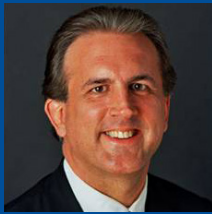




Rise of the robots

Robotic process automation can cut costs for financial services firms by up to 75 percent.

About the contributors



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Michael Henry: Mike is a principal in KPMG's Advisory practice based in New York City. In his 25-year career, he has helped financial services organizations transform to improve performance. He has lived and worked abroad for more than 15 years, including 6 years in Europe and 9 years in Asia, delivering value to local and global clients in banking, capital markets, and insurance.



Cliff Justice: Cliff is a principal in KPMG's Innovation & Enterprise Solutions team, leading the firm's Cognitive Automation initiatives. He is a leading authority on global service delivery model design and sourcing, with more than 25 years of experience in operations, technology, outsourcing, offshoring, and business transformation. Cliff has been an early leader in applying intelligent automation, robotics, and cognitive technologies to business operations and services.

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Introduction

“In the next 15 years, it’s likely that 45 percent, and maybe up to 75 percent, of existing offshore jobs in the financial services sector will be performed by robots,¹ or more precisely, robotic process automation (RPA),” stated Cliff Justice, KPMG LLP (KPMG) Advisory principal. “That should translate into enormous costs savings of up to 75 percent² for firms that get on board.”

And the potential benefits don’t stop there. “Success in today’s complex global financial markets requires unprecedented levels of speed, accuracy, and cost efficiency beyond what a human workforce can provide,” observed Bill Cline, KPMG Advisory principal. “That’s why firms in the financial services markets are increasingly turning to RPA and artificial intelligence (AI)-driven cognitive automation to transform their businesses.”

As technology improves, robots will be able to do more sophisticated tasks faster and more efficiently than human workers. “Businesses that don’t start taking steps now to integrate robotics and cognitive automation

into their operations will not only find themselves at a huge disadvantage, they likely will be as obsolete as the employees that the robots have replaced,” said Justice.

Powerful words... provocative predictions...

In this paper, we take a look at what’s behind these bold forecasts. We also explore some of the benefits that robots and AI/cognitive automation technology holds, including the ability to digest and analyze huge amounts of data. Finally, we present nine factors you should consider before implementing an RPA strategy.

We strongly believe that robotic and cognitive automation is the wave of the future for global capital markets and financial services firms. It’s crucial that you explore what you can do today to position yourself for success tomorrow.

We welcome your feedback on this topic and invite you to contact our specialists for further discussion.

“Success in today’s...financial markets requires unprecedented levels of speed, accuracy, and cost efficiency beyond what a human workforce can provide.”

—Bill Cline, KPMG Advisory principal

¹ We are defining a robot as a technology or technology-enabled process that can perform functions previously only performed by humans.

² [Robotic process automation: The new IT job killer](#), *InfoWorld*, March 23, 2015; Framing a Constitution for Robotistan: Racing with the Machine of Robotic Automation, Charles Sutherland, HfS Research, October 2013

Embracing technology and transformation

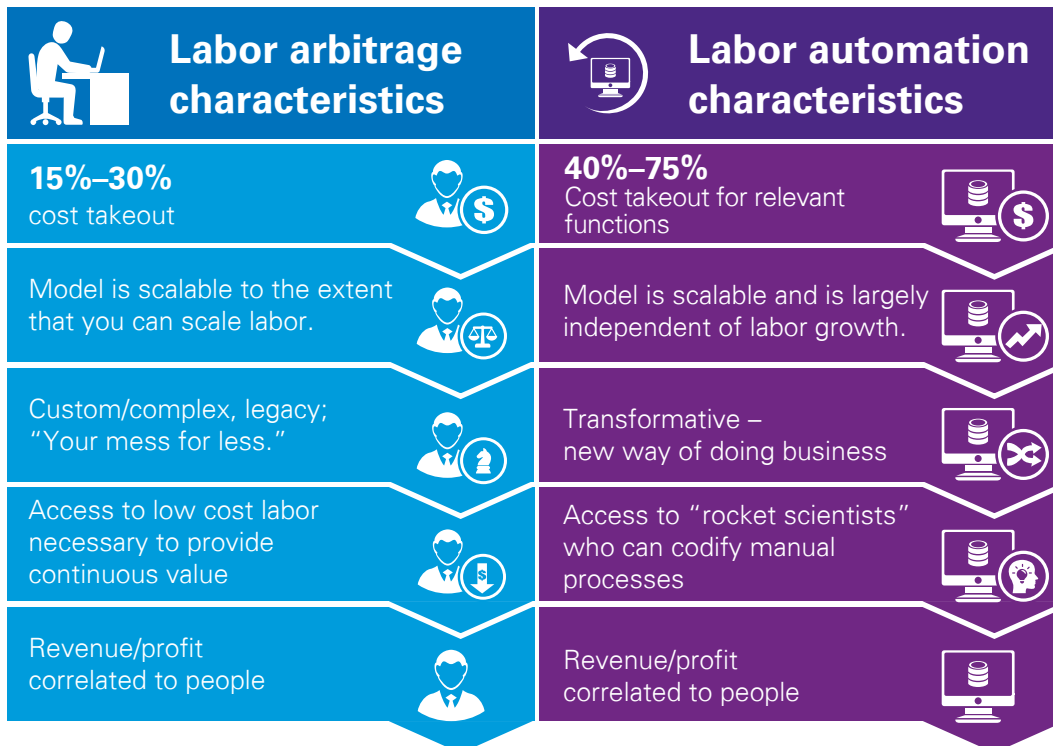
“Although capital markets have been expanding globally,” observed Cline, “there’s been an increase in competition from traditional competitors as well as from disruptive new entrants into financial services. And some of these new entrants are much more nimble and tech savvy than established firms with legacy infrastructure to support.” (See sidebar on page 3, “New disruptors and their high tech capabilities”).

“This increased competition, together with the ever-mounting pressure to reduce costs means that it’s not just a matter of working harder any longer, it’s a matter of working smarter,” Cline said.

He noted that huge sums of money have been spent to make front-office trading faster through the use of AI-generated algorithms. “These resources will now be focused on the middle- and back-office because sophisticated AI and cognitive automation programs will be available to do this work,” he stated. “Trying to cut costs in middle- and back-office operations by ‘labor arbitrage,’ that is, offshoring the work to lower cost countries, will no longer cut it.” (See Figure 1)

Figure 1: Benefits of labor arbitrage vs labor automation

The chart below compares the characteristics and benefits of labor arbitrage and labor automation.



Source: *Bots in the Back Office: The Coming Wave of Digital Labor*, KPMG, 2015

New disruptors and their high-tech capabilities

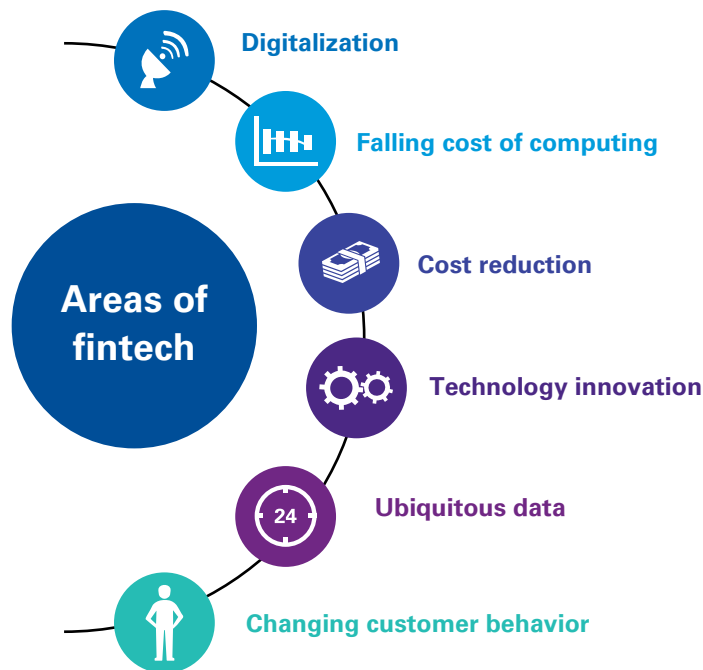
Here's a quick look at some of the new entrants into the fintech field and the high-tech skills they possess.³ This should put financial services firms on notice regarding the types of capabilities they may need to develop or acquire in the future:

- **Cinnobar:** This 230-person firm has developed a sophisticated multiasset, high volume, global trading platform.
- **eToro:** An online social trading and networking tool, eToro enables individuals to discuss investment issues, trade, invest, learn, and share knowledge.
- **Metamako:** The firm builds smart, super-fast (i.e., latency sensitive) trading networks for exchanges and the trading community.
- **Robinhood:** This zero-commission stock brokerage platform allows traders to get the best possible trade execution on purchases and sales across all stock exchanges.
- **Magna:** KPMG's proprietary tool allows firms to proactively monitor and detect unauthorized trading activity in real time, flags abnormal or risky behavior, and helps investigate and resolve potential risks.
- **Estimize:** This open, crowd-sourced, financial estimates platform aggregates fundamental estimates from buy-side and sell-side analysts, private investors, and students.

Investment banks, exchanges, clearing organizations, and others are increasingly recognizing the power of technology and the benefits of transforming their businesses. (See Figure 2)

Accordingly, many of them have begun to incorporate highly automated IT- and AI-driven process innovations into their operations.

Figure 2. How capital markets firms can benefit from technology



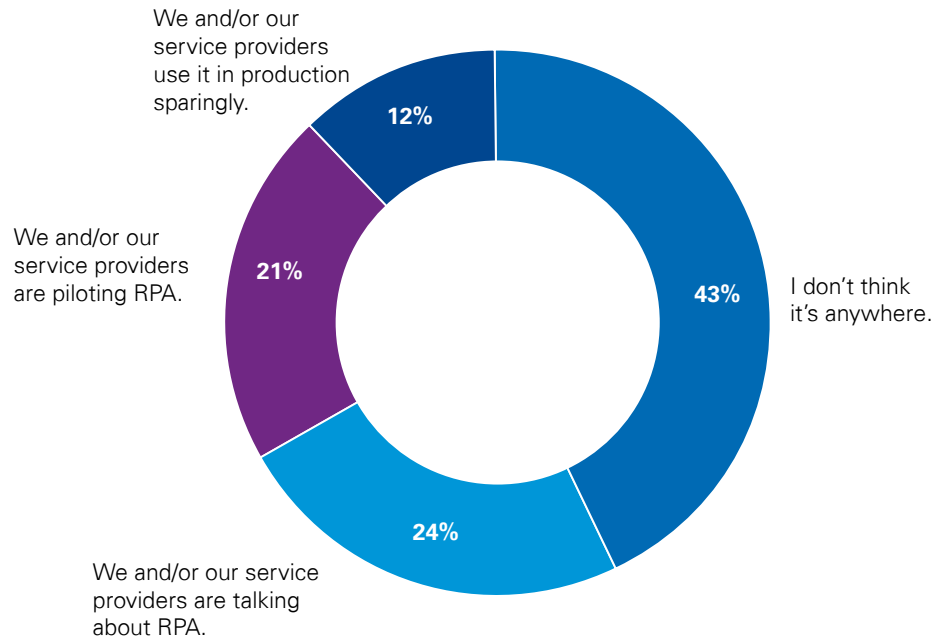
Source: *The Perfect Storm of Technology and Capital Markets: The Modern History of FinTech*. KPMG, 2015

For example, Cline noted that industry spending on speed and automation initially was focused primarily on trading infrastructure and data; middle- and back-office functions typically used economies of scale and offshoring as a way to reduce costs. (See page 6, "Offshoring" no longer a solution.)

"A drastically new approach is needed," said Justice. "We believe that the industry as a whole must move more quickly towards adopting RPA and AI, especially in light of the increasingly complex regulatory intensive environment."

And yet, most financial services firms have done little or nothing in the way of integrating RPA into their business processes. A recent study found that more than 40 percent of capital markets respondents weren't using RPA at all, and another 24 percent are just talking about it. Only 12 percent were using RPA, and then only sparingly. (See Figure 3)

Figure 3 – RPA has a long way to go



Source: "Ideals of As-a-Services" Study, HfS Research 2015
Sample: Total = 716; enterprise buyers = 178; advisers/consultants = 176; service providers = 372

"It's really pretty simple," stated Justice. "We see significant changes on the horizon in the financial services space. Firms that either resist those changes or are too slow to adapt risk being rendered irrelevant by disruptive forces—or traditional competitors that have adapted more quickly—in very short order."

"Firms that...resist those changes or are too slow to adapt risk being rendered irrelevant."

—Cliff Justice
KPMG Advisory principal



"Offshoring" no longer a solution

For more than two decades, a key strategy for capital markets firms to cut costs in middle- and back-office operations was to offshore the work to countries like China, India, and Philippines. The savings primarily resulted from the lower wages they could pay employees there as compared to major money centers. As wages and the standards of living in China and India rose, countries like Vietnam, Mauritius, and some Central and Latin American countries became popular offshoring destinations.⁴

This so-called labor arbitrage strategy—which was more about cost-cutting than boosting efficiency or any long-term strategic thinking—worked for many years. But, according to Cline, the offshoring business model is obsolete for several reasons:^{5,6}

- Shrinking gap in labor costs: Wages in countries outside of the United States have risen, sometimes sharply, while domestic wages have remained stagnant.
- Political/social backlash against offshoring: This backlash, along with tax factors and increased management overhead expenses, is making offshoring a less attractive option for U.S. companies.
- Increasing globalization and fewer employees: U.S. firms are competing with businesses from around the world for a shrinking number of employees. This is leading to higher labor costs abroad, especially for skilled workers.
- Political instability, labor unrest, and other increased risks: The United States remains one of the lowest risk countries in which to operate.
 - » What's more, as the use of RPA increases, countries with economic dependencies on outsourcing may start incurring significant job losses, potentially leading to increased geopolitical risk and unrest there.

- Turnover: Companies are finding it increasingly difficult to attract and retain foreign workers, especially skilled ones. This tends to lead to higher costs for either keeping skilled employees or retraining new ones.
 - » Firms that take the option of hiring less skilled workers typically find that a host of other problems arise (e.g., reduced quality, productivity).

RPA may be the final nail in the coffin for labor arbitrage. "RPA has the potential to displace offshore clerical work in the same way machines displaced manual work in the 20th century," observed Michael Henry, principal, Advisory, KPMG. "In 1870, 70 – 80 percent of the U.S. population was employed in agriculture; now it's less than 2 percent. RPA means the end of offshoring as we know it."

"RPA means the end of offshoring as we know it."

*—Michael Henry
KPMG Advisory principal*

⁴ Where in the World? Business Process Outsourcing and Shared Service Location Index, Cushman & Wakefield, 2015

⁵ Labor Costs – Assess Costs Everywhere, State Department of Commerce, July 2015

⁶ U.S. Firms Eyeing Benefits of Onshoring, CFO, 11/23/2015

Benefits of 'bots

“Capital market firms that continue to employ labor arbitrage are missing the boat in terms of the benefits they’d derive by using RPA and AI,” Justice stated. “What’s more, for the most part, firms that claim they’ve ‘automated’ have not really transformed their operations or processes. Their people are still doing most of the work; they’ve only made it marginally more efficient by using better work flow tools.”

This approach is no longer sustainable in light of the new RPA and “big data” technologies that are storming the industry, and the business challenges coming from disruptive new entrants. RPA and cognitive automation strategies can drive cost reduction and operational improvement well beyond anything that can be attained with “cubicle farms,” regardless of location.

Specifically, they can help firms:

- Improve accuracy as a result of reduced human error.
 - » Example: An automated process can factor in thousands of validation and due diligence rules when analyzing a single Foreign Account Tax Compliance Act (FATCA) form far more quickly and with fewer mistakes than a human workforce.

- Improve quality as human workers increasingly focus on higher-value tasks and exceptions.
- Improve speed of operations.
- Apply data analytics to evaluate “big data.” This can be invaluable in cleansing, standardizing, and analyzing data across the enterprise. For example, it can include:
 - » Determining P&L by enterprise, business unit, etc.
 - » Meeting regulatory requirements (e.g., Know Your Customer [KYC], Anti-Money Laundering [AML], FATCA).
- Connect the dots in analyzing global trading, accounting, controls, and risk management in real time.

“Machines can do many tasks better, cheaper, and faster.”

—Cliff Justice

To put it succinctly, “machines can do many tasks better, cheaper, and faster,” stated Justice. “While firms have long been aware of the uses and benefits of automation, advancements in robot technology and programming, combined with falling costs, have made the use of ‘bots more practical for many businesses.”

Case study: Upping the bet on 'bots

For one financial services firm, robots have proven ideal in back- and middle office centers, performing high-volume, rules-based work. At a recent conference, representatives from Australia and New Zealand Banking Group Limited (ANZ), Australia's fourth largest bank, discussed how they have been able to successfully integrate robots and robotic software into their operations.

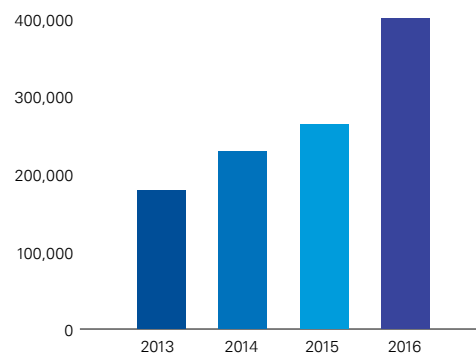
They emphasized that ANZ started off slowly at first, placing a single software robot into its lending operations. But now the bank uses 'bots in its finance, human resources, payments and mortgage processing departments as well. It was noted that in the payments area, the **number of human employees has decreased from 40 to 2.**⁸

For example, it's been estimated that a software robot can cost around a tenth of a full-time worker in the United States, United Kingdom or Australia, and roughly a third of a full-time worker in India. And the marginal cost of additional software robots is minimal.⁷

This goes a long way in explaining the exploding growth in the number of robots projected to be ordered in the next several years. (See Figure 4)

Figure 4 – Number of robots ordered on the rise

As the chart below illustrates, the number of industrial robots projected to be shipped worldwide by 2018 is more than double the number shipped in 2013.



*Note: 2015 and later are projections,
Source: International Federation of Robotics*

⁷ Automation versus labour arbitrage, Martin Conboy, the outsourcing-guide.com, 6/9/15

⁸ Rise of the machines as ANZ brings in robot workers to do the 'boring' jobs, Financial Review, 8/24/2015

So what's the holdup?

If integrating robot technology into the financial services markets and replacing human employees makes so much sense and offers so many benefits, why isn't it being utilized more often?

One reason is that RPA has only become advanced enough to replace humans in the capital markets sectors in the past two years; prior to that, the technology just wasn't quite there.

Thanks to enhanced AI and cognitive automation—including natural language processing, machine learning, and machine vision—together with better designed robots, 'bots stand ready to take their place in the financial markets workforce.

Another, perhaps equally important, reason for the delay is that many businesses simply are uncertain where and how to begin to transition to robotics and cognitive automation systems. Replacing or overhauling legacy systems can take time and have significant costs associated with it, depending on the size and complexity of the enterprise. For example, we worked with a large investment bank that recently spent over \$100 million to implement work flow tools allowing it to reengineer processes.

That's a huge investment in technology, and it can be a difficult pill for senior management or shareholders to swallow. Regardless of how you try to justify the expense and make the argument that it's necessary for long-term survival, it may be difficult to get executives, the board, or shareholders to act upon it.

In addition, specifically with respect to RPA:

- It takes a lot of time and effort to review and document a firm's current procedures and processes and convert them into "instructions" that robots and/or AI software programs need to follow. (See page 14. "Using RPA in the client onboarding process".)
- There may be cultural resistance to change from managers who are used to having a large number of people to supervise (i.e., protecting one's "turf").

What's more, few financial services firms have a "culture of innovation" that lends itself to taking the dramatic steps needed to compete in the future and have to overcome an ingrained resistance to change. (See Figure 5)

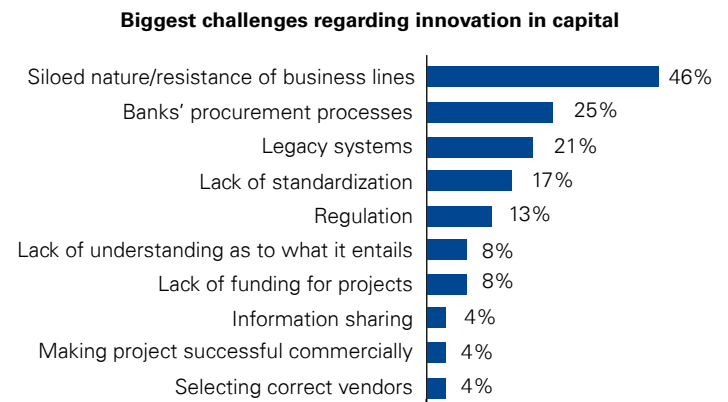
In a study of 38 banking, insurance, and investment firms, only 21 percent had a dedicated chief innovation officer (CINO):⁹

- 45 percent did not have a dedicated CINO.
- 24 percent had an executive with CINO duties but who also wears other hats.
- 10 percent had a person in the role but in a low-profile way or without a title.

It's likely that these firms will need to rely on third parties to create the tools needed for game-changing technologies such as robotics and cognitive automation.

Figure 5 – Challenges to innovation faced by capital markets firms

The chart below lists the key challenges to innovation faced by capital markets firms.



Source: *Innovation in Capital Markets: Not Just a Dog and Pony Show*, Aite Group LLC, October 2015

⁹ *Innovation in Financial Services: How Banks and Insurers Are Gearing Up*, Aite Group LLC, September 2015

Nine steps for RPA innovation

One question we often encounter in our meetings with financial services firms is whether investing in RPA and cognitive automation is right for their organization. According to Justice, this is the wrong question to be asking.

“At this point in time, it’s not a question of whether you should or should not adopt RPA,” he declared. “You risk remaining relevant if you don’t. The question should be: ‘What’s the best way for your firm to employ RPA and AI.’”

Here are nine factors to consider when setting out your plan of action:

1. Where would RPA work best?

- Start with the areas that are the most labor-intensive or involve repetitive, rules-driven work.
- This may include, for example, jobs that require a large number of relatively low-skilled employees with high turnover.

2. How is the quality and accuracy of the data you’re currently receiving? Have you measured error rates?

- Determine how RPA can help you harness and analyze data for better decision making (in terms of strategy, operations, and product development) and better reporting.
- Project the potential savings that will result from reduced errors and increased speed.
- Consider the potential benefits of improved data analytics guidance (e.g., to get a profile of your most profitable customers; to determine which customers require closer risk monitoring).

3. What is the current status of your existing technology systems?

- Calculate the technology debt you have on your balance sheet.
- Assess the skills/talents you have in targeted technologies.
- Determine whether existing products used in the front office can be applied to middle- and back-office tasks.

4. Are you facing escalating cyber threats to your operations and the security of your account information?

- A properly designed and operated RPA solution should allow for better risk control.
- Consider creating a public and private cloud strategy.
- Assess the sophistication of your data retention/deletion policy.

5. How much market-share erosion have you experienced as a result of new entrants and increased competition from traditional competitors? How are you reacting to it?

- Determine how customer experience can be enhanced by improved automation, including straight-through processing.
- Assess whether an AI-driven data analytics program can help you spot trends that will inform your business strategy.

6. What are your customers demanding in terms of service, speed, and mobility? Are you keeping up?

- By spotting trends and analyzing preferences, RPA and AI may help your firm attract and better service customers or clients.
- Map out any new offerings you will be able to provide to your customers as a result of enhanced robotics.

7. Are macroeconomic issues and geopolitical developments, including new and increased regulation, impacting your business?

- Consider how RPA and cognitive automation will enhance regulatory compliance in terms of speed, accuracy, and reduced head count.

8. What is your talent acquisition strategy to meet the new technology needs?

- Determine whether you will need to hire new employees, retrain current staff, or contract with third parties to operate and/or oversee the machines.

9. What is your strategy for communicating your plan to transition to RPA and AI innovations?

- Clear communication of any innovation effort of this nature—for example, how it will be accomplished and its goals—is the first step on the road to a successful program.
- It's essential that lines of business understand their roles and responsibilities in this effort.

Presenting to senior management or the board

When you make a case for RPA to senior management or a board of directors, in addition to explaining its necessity by referencing some of the nine points set out above, you will want to:

- Employ a “land and expand” strategy, starting modestly but then scaling fast.
 - » Consider introducing AI and RPA gradually, integrating it into your firm's legacy infrastructure. If it's successful, it should help pave the way to a larger investment in the future.
- Provide backup plans in the event of robot/automation failure.
- Be prepared to discuss risk/regulatory/compliance issues and ramifications.
- Use charts, graphics, dashboards, and/or heat maps to explain why RPA is a necessity.
 - » Effective illustrations can often help tell the story better than verbal explanations.
- Have a strategy in place to quickly convince other departments/business units of the benefits of 'bots once you get senior management buy-in.

Case study: Integrating RPA gradually

A large capital markets firm we work with uses existing work flow processes and offshore cubicle farms to perform business-as-usual functions, such as KYC/AML onboarding. However, when periodic KYC updates are required, instead of hiring temporary staff to supplement its workforce, the firm shifts to using robotics to handle the overflow work.

Result: The firm eliminated backlogs seamlessly, has become comfortable using RPA, and hasn't had to make a full-scale investment in overhauling its existing system.

Using RPA in the client onboarding process

RPA can dramatically improve regulatory compliance and reporting, as well as the client onboarding process. It's better, less expensive, and faster than anything that can be obtained with human workers.

The KYC, AML, and FATCA regulations, for example, impose an almost overwhelming number of requirements that banks and other financial firms must meet before they do business or continue doing business with a customer. These requirements include:

- Asking potential clients a host of questions and getting reams of information about the clients' business and activities. This information might come back as PDFs, paper forms, or other types of documentation.
- Keeping track of any changes in the customer's circumstances.
- Collecting, inputting, and analyzing this data to make sure it complies with regulatory and firm policies.
 - » This can be both labor-intensive and fraught with errors—through both mistakes and omissions.
 - » Updating this information and keeping track of future changes and developments is also burdensome and susceptible to human error.

In response to the challenge of properly onboarding customers and clients in the face of complex—and sometimes contradictory—domestic and international regulations, KPMG has developed an RPA-enabled service that brings unprecedented levels of automation to these tasks.

The program:

- Helps gather and input huge amounts of structured and unstructured data.
 - » Natural language processing, metadata, and ontology models are used for content enrichment and aggregation.
 - » Intelligent 'bots gather information from public and proprietary news and information sources beyond what clients submit.
- Determines whether each entity or individual complies with regulatory and/or firm requirements, assigns a preliminary risk rating, and automatically identifies exceptions for further investigation.
- Maintains a complete electronic audit trail for use with internal and external auditors.
- Continues to search for information that may cause a customer to become noncompliant and provides alerts if and when this occurs.

For use by single or multiple firms: These RPA services can be integrated with any legacy system or process and can reside on the premises or be "hosted" as part of a cloud-based solution with other firms.

As a hosted solution, expenses can be reduced even further, as common infrastructure costs may be shared by a group of firms, or it can be marketed to smaller, emerging players.



Impact on employees – and getting their buy-in

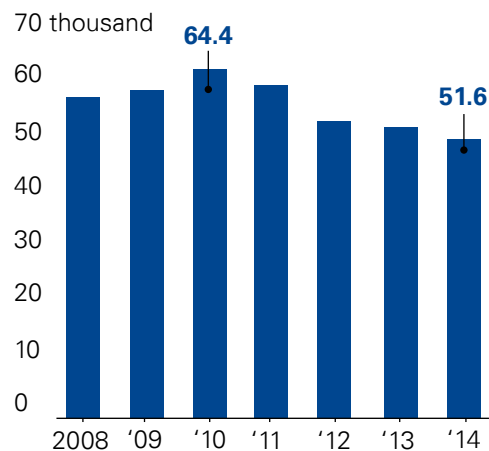
When discussing the integration of RPA into a company, an elephant in the room, at least from the employees' point of view, likely is: "Am I going to lose my job to a robot?"

And they have good cause for concern. In earlier times and in different industries, advances in automation eliminated many jobs that required manual effort. They'll get no comfort from the recent job cuts at some of the largest investment firms, part of which is attributable to automation in trading and other aspects of these firms' processes. (See Figure 6.)

Figure 6 – Wall Street job losses

Wall Street firms continue to cull the ranks of bankers, traders, salespeople, and other front office personnel.

Wall Street Front Office Producer Headcount

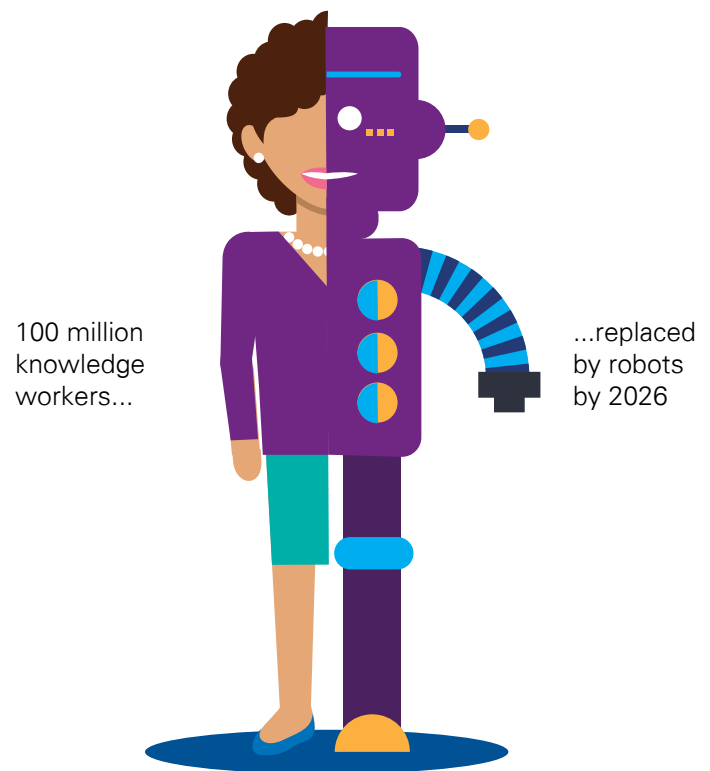


Source: Coalition Index

This trend undoubtedly will continue throughout the financial services markets in other positions as RPA, AI, and cognitive automation come to the fore. (See Figure 7.)

Figure 7 – Jobs in jeopardy

Some fear that smart robots may replace more than 100 million knowledge workers—or one-third of the world's jobs—by 2026.



Source: Employees: An endangered species? KPMG 2015

Depending on the nature and culture of your firm, getting the buy-in and cooperation of your employees in integrating RPA may not be essential. However, in our experience, we've found that gaining support for RPA among your employees, many of whom may end up being displaced by 'bots at some point, will make the process faster, easier, and more efficient.

Here are some suggestions for how to garner employee backing for RPA:

- Communicate to employees that the goal of RPA is operational excellence and efficiency, not reducing head count; if employees believe they will be making themselves obsolete, it will be difficult to get their cooperation.
 - » While head count may end up being reduced, ideally it should be the result of normal attrition.
 - » Have a strategy in place to help employees transition to different, perhaps more creative and fulfilling, jobs.
- Demonstrate the value to employees of being involved in using these high-tech tools.
 - » Present information to the effect that employees who have the ability to use big data, natural language processing, analytics, and machine intelligence are more valuable in the marketplace.
- Work *with* employees in the automation process and empower employee teams to change the process to make it better and more efficient.
 - » Consider letting them weigh in on whether a robot can do a job alone or in conjunction with a human resource.
 - » If it's decided a robot can't do the task effectively, let them know it's OK to stick with a manual process.
- Build excitement around installation of the first "bot."
- Roll out RPA slowly, test it thoroughly, and make sure it's successful before expanding.
 - » It's important for RPA to have some early wins; this will also tend to help build excitement about the initiative.
- Have leaders at the top and also leaders "on the ground" champion the RPA cause.
 - » Road shows with "regular" employees speaking to the benefits of RPA, in addition to more senior leadership, can be very effective in getting employee buy-in.



What lies ahead?

RPA has already taken its place in the financial services space and is generating results. While there's certainly a way to go before it becomes the norm, it's no longer a matter of if, but rather when. According to Cline, "The transformational potential of RPA and cognitive automation is unparalleled in an industry that arguably needs it more than any other."

RPA can generate significant, year-over-year savings in labor costs. As discussed throughout this paper, 'bots and smart automation offer significant benefits in terms of speed, accuracy, and productivity, and the ability to gather, input, and analyze vast amounts of data.

For financial services firms, the real questions are: "How quickly do you want to get on board?" and "How deeply do you want to dive in?" Your long-term survival may depend on your answers.

"The transformational potential of RPA and cognitive automation is unparalleled."

—Bill Cline



About KPMG

Working collaboratively and pragmatically alongside our clients, KPMG helps organizations improve service delivery models, reduce support costs, and drive specific business outcomes in order to achieve sustainable, continuous improvements, and competitive advantage. We are also an industry leader in applying intelligent automation, robotics, and cognitive technologies to business operations and services.

Our numbers:

- Serving clients in 155 countries (through our network of member firms)
- Hundreds of advisory professionals globally (through our network of member firms)
- Providing services to 76 percent of FORTUNE Global 500 companies

Our differentiators:

- Objectivity as advisers
- Beginning-to-end experience
- Functional breadth
- Industry-specific experience
- Technology and governance services
- Extensive data and analytics capabilities
- Proprietary research, tools, and intellectual property
- Industry relationships
- Integrated competencies and services

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