



The creative CIO's agenda: Getting started with digital labor

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Introduction

The availability of powerful but cheap processing power on demand, coupled with advances in artificial intelligence, natural language processing, and exponential growth of data, has created an opportunity to deploy digital labor to substitute or augment human labor. This opens the door for step-change improvements in costs, quality and speed for businesses across all industry sectors. CIOs play a dual role, as the technology leader enabling business automation and innovation, and as the IT functional leader.

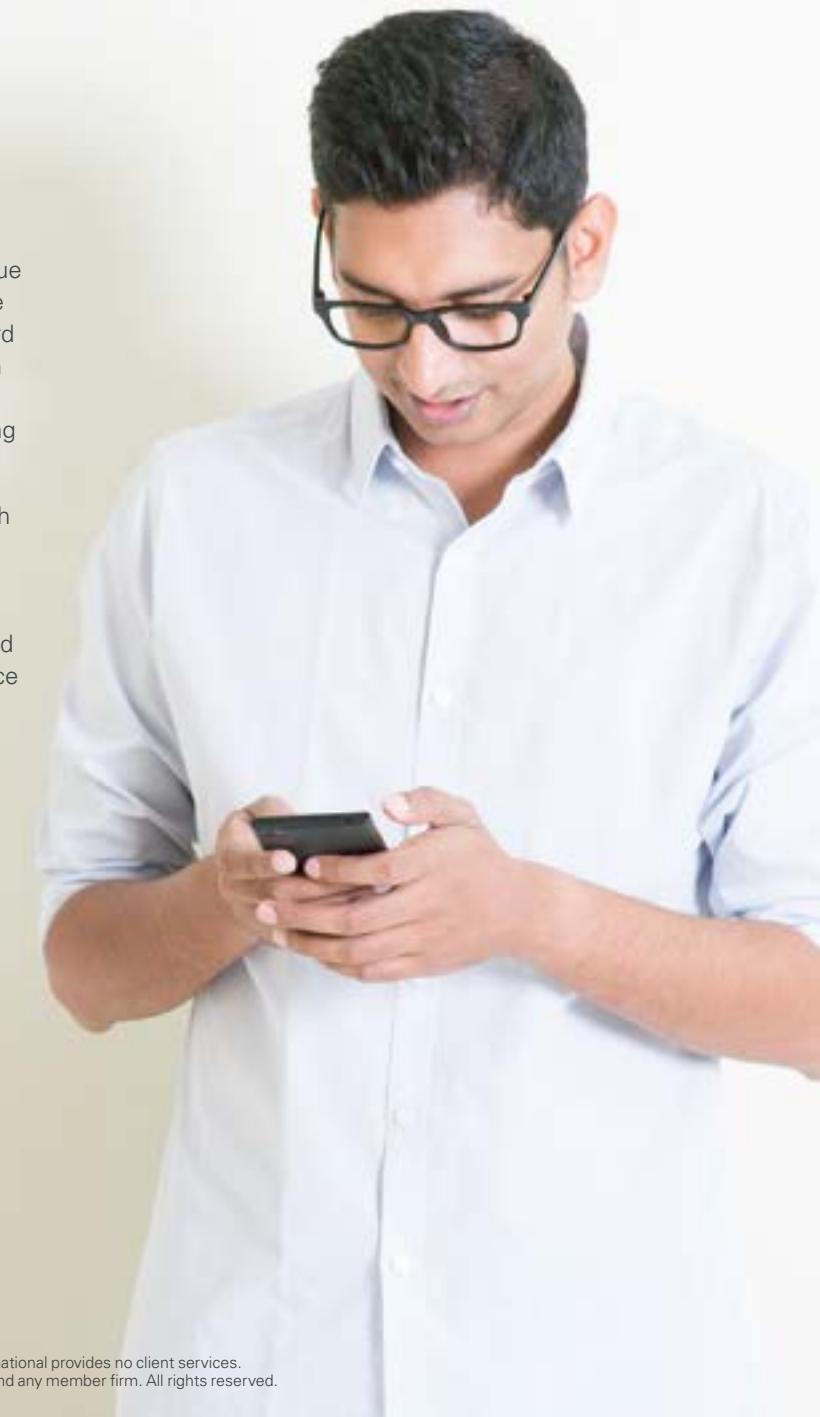
Depending upon your age, the word robot conjures up different images. Perhaps it is the clunky robot from "Lost in Space", or the android servants from the British show "Humans", or Chappie from the movie of the same name, or one of the other thousands of robots that have appeared in literature, movies and TV over the years. Whichever, it is doubtful that we will see these kinds of robots outside of fiction any time soon. On the other hand, some enterprises have deployed hundreds and even thousands of software robots or 'bots' to perform tasks once exclusively done by humans.

For the past ten plus years, many CIOs have virtualized servers, storage and networks, increasing utilization rates while reducing costs. KPMG believes that the availability of very cheap high performance computing power, recent advances in artificial intelligence and algorithms, coupled with the massive amounts of data being produced, is setting the stage for a paradigm shift and the next big wave of virtualization - people via digital labor.

However, just as virtualization did not completely eliminate hardware, digital labor will not necessarily replace people but rather free up the capacity of workers to change their focus away from manual, repetitive processes to higher value tasks like engaging directly with customers to provide more personalized services or handle more complex, non-standard activities. Even more transformatively, cognitive automation and artificial intelligence have the potential to go beyond virtualization and enable capabilities that are beyond anything that humans can do.

It is important for CIOs to understand the breadth and depth of this new technology landscape, with a directional sense of where it is going and a roadmap to take advantage of it. Initially, most of the impact is likely to come from improved efficiency and lower costs as manual processes are replaced by bots. But as cognitive automation and artificial intelligence evolve, the impacts are likely to be radical, driving growth through innovative new capabilities currently not possible.

In this KPMG points of view we seek to define digital labor, describe its various forms and potential use cases, and provide pragmatic recommendations for CIOs who want to get started deploying digital labor within their companies.





What is digital labor?

The availability of ubiquitous, cheap but powerful computing (cloud) coupled with advances in machine intelligence and natural language processing (NLP) is driving innovation around robotic process automation (RPA) and cognitive automation (CA) leading to the emergence of digital labor as a viable means to augment or even substitute for human labor. KPMG defines digital labor as:

“The automation of labor by leveraging digital technologies to augment or automate the tasks undertaken by knowledge workers in your business.”

However, digital labor is not just one thing but also an array of capabilities that span a spectrum of age-old core technologies such as rules engines and workflow, up through more sophisticated technologies such as artificial intelligence (AI) and machine learning that can support cognitive reasoning. They are at different states of maturity and are evolving at different rates, providing a spectrum of capabilities ranging from simple, repetitive task automation to ones that actually learn and adapt. To provide some clarity we have categorized digital labor into three classes.

Figure 1: The three classes of digital labor

Class 1 Basic Process Automation					Class 2 Enhanced Process Automation	Class 3 Cognitive Automation									
Key Features	Macro-based	Unstructured Data	Natural Language Processing	Knowledge Base	Adaptive Alteration	Macro-based	Unstructured Data	Natural Language Processing	Knowledge Base	Adaptive Alteration	Macro-based	Unstructured Data	Natural Language Processing	Knowledge Base	Adaptive Alteration
	Predictive Analytics	Machine Learning	Reasoning	Large-Scale Processing	Big Data Analytics	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Example A US-based online bank has used RPA to automate tier 1 inquiries (i.e., address change)					Example An energy company utilized AI and advanced semantic reasoning to deploy a virtual service desk agent (click to chat) to rapidly understand questions, provide customers with answers, and escalate to humans if needed					Example IBM Watson's natural language processing, machine learning, pattern recognition and probabilistic reasoning algorithms are aiding skilled employees with complex decisions					



The potential benefits are significant

The benefits of digital labor are both qualitative and quantitative. Digital labor works around the clock, improves quality because 'robots' don't make human errors, scales at digital speeds to address increasing workloads, frees up staff to do more strategic work, is not affected by geographical location, and keeps perfect audit trails. Sources of value are found in three categories and include:

Direct financial benefits:

- **Cost efficiency** – Estimates have found that software robots cost about one-third of an offshore full-time employee and as little as one-fifth of an onshore employee. For organizations that employ large numbers of back-office people performing repetitive manual processes, e.g. order entry, invoice processing, reconciliations, significant savings are possible.
- **Lower capital intensity** – Bots do not require cubicles, desks, restrooms, break rooms, PCs, or telephones, significantly reducing the facilities footprint and related costs.

Indirect financial benefits:

- **Productivity/performance** – Software robots work 24/7 and do not take vacations, call in sick, or require breaks and perform at their peak all the time.
- **Scalability** – They can scale up or down automatically and instantaneously to respond to changes in demand or respond to business growth without human intervention. There is no hiring, training, or severance required and no overtime for multiple shifts, disconnecting growth from people.
- **Quality/reliability/consistency** – Software robots always perform as commanded and they are 100% accurate, eliminating human error. They consistently perform their tasks the same way every time.

Other non-financial benefits:

- **Auditability** – Software robots log all of their activities so there is always a record of what they did and what the outcome was, providing an audit trail.

- **Employee satisfaction** – Software robots free humans from having to do the mundane, repetitive work and frees them up to do more fulfilling work that results in higher job satisfaction and morale.
- **Process digitization** – Bots are constantly generating data about processes and make tribal knowledge repeatable while providing opportunities for continuous process optimization.

So why is this different?

Computers have been used to automate the work of people from the beginning. They have been able to perform routine, repetitive tasks faster, at a lower cost, and with fewer errors than their human colleagues, subject to the constraints imposed by their programming and access to data. More recently, business process management (BPM) solutions have been deployed to automate business processes. So it is perhaps easy to see why many CIOs or technology leaders ask the question "why is digital labor different than our prior process automation efforts?"

Historical IT automation solutions are not necessarily mutually exclusive from digital labor but they are complimentary. Take for example some IT service management processes. All IT departments have monitoring and incident management systems (BPM tools), but most if not all have some manual intervention in between these systems. Employees need to perform certain tasks connecting these two systems together (e.g. opening a ticket, escalating an incident). Digital labor aims at automating these manual tasks.

In the case of BPM, you are re-engineering and then automating business processes to make them more efficient. They typically require a significant investment of time and money and involve extensive IT systems work to implement and integrate software with legacy systems and databases. With digital labor you are essentially mimicking what humans do using the same systems and data that they use. Specifically in RPA and some EPA solutions there is little to no IT footprint, implementation times are much shorter and they require a smaller investment. As you go up the class so does the intrusion level in IT systems, the implementation effort and accordingly the investment requirements.



CIOs play two roles

When they first hear the words “digital labor,” many technology leaders that KPMG member firms talk to feel concern. One of the first things that comes to mind is a hollowed out IT organization staffed by bots. While there is some justification to this concern, we think that, properly implemented, concerns can be mitigated while significant benefits can be realized. Instead, we believe CIOs should be excited about the bigger opportunity to play two important roles introducing digital labor into their organizations.

Because of their unique position, CIOs can lead by example, implement digital labor solutions within their own IT organization and enable other functions and business lines in their company to take advantage of the rapidly unfolding digital labor revolution (see Figure 2).

As Functional Head of IT

The first order of business for the CIO is to lead by example by building a digital labor capability and finding transformational opportunities in their own organizations. By starting within IT, CIOs can gain valuable insights and experience with digital labor technologies and vendors, validate business cases, and develop talent. The IT function will begin reaping the benefits of digital labor through reduced costs, improved quality, and other optimizations. These deployed solutions can be used to demonstrate the benefits to their business counterparts while establishing their credibility at the same time.

KPMG member firms are helping multiple clients with digital labor projects within their IT organizations whether automating simple tasks such as ticket status, or more complicated ones like incident management and escalation procedures (see Sidebar for additional opportunities). For example, one client is using RPA to create a virtual service desk to respond to routine requests; another has implemented bots to automate testing in support of continuous delivery. By being a pioneer and innovator CIOs can:

- Ramp up their knowledge around digital labor quickly including understanding the different technologies, vendors, tools, etc. to start building their capability internally
- Assess the true impact of this revolution on their staffing including capabilities/skills gap and potential headcount impact
- Have several real examples to demonstrate digital labor capabilities and IT's expertise to business executives.

Digital labor opportunities in IT

Class 1

Basic Robotic Process Automation (RPA)



Using RPA to automate repeatable IT tasks; validate change requests, password resets, log reviews and/or hardware/software asset updates.

Class 2

Enhanced Robotic Process Automation (EPA)



Deploying virtual incident managers to resolve outages and/or resolve incidents without human intervention.

Class 3

Cognitive Automation



Using cognitive technologies across service management, risk and control systems to exponentially increase automation across the IT estate.



As a Technology Leader Enabling Business Transformation

CIOs have a cross-enterprise perspective into the end-to-end business processes and value chains of their organizations. They should also have relationships with all of the business and functional leaders. We believe this puts them in a unique position to lead the enablement of digital labor across the business.

Many companies are under constant cost pressure and the first place CEOs look for cost reductions are back-office functions. Teams like HR, Finance & Accounting and Customer Support have gone through multiple rounds of evolution, from consolidation to shared services to off-shoring, and more. Having maxed out these alternatives they are looking for the next big operational transformation, with or without the CIO's involvement.

In fact, based on our work with clients we know that some business leaders are already exploring the potential of digital labor, in most cases without the participation of the CIO. In our opinion, this would represent a missed opportunity and result in overall diminished value. Rather, value is optimized when approached as an integrated, enterprise-wide digital labor program. There is a real opportunity for the CIO to take a proactive role leading digital labor opportunities in their companies. The potential benefits of this approach include:

- Reduces the costs of implementing digital labor solutions by eliminating potential redundancies across multiple business lines/functions
- Accelerates adoption across the enterprise by leveraging successful digital labor implementations from one business line or function to others and sharing best practice
- Eliminates potential hidden costs and delays when IT involvement is required post implementation to provide data access or integration services.

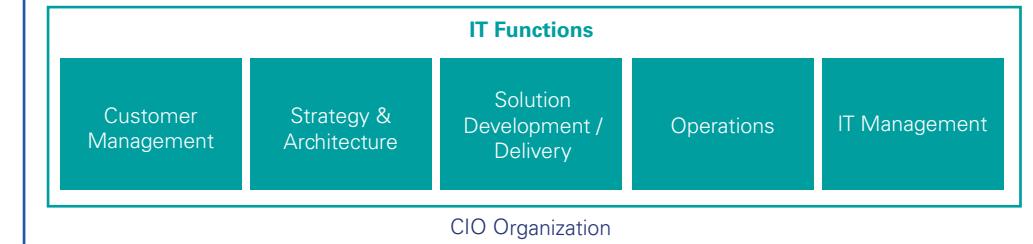
Successful CIOs pursue both roles. We suggest starting with an initial focus within IT to gain some experience, acquire some capability, and develop credibility in the process but ultimately both roles will need to be pursued simultaneously. However, if the business has already deployed digital labor this might not be possible. The good news is that most RPA and many EPA solutions do not require significant IT resources and can be implemented in weeks or a few months, enabling the IT organization to gain meaningful experience in a short period of time and without committing many resources before turning to the business opportunities.

Figure 2: Dual roles of the CIO

1 Enable Business Automation



2 Automate IT Delivery





Six things to get right

As digital labor technologies continue to evolve and mature and more solutions enter the market, adoption is likely to accelerate. Before digital labor solutions proliferate across the enterprise unchecked, CIOs should seek to move quickly to demonstrate that a more strategic, enterprise-wide approach can deliver more value and reduce risks. KPMG professionals have identified a number of things to get right as you start down the path of exploiting digital labor in your organization.

1 Get smart



Unlike some disruptive technologies like cloud, mobile, and social, digital labor and its component technologies are relatively new and not widely adopted. They are also evolving rapidly and an ecosystem of vendors, products, and consultants grows larger every day. As a result, there is a significant challenge in acquiring sufficient knowledge to be able to understand where and how it is likely to affect your business. There are three dimensions to getting smart:

1. Get smart about technology solutions, vendors, and capabilities. As stated earlier, digital labor is comprised of multiple technologies at varying states of maturity and degrees of capability. There is also a growing ecosystem of vendors and consultants. IT functions need to develop a basic understanding all of this in the context of their business.
2. Get smart about your large sourcing providers. They are likely leveraging these technologies behind the scenes or at least exploring them. What may have started out as outsourcing manual processes to take advantage of labor arbitrage may now have been automated. Have they passed these cost savings along? Have they shared what solutions they are using?
3. Get smart about the most popular use cases for digital labor and what opportunities exist within IT and the business. These would include manual, repetitive processes; processes that are error prone; processes that follow a standard set of rules; and processes that require data from several disparate systems.

2 Lead IT to be a fast adopter

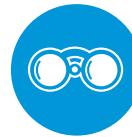


Many opportunities exist across IT to deploy RPA. As a technology leader, CIOs can effectively leverage these capabilities to manage their own business, i.e. business of IT. Furthermore, through these experiences the IT organization will gain the critical experiences required to enable broader business transformation. The capabilities delivered by machine learning, natural language processing and artificial intelligence can significantly uplift the service performance and experience in the areas of IT service support and service operations. CIOs in leading organizations are looking to bring automation through virtual service desk agents, virtual system administrators, automated service requests fulfilment, self-healing, predictive service operations, auto discovery, and smart knowledge search. In other words, CIO should look to enhance their service delivery model through smarter automation with capabilities provided by the likes of RPA.

For example, a large insurance company made a strategic decision to move its infrastructure to a virtual environment for both IT operations and applications development. Using an RPA agent they were able to develop a provisioning portal to automate the provisioning, management, and decommissioning of thousands of virtual machines a day without requiring any manual support from IT operations staff.



3 Look forward



Once they get started, most large enterprises will find many opportunities to deploy class 1 & 2 digital labor solutions across IT, business lines, and functions. These tend to have relatively short implementation timeframes and rapid realization of benefits. It would be easy to remain in this comfort zone and forget that some of the bigger paybacks come with class 3 cognitive solutions.

CIOs that develop and maintain an active R&D capability to continuously explore emerging cognitive technologies, while evaluating opportunities in IT and the business where “smart” technologies can have an impact, are more likely to have the most success. While driverless cars and drone deliveries get most of the press, energy companies are already using self-piloting drones to inspect transmission lines and pipelines, and several industries including healthcare and financial services are using cognitive technologies to augment knowledge workers (see page 9 sidebar).

As you build your digital labor capability, especially if other areas in your company have already started on the digital labor path, having an integrated approach to digital labor becomes critical. So often KPMG member firms have seen CIOs who started the digital labor journey later than their peers in the company and they are tasked with “stitching” all these solutions together. This is why we emphasize how important it is for the CIOs to start early. So what does an integrated approach mean? It means a single data strategy (building links to data sources and APIs once instead of different links for different solutions), an architecture that incorporates the new digital labor technology requirements, and a log of all bots in one place so you can potentially reuse them in other areas. For example, a bot used in on-boarding employees might also have elements that could be reused for on-boarding customers.

4 Don't follow the business



Business teams which invariably initiate and run the RPA projects are going to need support to introduce the services inside the organization's IT landscape, maintain the bot scripts, manage the system upgrades and do basic system housekeeping to ensure the robots do the work they are supposed to.

Instead of taking a hands-off approach and waiting for the business teams to reach out when they need IT support, CIOs should be proactive and engage business leaders in RPA initiatives. As CIOs have an established framework and processes for service management, they have a great opportunity to advise the business on how the existing process and tools used by IT teams could be adopted for ongoing support and operation of RPA services.

For example, issues at the application or underlying infrastructure layer could prevent a bot from executing a routine. Standard processes like incident and change management, service provider governance, and service level management can help the business teams take a structured approach to handle such operational issues and ensure stability of services.

Most CEOs/CFOs think of direct savings when hearing ‘digital labor’. While that is true in many cases there are other reasons to implement a digital labor project. It is crucial for the CIO to articulate and quantify these benefits to the C-suite to ensure they meet their expectations, open their eyes to the wide range of benefits, and set the company for an expansion of digital labor initiatives, each with its own benefits.

If the business has already begun to deploy digital labor there may be less need for the CIO to evangelize it but there is even more reason to work to get the business on board with taking a more strategic, enterprise-wide approach.



5 Get started



While digital labor is still an emerging opportunity we expect adoption to accelerate as additional vendors and their products and solutions enter the market, gain more visibility, and certainly attract the attention of the business. In fact, early adopters have already made significant progress in this regard.

For example, a Fortune 100 client has been using RPA to automate a number of previously manual processes including sales order entry. They have deployed over 300 bots and plan to have more than 450 bots in operation by the end of this year.

Meanwhile, a large global bank has already deployed 500 bots across eight locations around the world and plans to have 1,200 bots deployed by the end of this year performing processes like month-end closes and audit compliance.

Doing nothing is not an option. CIOs need to seize the moment now before competitors take the lead and/or the business functions go their own way. At the same time because there are so many opportunities within IT and the business it is easy to fall into a trap and take on more than you can reasonably deliver. Stay focused on executing IT and non-IT pilots for some quick wins and build on them.

6 Get scale



As you complete your pilot projects, it will quickly become apparent what functional and skills gaps exist that need to be closed to build a digital labor capability in your company. The question is how you plan to close these gaps. For example, identifying current staff that can be developed to meet some needs, collaborating with one or more external firms to source talent, especially in the early stages, and working with human resources to recruit additional talent.

Successful pilots will most likely lead to increasing demand from the business. To scale up your digital labor capabilities we recommend establishing a digital labor Center of Excellence (CoE). Guided by a strategy and charter, the CoE would provide a better chance for building a sustainable capability by combining the strengths of business analysts, technical resources, process engineers, and operations expertise under one umbrella.

Moreover, it is critical that the CoE contain resources that can effectively communicate the nature of digital labor technology and the benefits it can deliver. This function should be responsible for the oversight of an ongoing communications campaign, including "live sessions" to disseminate these messages across the enterprise. These sessions should include the participation of one or more members of business units to increase the likelihood of adoption and create an atmosphere of partnership. As digital labor technologies continue to evolve, helping the business to understand capabilities like cognitive processing will become increasingly important to the success of a digital labor program.

KPMG Watson tech audits

KPMG in the US announced plans to apply IBM's Watson cognitive computing technology to KPMG's professional services offerings. The agreement, including a focus on auditing services, builds on several recent successful KPMG initiatives demonstrating the promise of cognitive technologies in transforming the US firm's ability to deliver innovative and enhanced business services.

Many of KPMG's audit, tax, advisory and other professional services rely heavily on judgment-driven processes. Adding cognitive technology's massive data analysis and innovative learning capabilities to these activities has the potential to advance traditional views on how talent, time, capital and other resources are deployed by professional services organizations.

One current initiative is focused on employing supervised cognitive capabilities to analyze much larger volumes of structured and unstructured data related to a company's financial information, as auditors "teach" the technology how to fine-tune assessments over time. This enables audit teams to have faster access to increasingly precise measurements that help them analyze anomalies and assess whether additional steps are necessary.

Cognitive technology helps allow for the possibility of a larger percentage of the data to be analyzed, providing KPMG professionals with the potential to obtain enhanced insights into a client's financial and business operations. At the same time, cognitive-enabled processes allow auditors to focus on higher value activities, including offering additional insights around risks and other related findings.

Source: "KPMG Announces Agreement with IBM Watson", March 8, 2016.



How KPMG can help

KPMG recognizes that today's CIOs face increasingly complex demands and challenges in becoming the strategic technology partner their businesses require.

KPMG's CIO Advisory practice helps CIOs, technology leaders and business executives harness technology disruption, more effectively manage technology resources to drive agile and improved business performance, enhance strategic position, and improve the strategic value of their technology investments.

If your IT organization is seeking ways to leverage technology as a source of innovation and competitive growth, KPMG member firms can help.

For more information on CIO Advisory's service and capabilities, please visit kpmginfo.com/cioagenda

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