Labor Arbitrage: an Endangered Species

The benefits of bringing some or many of these capabilities back in-house are that it raises productivity levels beyond what contractors can ever deliver, it adapts to market change as change occurs rather than at contract renewal times, and it can be used as a competitive weapon to retain and grow business rather than relying on outside contractors.

Cognitive digital labor will materially reduce the cost of operations for all business processes, not just customer service. A cost advantage of between $5,000 and $25,000 per digital agent per year means that businesses can substitute digital labor where it makes sense, thereby reducing prices charged to customers. These price reductions will result in market pressure on competitors that do not use digital labor. Beyond its obvious low cost, enterprises can use digital labor to emphasize customer intimacy and grow new business. For example, digital labor can be used to deliver new services to underserved and unserved markets, thereby improving and increasing growth that place competitors at a disadvantage in the market.

Compared with IT outsourcing / offshoring (ITO), business process outsourcing (BPO), and on-shore labor, the competitive market opportunities offered by digital labor offer new possibilities for both growth and profit that could not be achieved otherwise. Unlike the dire

market scenario envisioned by Oxford University and others, enterprises are more likely to use cognitive digital labor to selectively emphasize and chase strategic initiatives rather than be used as a blunt cudgel resulting in wholesale labor cost reductions. Much of the activity with digital labor will be focused on driving strategic advantage by freeing up scarce talent to grow results rather than focus solely on wholesale cost cutting.

Overall, the use of cognitive digital labor is likely to influence business strategy, market and product portfolios, revenue and profit, and growth and decay. Depending on market factors, digital labor could eliminate or significantly change up to 15 percent of jobs described as Level zero / 1 positions. It is likely to augment and change the jobs of people working at skill levels 1 through 4 today and for some time to come as humans and machines learn to work with one another.

**Labor Skills Mix**

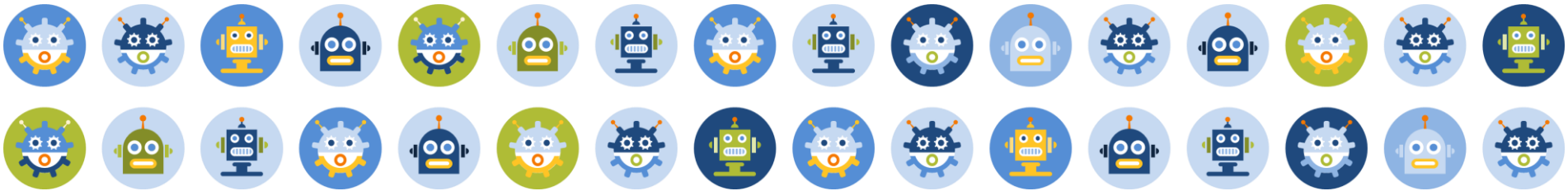
| Level | Skills | Tasks |
|---|---|---|
| 1 | ***Simple*** | Follows established processes and checklists |
| 2 | ***Moderate*** | Understands and applies more advanced concepts and processes |
| 3 | ***Moderately complex*** | Develops new concepts and processes |
| 4 | ***Complex*** | Researches and evaluates new concepts and processes |
| 5 | ***Exceptionally complex*** | Inter-disciplinary and inter-organizational leadership |

*Source: ISG Research, 2016*

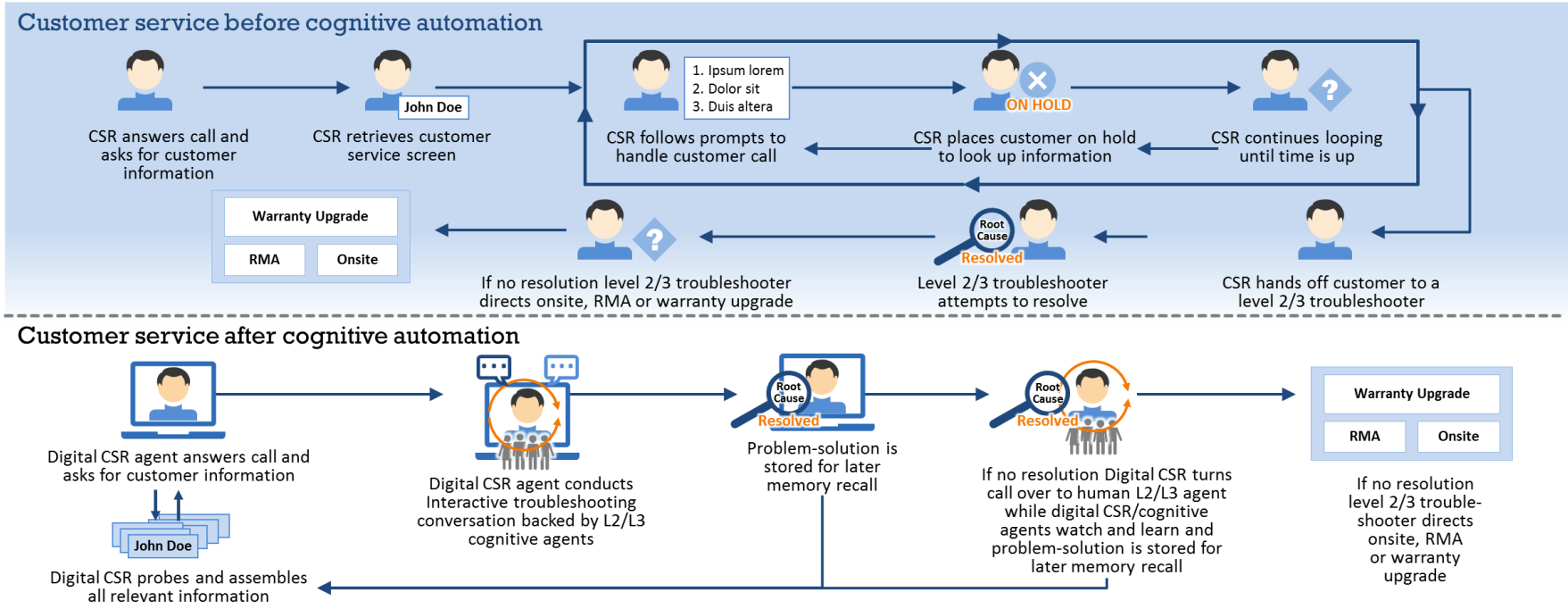
# Demystifying Digital Labor

Underneath the covers of cognitive digital labor is a smorgasbord of data science and machine learning, including conversational semantics, semiotics, language translations, cultural encodings, natural language processing, autonomic processing, supervised and unsupervised learning, reinforcement learning, deep neural learning and big data all rolled into Cloud "as a Service" black boxes with friendly cognitive digital agents with personal names. In fact, almost all cognitive digital labor systems are implemented in the Cloud, making the black-box nature of their operations even easier for business lines to use. When training new cognitive automations, the key is not the technologies operating in public or virtualized private Clouds "as a Service" black boxes, but the business process. Our ongoing research reveals that at least half of the people working on new cognitive digital labor systems are business analysts. The other half are composed of project managers, user-experience specialists, business-line experts, and a small IT staff to interface / integrate the new cognitive digital labor systems into existing workflows / IT systems. These changes to the composition of the teams working on IT-related business will forever alter the way business IT is practiced, delivered and managed as the business is reinvented.

The before and after scenarios for cognitive automation in the Service to Resolve process is a good example of reinventing the business using cognitive digital labor.



## Figure 2: Customer Service Before-and-After Cognitive Digital Agents




*Source: ISG Research, 2016*

Without cognitive digital agents, customers talk on the phone with a live human being working at Level zero on the Labor Skills Mix. Customer service representatives (CSRs) often place customers on hold repeatedly to search for information from multiple locations that might help resolve the customer's problem. The script-based prompting and training CSR's receive is not enough to resolve customer problems, resulting in customers transferred to Level 1 CSRs to handle. When this does not work, customers are transferred to Level 2 CSRs and thereafter are escalated further, or customers are scheduled for onsite visits or upgraded to new warranty contracts. All of this may take place over days through inconsistent communication channels with different people in the Service-to-Resolution business process. The scripted process that is all too common for front-end customer service leaves customers dissatisfied, angry and looking for alternatives.

When automated with cognitive digital agents, the workflow is very different. Gone are the multiple levels of escalations, replaced by a streamlined cognitive system. Instead of a human being, customer calls are picked up by a cognitive virtual digital agent (we'll call her Sarah) using conversational language native to the geography and interacting with the customer much like a human CSR. As Sarah obtains answers to questions, she builds a case file that starts assembling information from multiple sources across the enterprise and participating Level 1, 2 and 3 cognitive digital agents start assembling hypotheses and testing of the hypotheses based on previous customer resolutions. This virtualized testing and reformulating of the root cause and solution to the customer problem occurs in real-time as Sarah and the customer are conversing. Sarah communicates the most likely cause of the problem to the customer in an attempt to resolve the call immediately. In situations in which resolution is not possible, the call is transferred to a human subject matter expert at level 2 / 3, who takes the call and resolves it with the customer. Sarah and her virtual digital helpers listen in, learn from the call, and commit the resolution to memory. Otherwise, the resolution is scheduled for later, including options for an onsite visit or a warranty upgrade. All of this takes place within five to ten minutes with consistent communications between the customer and Sarah in a streamlined Service-to-Resolution business process.

## Call to Action / Next Steps

Although the example provided pertains to customer service, the implications of cognitive digital labor are clear. The enterprise can use it to digitally improve performance across its core business processes, including Sales to Service, Service to Resolution, Quote to Cash, Plan to Forecast, Procure to Pay, Plan to Deliver, Hire to Retire, Innovate to Commercialize, IT Strategy to Operations, Acquire to Divest, and Product Line Introduction to End of Life, among others.

Those now testing and deploying cognitive digital labor are in the vanguard of digitally enabling the business. These firms will be the first to leverage

digital labor in a virtuous growth / profit cycle that may seem risky today but will become commonplace tomorrow. Cognitive digital labor provides the opportunity to reinvent the digital business of tomorrow, today.

Our recommendations for next steps include:

- **Hire a Chief Digital Officer (CDO).** Cognitive digital labor is a new way of using IT to automate the business. It is not yesterday's technology. It requires new thinking, new skills and new ways of interacting with and empowering the business. The CDO should report to the business, be empowered to define the new processes of digital business and identify who will work with IT to imbue / embed the new cognitive digital learning / operating procedures into the business. This role serves as the bridge between the future of business IT with digital process automation and IT's legacy technology automation.
- **Empower Change.** The art and science of digital labor is going to uncover some of the sacred cows of the business, including the "we've always done it this way" way of thinking. It is imperative that senior management empower and stand behind the strategic digitization of the business: it is the future of the business.
- **Empower Business Process Owners**. The new face of digital labor screams out for business process owners. Where digital labor is used successfully, business process owners are interviewing business experts, subject-matter experts, data-flow experts, and others to identify the mundane that should be automated and why, what is needed to improve results, and work in lock step with others to improve the business.
- **Revisit Your Sourcing Strategy.** Review what is available in the market for business process automation. Business process and IT outsourcing strategies that worked five years ago may not be the answer this time around. Conduct a full market scan including peer experience, digital transformation experience, consulting / guidance experience, project management, robotic, autonomic and cognitive digital labor.

"Digital labor does not require deep technology skills. We focus on automating the business processes rather than the technology. Thinking in terms of technology automation actually gets in the way."

*— Senior Director of Digital Process Integration, Medical Industry*

- **Digitally Automate End-to-End Business Processes.** Digital labor from RPA to cognitive digital labor is all about end-to-end business processes. Digital labor automation may start out in back-end IT process automation, in front-end call centers or customer service, or could start in front-end telemarketing processes. Wherever it starts and is used, it is about the automation of end-to-end business processes and much less about the automation of technologies.
- **Digitize Using Small Step Functions.** Rome was not built in a day, and neither will digital business. It is built one step at a time. The sage advice of those on the front lines is to focus on one core end-to-end business process, break it down into its component parts, take it apart, simplify it and rebuild it with digital labor. The early adopters are automating each part of business processes in rapid and successive steps until the sum of its parts is much greater than the whole.
- **Have the Business Pull from a Digital Labor CoE.** Do not push digital labor into the business. Rather let business sponsors pull it to success. Have business sponsors describe what they want, why and when, and work on demonstrable automation steps from a smaller Center of Excellence (CoE) for cognitive digital labor.
- **Do What Works Best: Formalism versus Pragmatism.** Do what makes sense given the culture of the enterprise. Some enterprises are defining formalisms of end-to-end process diagrams and data flows before embarking on their journey. Others are deploying cognitive digital labor working alongside owners and subject-matter experts, identifying the mundane and sources of frustrations in the business today, and from these "what works" iterations that deliver new automations for end-to-end cognitive digital labor processes.
- **Let Cognitive Digital Labor Operate and Learn in Context.** Cognitive digital labor learns and operates best when it operates in context. The process automations of IT support help desk services are very different from those of Quote to Cash, Sales to Close, Procure to Pay or any other end-to-end business process. Look for cognitive digital labor "as a Service" with easy-to-use and translatable business process workflows, capabilities that go beyond the basics of machine learning by incorporating conversational interactions, episodic memory recall capabilities, process sequencing looks ahead, and behavior that mimics human empathy.

Perhaps the most striking aspect of the new cognitive digital labor technologies is that it learns from people using natural language interactions. The cognitive digital agents of the new digital labor systems make it possible for the business to teach computers what to do, when and why, and how to act under differing circumstances, using real-life situations and actions in back- and front-office operations.

The draw for cognitive digital labor is the market advantage that comes from freeing up talent. No longer constrained by the hidebound repetitive processes that slow down responsiveness to customer and market

opportunity, the early adopters of cognitive digital labor report their focus is on increasing growth by freeing up human capital to be more creative and productive.

Early adopters of cognitive digital labor are using cognitive digital labor as a tool on their journey to a digital future, a future in which channels to market are changing and where new, digitally enabled products and services, while not yet a reality, are the plan. For these businesses, cognitive digital labor is but one leg; the other is cognitive digital intelligence. Together, these capabilities enable scaling and adaptability of business beyond today's human-scale capabilities.

The early adopters have some first-mover advantages that might be difficult for competitors to overcome, including a workforce that is learning what to do with it, business processes being tuned for it, and adaptability and agility baked-in by it. The successful enterprises of the coming decade will use cognitive digital labor for some or many parts of the business. Delaying an investigation of the business possibilities enabled by cognitive digital labor could prove to be the wrong decision.

# Sponsor Perspective: IPsoft

In recent years, the market has seen the emergence of "chat-bots" attempting to assist users with queries and questions. These systems rely on simple keyword pattern-matching and often rigid scripting and programming. The result is an inflexible user interaction more akin to traditional IVRs than human dialog. IPsoft's Digital Agent, Amelia, is fundamentally different from average chat bots and based on years of research in cognitive science and natural language. Amelia fully automates traditional human-to-human interactions and process execution. Like a human, she can understand customers and learn from experience, while using her knowledge to diagnose and solve problems independently. Unlike a human, Amelia works at machine speed, is able to handle thousands of dialogues in parallel and scales exponentially.

Amelia's mind is modelled on the human brain. Her Neural Ontology allows her to engage in natural conversation dialogue by ensuring she understands the concepts conveyed rather than relying on pattern matching words. Amelia's Episodic Memory ensures she understands the context of the exchange and leverages prior experiences to quickly gauge the customer's goal. By applying her Process Ontology, Amelia can determine the actions to take and execute on those immediately. Uniquely, Amelia's Emotional Ontology allows her to respond to emotional cues given by the customer. Most importantly, Amelia learns by observation so that her knowledge and performance continues to improve on a daily basis.

In practice, all these capabilities offer an opportunity to provide customers with prompt, efficient support whenever they need it. So, whereas other technologies demand that humans adapt their behavior to interact with "smart machines," Amelia adapts to human behavior.

For example, a driver filing a car insurance claim after an accident contacts Amelia. After verifying the driver's identity, Amelia retrieves the policy details and is ready to help him log the necessary information immediately. Amelia is able to empathize with the driver as he recalls details of the crash, but, noting that he is getting agitated, asks whether he would prefer to speak with a human agent. The driver is reassured by the fact that Amelia is aware of his anxiety and chooses to complete the form with her help as she is so efficient. While the process Amelia follows is well-defined, her dialog is fluid, making it easy for the customer. Simultaneously, Amelia makes it possible for the insurer to be confident that every customer interaction is fully audited and complies with all relevant regulations.

By the end of 2016, Amelia will be in production with clients in Europe and the US across a range of industries, including Banking, Insurance, Media and Entertainment, Telecommunications and Government. For further information contact Sean Connolly/IPsoft Advisor Relations at **Sean.Connolly@ipsoft.com** to discuss how Amelia can transform your business.

## About the Author

Jim Hurley is a Research Director at ISG with a research focus on advanced analytics / cognitive systems, information and IT security, regulatory compliance, and privacy and risk management.

Prior to ISG, Jim directed software lines of business for smart-grid utility providers, headed a benchmark research consortium for Symantec, spearheaded the information security and risk research practice at Aberdeen Group, among other experiences. Jim is a graduate of Boston University and a CISSP.