

## Robotic Process Automation at Telefónica O2

*This article examines a new breed of automation software called Robotic Process Automation (RPA) and describes the case of O2 in the U.K., an early adopter of RPA. The case shows that RPA can deliver faster and more accurate performance of routine back-office processes, and annual returns on investment of up to 200%. But as with all technology innovations, organizations must assess RPA's capabilities and manage its adoption to achieve maximum results. Based on O2's experiences and other RPA case studies, we provide five action principles for future RPA adopters.<sup>1,2</sup>*

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### Robotic Process Automation at Telefónica O2

*"Robotic Process Automation is the next wave of innovation, which will change outsourcing. We already are seeing the beginnings of a race to become the top automation-enabled service provider in the industry. In time, we are likely to see an arms-race for innovation in automation tools leading to new offerings and delivery models." Sarah Burnett, Vice President of Research, Everest Group*

There is an automation revolution happening inside the business operations groups of many companies called Robotic Process Automation (RPA). The new breed of RPA software providers includes Blue Prism, Automation Anywhere, IPsoft and UiPath. Many of these tools are easy enough to use so that business operations staff, including people with process expertise but no programming experience, can be trained within a few weeks to automate processes. Business operations groups in companies such as Associated Press, Ascension Health, Telefónica O2, VHA (a U.S. national health care network of not-for-profit hospitals), Virgin Trains and Xchanging (a U.K.-based provider of business processing, technology and procurement services) are using RPA to automate processes quickly—often with little development help from centralized IT. Nevertheless, CIOs and other IT professionals need to ramp up quickly on what RPA can and cannot do for their firms.



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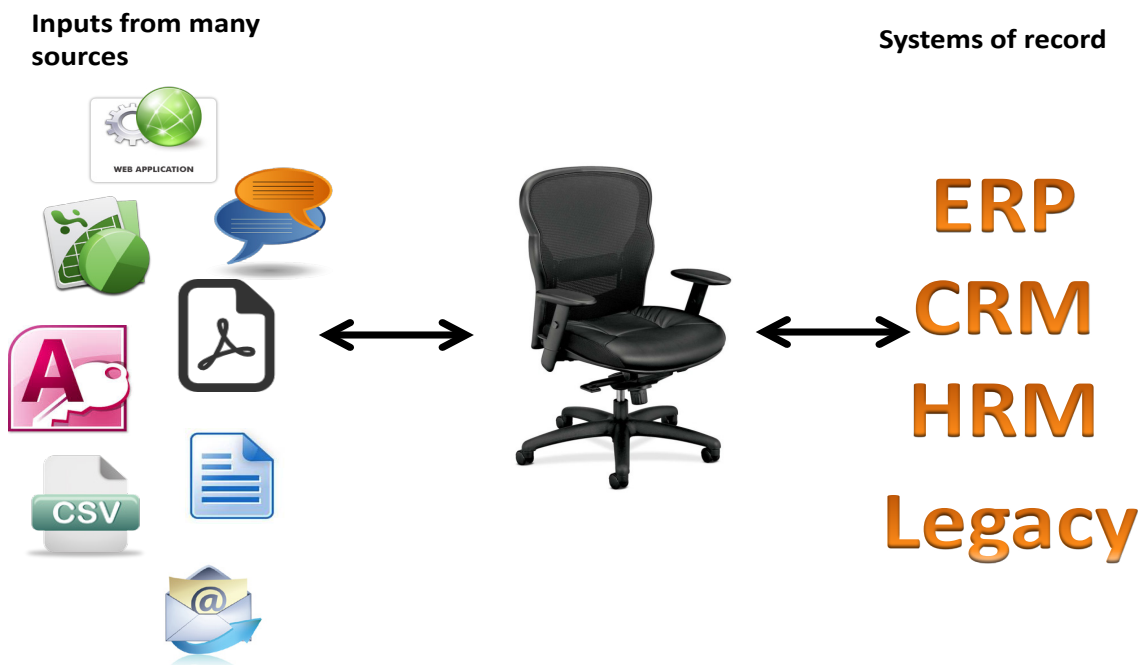
Although the term “Robotic Process Automation” infers there are physical robots wandering around offices performing human tasks, RPA is a software solution. In RPA parlance, a “robot” is equivalent to one software license. For business processes, the term RPA most commonly refers to configuring the software to do the work previously done by people. RPA software is ideally suited to replace humans who perform so-called “swivel chair” processes. Such a process is where a human sits in a swivel chair at a workstation and takes in work from many electronic inputs (like emails and spreadsheets), processes it using rules, adds data as necessary by accessing more systems and then inputs the completed work to yet other systems, like ERP or customer relationship management (CRM) systems (see Figure 1).

Consider, for example, an HR specialist who is in charge of onboarding new employees for a large company. The onboarding process likely requires the specialist to log on and off a dozen systems to set up a new employee with benefits, payroll, email, voicemail, security clearance, office space, office furniture, computer, parking pass, expense account, identification badge and

business cards, with the specialist following standard rules for each routine task. Multiply that process by the thousands of employees who are onboarded each year in many large organizations. Now imagine that RPA software has been configured to do all this work just as the HR specialist did—by logging on and off systems with its own assigned logon ID and password and performing these routine tasks.

This HR example illustrates that RPA software interacts with other computer systems just like a human would. If configured correctly, the software should do the work better, faster and much cheaper than the HR specialist. The HR specialist would be free to focus on non-routine tasks, such as working with business units to craft job descriptions, suggesting appropriate recruiting outlets, fielding calls from potential applicants, reviewing résumés and taking up references. The HR specialist would also handle the non-routine exceptions that the RPA software could not process. There would be fewer HR specialists needed overall if the volume of work was constant, but those who remain would have more challenging work.

**Figure 1: RPA Software is Ideally Suited for “Swivel Chair” Processes**



## Robotic Process Automation vs. Business Process Automation

Given the typical scenario of the use of RPA described above, some CIOs may dismiss it as nothing new, thinking “We’ve been automating business processes for years with business process management (BPM) solutions.” But there are two things that distinguish RPA from BPM tools.

### 1. RPA is Relatively Easy to Configure; Developers Don’t Need Programming Skills

The RPA interfaces work a lot like Microsoft Visio; users drag, drop and link icons that represent steps in a process. Figure 2 shows screen shots of the development environment from two of the most popular RPA software providers, Blue Prism and Automation Anywhere. As users drag and drop icons to automate a process, code is generated automatically. Business operations people, with process and subject matter expertise but with no programming experience, can be trained to automate processes in just a few weeks. In contrast, BPM solutions require coding expertise.

### 2. RPA is “Lightweight” IT That Does Not Disturb Underlying Computer Systems

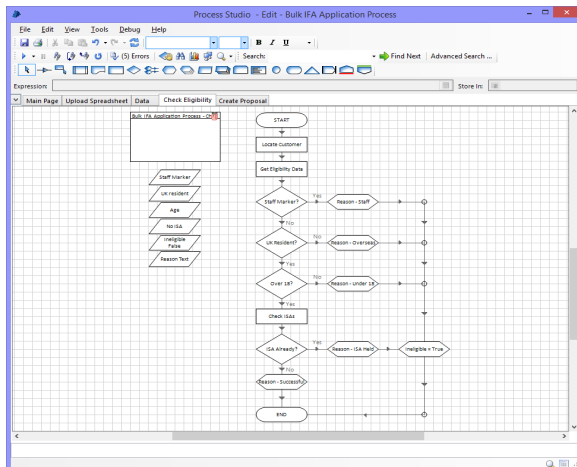
RPA software is an example of “lightweight” IT, a term used to describe front-end, commercially available software that supports processes and can be adopted largely outside the control of the IT department.<sup>3</sup> However, RPA cannot be deployed outside the control of IT completely. Our research shows that RPA must still be consistent with IT governance, security, architecture and infrastructure regulations.<sup>4</sup> RPA technology sits on top of existing systems—there is no need to create, replace or further develop expensive platforms. RPA software accesses other computer systems the way a human does—through the user interface with a logon ID and password. It accesses other systems through the presentation layer, which means the underlying business logic is not touched (see Figure 3). RPA products do not store any data. In contrast, BPM solutions interact with business logic and data access layers.

RPA does not replace BPM, but rather complements it (see Figure 4)—each is suited to automating different types of processes. BPM

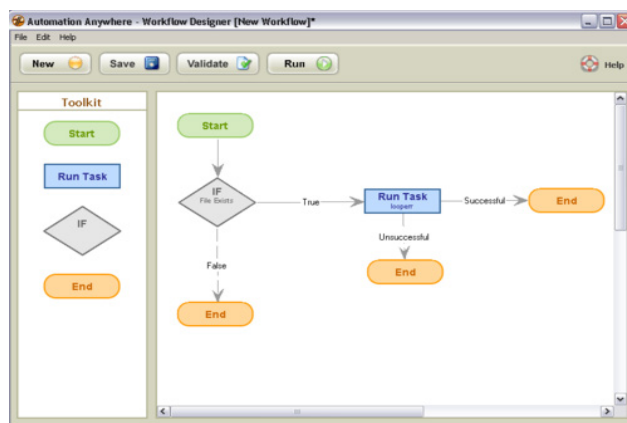
3 Bygstad, B. “The Coming of Lightweight IT,” *23rd European Conference of Information Systems*, Münster, Germany, 2015.

4 Willcocks, L. and Lacity, M. *Service Automation: Robots and the Future of Work*, Brooks Publishing, 2016.

Figure 2: User Interfaces for RPA Software

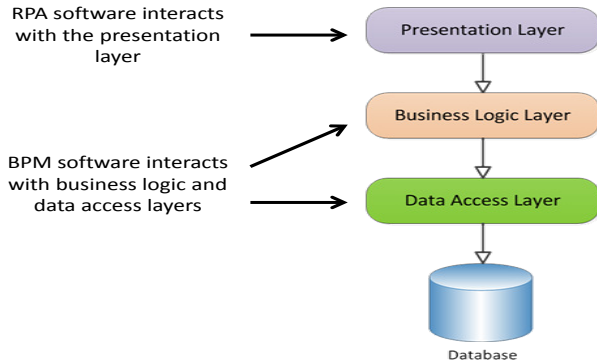


Blue Prism screenshot for development environment



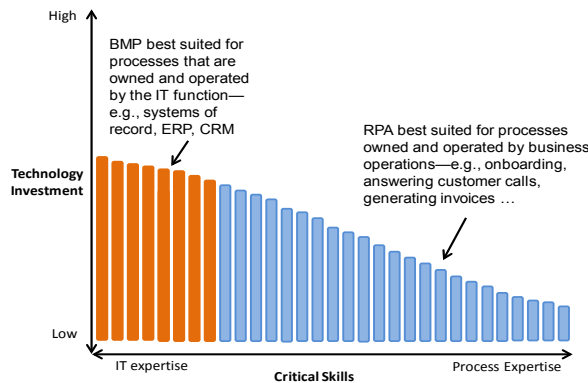
Automation Anywhere screenshot for development environment

**Figure 3: RPA as “Lightweight IT”**



solutions are developed by IT staff and are best suited for processes requiring IT expertise on high-valued IT investments like ERP and CRM systems.<sup>5</sup> The two distinguishing attributes of RPA software—designed for use by non-programmers and not disturbing existing systems—means the threshold of business processes worth automating is substantially

**Figure 4: RPA Complements BPM**



5 The following discuss the detailed software, data and technical architecture skills needed to use BPM solutions: Ravesteijn, P. and Zoet, M. “A BPM-Systems Architecture That Supports Dynamic and Collaborative Processes,” *Journal of International Technology and Information Management* (19:3), 2010, pp. 1-17; Wohed ,P., Russell, N., Hofstede, A., Andersson, B. and van der Aalst, W. “Patterns-based Evaluation of Open Source BPM Systems: The Cases of jBPM, OpenWFE, and Enhydra Shark,” *Information and Software Technology* (51:8), 2009, pp. 1187-1194; Chen, M., Zhang, D. and Zhou, L. “Empowering collaborative commerce with Web services enabled business process management systems,” *Decision Support Systems* (43:2), 2007, p. 530.

lowered, as illustrated by the blue “tail” in Figure 4.

With RPA, the “swivel chair” processes that are owned by operations and are too small to justify the use of IT development resources can be automated and deployed by operations personnel using their business and process expertise. IT developers are not involved in creating RPA solutions, although RPA software is deployed with IT oversight to ensure conformance with IT governance rules. The significantly lower IT investment cost of RPA makes it financially viable to automate many more processes. Pat Geary, chief marketing officer for Blue Prism, said, “We are not trying to replace enterprise IT, and we are not really trying to compete with BPM solutions. It’s the long tail of processes that are typically deployed by humans that are most suitable for RPA. Humans can be redeployed to more intelligent decision-making tasks.”

Based on interviews in 12 large organizations, Forrester Research found that enterprises benefit from both BPM and RPA technologies (see Table 1). Forrester argued that RPA complements BPM: “The trick is to put them together in the right combination to achieve your strategic goals.”<sup>6</sup>

**Table 1: BPM vs. RPA**

Attribute	BPM	RPA
Business goal	Reengineer processes	Automate existing processes
Technical outcome	Create a new application	Use existing applications
Integration method	Access business logic layer	Access the presentation layer of existing applications
Developers	Software developers	Business operations
Testing requirements	System testing	Output verification

Adapted from Forrester Research (2014)

6 *Building a Center of Expertise to Support Robotic Automation*, Forrester Research, February 2014.

**Table 2: O2’s 2015 RPA Capabilities at a Glance**

Number of processes automated	Number of RPA transactions per month	Number of robots (i.e., software licenses)	Number of FTEs saved or redeployed	Payback Period	Three-Year ROI
15 core processes	400,000 to 500,000	>160 and growing	Hundreds	12 months	Between 650% and 800%

## Our Research into RPA

Our research shows that early adopters of RPA are finding that automation can radically transform back offices, delivering much lower costs while improving service quality, increasing compliance (because everything the software does is logged) and reducing delivery time. But as with all innovations, organizations must learn to manage RPA adoption to achieve maximum results. Thus far in our research, we have studied 13 organizations that have adopted RPA (see the Appendix for more details). Because RPA is a new concept to CIOs and to other senior executives, it is helpful to examine one case of an early adopter in detail.

In this article, we present the case study of Telefónica O2’s implementation of RPA in its U.K. operations using Blue Prism software. (O2, a mobile telecoms company, is owned by Telefónica Group; from here on we refer to it just as O2.) The O2 case study is typical of the RPA implementations we have studied in that adoption occurred in business operations instead of the IT department (true for 11 of the 13 cases). It is also typical in that multiple business benefits were reported, including full-time equivalent (FTE) reductions, faster execution of services, ability to increase service volumes without adding staff and the ability to focus staff on higher-value work.<sup>7</sup> O2 is also interesting because it was one of the earliest adopters of RPA among our cases (it began its RPA journey in 2010).

Moreover, O2 (along with other early RPA adopters we have studied) made some initial mistakes that future adopters can avoid, such as deploying RPA software without involving the IT department. From the experiences of O2, and the other 12 cases, we have identified

<sup>7</sup> We also selected the O2 case because it was willing to be named; some companies in our study were sensitive to negative press about automation and asked to remain anonymous.

five “action principles.”<sup>8</sup> These principles are suggested practices that can be used by other businesses embarking on their own RPA journeys to achieving business value from RPA implementations.

## O2’s Pioneering RPA Journey

### Company Background

O2 is the second-largest mobile telecoms provider in the U.K. and is headquartered in Slough, 22 miles west of London. O2 began life in 1985 as Cellnet, a venture launched by BT Group and Securicor. In 1999, BT bought out Securicor and rebranded the company as O2 in 2002. In 2005, Telefónica bought O2 and retained the brand and management team and continued to base the company in the U.K.

Like other telecoms companies, utilities, banks, insurance companies and large retailers, O2 has a huge number of customers, and as a result, has multiple large-scale back-office processes. As of 2015, O2 had 24 million customers and operated over 450 retail stores.<sup>9</sup> In 2013, its U.K.’s revenues were €6.69 billion (about £4.8 billion or \$7 billion), and it employed 21,580 people. Like all large organizations, O2’s back-office processes needed to scale up to match business growth while keeping costs low to thrive in the highly competitive mobile communications market.

### RPA Outcomes at O2

To understand the business value achievable with RPA, we begin the O2 case study with the

<sup>8</sup> Action principles are suggested practices based on actions that produced desirable results or on actions to avoid because they produced less than desirable results in real-world implementations. Action principles are grounded in data and may be identified by research participants, researchers or both. See Susman, G. and Evered, R. “An Assessment of The Scientific Merits of Action Research,” *Administrative Science Quarterly* (23:4), 1978, pp. 582-603.

<sup>9</sup> <http://www.o2.co.uk/abouto2>.

outcomes achieved by O2. As of April 2015, O2 deployed over 160 “robots”—i.e., RPA software licenses—that process between 400,000 and 500,000 transactions each month, yielding a three-year return on investment of between 650% and 800% (see Table 2).

For some processes, RPA reduced the turnaround time from days to just minutes. As a consequence, customer “chase up” calls have been reduced by over 80% per year because fewer customers now need to inquire about the status of service requests. Scalability was another benefit—the number of robots could be doubled almost instantly when new products were about to be launched—and then scaled back down after the surge. We describe below how O2 achieve these outcomes.

## Transforming and Rationalizing Back-office Processes

Like many large organizations, O2’s back-office transformation began when it transferred work from the U.K. to India in 2004. Initially it “lifted and shifted” a significant amount of back-office work offshore to India by engaging a business process outsourcing (BPO) provider with a delivery center in Mumbai. By 2005, there were 200 FTEs working in India, while 98 FTEs remained in the U.K. By 2009, the headcount in India had grown to 375 FTEs, and the U.K. headcount had reduced to 50 FTEs. O2 was reaching the ceiling on extracting any more value from offshoring; there was not that much more work that could be moved to India. Furthermore, wages in India were rising, and the offshore contract did not incentivize the BPO provider to innovate. The contract was largely based on hourly wages, and the service levels were based on turnaround times and accuracy, not on reducing costs per transaction.

By 2010, the volume of offshore monthly transactions had grown from about 400,000 to over a million, resulting in a huge increase in O2’s back-office costs. Wayne Butterfield, who in 2010 was head of back-office services at O2,

recalled “*Low cost wasn’t so low anymore.*”<sup>10</sup> As a consequence, Butterfield’s mandate became: Do more work with less money. His vision was to reduce the FTE count by 50%, reduce average response time by 50% and reduce customer calls triggered by back-office failures by 50%. (If customers are serviced quickly and accurately, they don’t need to make follow-up calls.)

In 2010, O2 was managing over 60 core back-office processes (amounting to about 400 sub-processes). To reduce costs, the company began eliminating non-value adding processes and optimizing and simplifying the processes that remained. For example, it removed a legacy process that verified order shipments. The order process had become so mature that it was 99.99% accurate—the legacy verification process was no longer worthwhile. Butterfield explained, “*The verification was a process in place for people to check hundreds of thousands of orders, and they would potentially find just one that hadn’t gone out. That’s a really pointless process. It was there for many, many years, and no one had looked at its value.*” Another example of a redundant legacy process was verifying bar removal<sup>11</sup> from a customer’s account after swapping a SIM card. The bar removal process was automated, so the verification process made no sense. O2 eliminated that process as well.

In addition to eliminating processes, O2 also sought to optimize the remaining processes by simplifying them and by bringing some of the BPO provider’s people onshore so they could gain a better understanding of the processes. The entire two-year process-rationalization initiative—which included process elimination, simplification and optimization—reduced the back-office headcount by 10%.

## RPA Proof-of-Concept

During the two-year rationalization initiative, the possibility of automating processes surfaced when the Head of Finance told Butterfield about Blue Prism software. After an initial assessment

<sup>10</sup> This quote is from Burnett, S. “A Conversation with Wayne Butterfield, Head of Digital Service Innovation & Transformation at Telefónica,” *Everest Group Practitioner Perspectives*, EGR-2015-4-0-1422, 2015.

<sup>11</sup> A bar is a service that restricts a phone’s usage, for example to avoid additional charges when you travel outside your wireless service network. Or, if you lose your phone or it is stolen, you can call the mobile provider to add the stolen bar option, which prevents unauthorized use of your phone.

of Blue Prism’s capabilities, Butterfield decided in 2010 to conduct two pilot projects on high-volume, low-complexity processes to prove the concept.

The pilots were designed to answer three questions:

1. Will RPA integrate with O2’s systems of record without breaking them?
2. Will RPA technology provide quality services?
3. Will the technology provide enough of a return on investment?

The first RPA pilot was on SIM swaps—the process of replacing a customer’s existing SIM card with a new one but keeping the same number. The other was on the process for applying a pre-calculated credit to a customer’s account. People executed these processes using various software systems normally. For the pilots, Blue Prism’s consultants worked onsite and configured the RPA software to perform what people normally did to execute the processes. The RPA software was assigned a logon ID and password so it could log on, execute the tasks on test accounts that used actual data and log out of the systems, just as people did. The pilots were completed within two weeks.

The pilot trials provided a positive answer to the first question by proving that RPA technology could seamlessly work with O2’s systems and perform the process tasks as expected. In fact, the trial proved so effective that it triggered alarms in the IT security system: the RPA software executed so many transactions in such a short period of time that O2’s Fraud and Security team tried to hunt down the presumed intruder. When security traced the intrusion to Butterfield’s pilot project, he was nearly fired. Butterfield reminisced, *“Although it was scary to be escorted by the head of security into a private room, we had actually proved the RPA concept quite well!”*

The IT team had already developed very negative ideas about RPA. It had a mature in-house BPM system and questioned why additional automation software was needed. The IT team also incorrectly assumed that Blue Prism

was a “screen scraper”<sup>12</sup> package. Screen scrapers were an older technology that recorded users’ actions as they moved fields around systems. Screen scrapers only understood that a field located in one specific position on one screen should be moved to another specific position on another screen. If the field was moved without reconfiguring the screen scraper, the technology would no longer function. Butterfield explained, *“[The IT team viewed RPA as] screen scraping, which isn’t fit for enterprise use—[screen scraping leads to] macros [being] created by keyboard warriors left to their own devices in darkened rooms, [and to] unsupported macros that quite often need regular check-ups to keep them running. That was the stigma that we originally received from our colleagues in IT.”*<sup>13</sup> In contrast, Blue Prism’s RPA software does not rely on a field’s x and y screen coordinates but instead finds data fields through HTML, Java Access Bridge and surface automation for Citrix.<sup>14,15</sup>

According to Allen Surtees, at the time an O2 senior IT project manager, the biggest challenge IT managers faced was to understand the RPA technology. He said, *“The Architectural Review Board had a fear factor: Are we going to let customer service people develop code? I said, ‘No, no, they are not developing code.’ It’s hard to get your head around what RPA actually is.”* O2’s IT managers thought back-office automation should be IT projects using existing BPM technology. Specifically, the IT department wanted to test

12 According to Neil Wright, Blue Prism’s Director of Professional Services, screen-scraping was a poorly executed technology for a fundamentally sound idea to replicate how a user interacted with software. He explained, *“To teach the screen-scraper, all you did was set a recorder, and then you navigate around systems, and it recorded when the user copied data off of one screen and pasted it into another screen. The recorder remembered everything verbatim.”*

13 Quote from presentation during the Everest Group Webinar, “Service Delivery Automation: The Next Big Thing,” February 26, 2015.

14 For more information about Citrix and surface automation, see <http://info.genfour.net/blog/robotic-process-automation-is-more-than-an-application-interface-tool>.

15 Automation Anywhere’s RPA software can be instructed to find a field anywhere in a document. To find an invoice, for example, it can be instructed to find a field next to a text tag that has “invoice number,” “invoice #” or “invoice no.” If the software cannot confidently identify the invoice number with the pre-specified search terms, it presents what it thinks the invoice number is as an exception for human intervention. If the human confirms the guess with a touch of a button, the guess is incorporated in the RPA software going forward. Otherwise, the human has to find the invoice number and enter it into the RPA software.

whether BPM could achieve the same results as RPA.

An IT team was assigned to automate two processes with BPM technology. One was identical to the RPA trial (SIM swaps); the other was different but with similar attributes as the pre-credit calculation process. The BPM team successfully automated the two processes within three weeks, which was comparable to the RPA pilots. However, when it came to the financial cases, RPA was the clear winner. The financial discrepancy between the business cases for BPM and RPA was attributed to the additional IT headcount needed for BPM projects, which required IT developers and Scrum teams.<sup>16</sup> RPA projects required just the subject matter experts from the back office.

So the major development cost difference was due to the IT labor needed for BPM development. Although RPA had more upfront costs in terms of training for subject matter experts and short-term consulting support, the total cost of development was still lower with RPA. Butterfield said, *“Our projections showed that RPA for 10 automated processes would pay back in 10 months. In contrast, the BPM systems were going to take up to three years to payback.”*<sup>17</sup> The three-year business cases estimated zero net financial benefits with BPM and nearly £1 million (\$1.4 million) with RPA. Thus the pilots provided a positive answer to the second question by showing that RPA would deliver enough of a return on investment.

## RPA Rollout

After the pilot trials, RPA was selected as the obvious choice over BPM for automating routine back-office processes. Before automatically adopting Blue Prism as the software vendor, O2’s procurement policy required the head of back-office services to do a formal vendor search by issuing a request-for-proposal. Back in 2010, the only truly RPA response was from Blue Prism; the other five were from BPM solution providers. Blue Prism became part of O2’s technology offerings after the IT department verified the software met its governance requirements.

O2 asked its Indian-based BPO provider to consider doing the RPA development work on its behalf. Because the provider was paid based on FTE headcount, it would earn less money if it automated a process that reduced FTEs. However, O2 understood that the financial rewards from automating processes would need to benefit both parties and that it would need to financially compensate the provider for part of the loss to incentivize the provider to automate processes. But after a six-month investigation, the BPO provider backed off (no official reason was stated), and O2 chose to implement RPA on its own with the help of Blue Prism.

Two back-office staff members attended a week-long training program at Blue Prism’s headquarters.<sup>18</sup> After the training, a Blue Prism consultant worked alongside the trained staff members for about a month. From then on, Blue Prism support was reduced to once a week to review the staff members’ work. The staff members became nearly 100% independent of Blue Prism in about 12 weeks. On the ease with which business process people can master RPA, Butterfield said, *“So I think from having never automated a process before or having any qualifications that would even stipulate that they could do this type of thing, to automating processes end-to-end, probably took the guys about three months.”*

O2 began its rollout with 20 RPA software licenses. The next wave increased the number of licenses to 75. Eventually, a third staff member was trained. With this team of just three in-house RPA developers, O2 automated 15 core processes, including SIM swaps, credit checks, order processing, customer reassignment, unlocking, porting, ID generation, customer dispute resolution and customer data updates. These processes represented about 35% of all back-office transactions by the first quarter of 2015.

As the deployment of RPA spread, O2 learned that the software needs more explicit instructions than humans. An example relates to the announcement of the Apple iPhone. O2’s customers could pre-order iPhones, but in their enthusiasm, some pre-ordered multiple times. Whereas a human would likely recognize that a single customer is really requesting a single phone, the RPA software did not and multiple

<sup>16</sup> Scrum is a lightweight agile project management framework used for software development.

<sup>17</sup> Burnett, S., op. cit., 2015.

<sup>18</sup> Since then, Blue Prism’s training is mostly online.



phones were shipped to customers. Butterfield said O2 learned that *“In processes that we felt had hard and sufficient rules around them, we have found that when [we automated them with] RPA and completely removed humans, we had to implement additional ‘common sense’ type rules not needed previously.”*

It is difficult to assess accurately the total FTE savings resulting from RPA over time because some of O2’s U.K.-based people were redeployed to other service areas, and the business continued to grow. But the estimated FTE savings are in the hundreds. Butterfield reported, *“Not only have we saved FTE in the back office, we’re now actually saving FTE in the front office as a result of those reduced calls. And then lastly, customer experience. It’s very difficult to measure from a customer experience perspective what benefits we’ve had by using RPA. But with reduced turnaround times and reduced calls, how can experience not have improved?”*<sup>19</sup>

Despite the high levels of automation enabled by RPA, O2 continued to have a good relationship with its Indian-based BPO provider. Although the provider’s FTEs required for the automated processes had reduced by a few hundred, it continued to deliver the non-automated back-office processes with about 250 FTEs. (Without automation, the offshore FTE headcount in 2015 would be closer to 500 because of O2’s growth since 2010.) In addition to back-office processes, the BPO provider also handles nearly all of O2’s email and web chat services. In total, it had about 900 FTEs supporting O2 in the first quarter of 2015.

### The Future of RPA at O2

As of 2015, RPA was processing between 400,000 and 500,000 transactions each month. O2 is planning to continue to automate processes with RPA and estimates RPA volumes could increase to 700,000 per month or more. Butterfield said, *“We’re certainly not at the end state yet.”*<sup>20</sup>

## RPA Action Principles

As an early adopter of RPA, O2 and some of our other case studies offer five action principles for other companies considering RPA. These action

principles are robust in that they were suggested by companies operating in different industries (see the table in the Appendix). The companies also automated different specific processes, but all the automated processes fall into the category of structured “swivel chair tasks.”

### 1. Test RPA Capabilities with a Controlled Experiment

Back in 2010, O2 did what most companies do when they are considering the adoption of a new technology: they did a proof-of-concept of RPA. This involved small-scale pilot trials that aimed to test the technical viability and financial value of the RPA product. An interesting twist extended the proof-of-concept into a controlled experiment when O2’s IT department claimed that its BPM software could do everything the RPA software could do. This experiment allowed O2 to directly compare RPA with BPM. Functionally, the solutions were nearly identical, but RPA delivered better financial value for the types of “swivel chair” processes O2 aimed to automate. Note, however, that BPM would likely have been the victor if the automation required recoding business logic or data access layers.

Some companies we studied (including O2 initially), asked their outsourcing service providers to implement RPA on their behalf. In prior research, we also found that a controlled experiment is the best way to assess provider capabilities.<sup>21</sup> Giving two RPA service providers the same process to automate in a controlled experiment is an excellent way to compare their capabilities.

### 2. Develop Criteria for Determining Which Processes Can Be Automated

Potential adopters of RPA often ask how they can assess the suitability of their processes for RPA. Although RPA is new to many organizations, shared services and outsourcing (SS/O) are long-standing practices that can serve as a starting point for understanding the suitability of RPA for existing processes. Based on years of research, it is well known that the processes most suitable for moving to SS/O are those that have high volumes,

<sup>19</sup> Everest Group Webinar, op. cit., 2015.

<sup>20</sup> Ibid.

<sup>21</sup> For an example of a controlled experiment of two service providers, see Lacity, M., Willcocks, L. and Burgess, A. *The Rise of Legal Services Outsourcing*, Bloomsbury, 2014.

because high-volume processes provide the most opportunity for reducing costs.<sup>22</sup>

The easiest processes to move to SS/O also have high degrees of process standardization so that all of the company's business units expect the same service.<sup>23</sup> Processes that are highly rules-based are also easier to migrate to SS/O because rules can be documented, which results in lower knowledge transfer costs compared to processes that require tacit knowledge transfer.<sup>24</sup> Mature processes are also easier to move to SS/O because they are measured, well-documented, stable and predictable, and their costs are known.<sup>25</sup> High levels of process interoperability across many platforms are easier to migrate to SS/O.<sup>26</sup> Some processes are difficult to move to different jurisdictions because of compliance risks.<sup>27</sup> Highly integrated processes that are tightly coupled and difficult to detach from other processes are

also harder to migrate to SS/O.<sup>28</sup> The degree of business value is also a factor on whether to move a process to SS/O. Academic research shows that the most critical processes are often insourced close to the business.<sup>29</sup>

Can these attributes for deciding which processes are suitable candidates for SS/O also be used to decide which processes are suitable for RPA? As with SS/O, RPA experts and early adopters report that RPA is most suitable for processes with high transaction volumes and high levels of standardization, and are highly rules-based and mature.<sup>30</sup> However, RPA can deal effectively with complex processes as long as the complexity is defined as requiring compound steps and the control of many variables. (Some researchers define complex processes as ones where cause and effect are subtle and dynamic; such processes would not be ideally suited for RPA.<sup>31</sup>)

One of the advantages of RPA is that it is highly interoperable and can readily run on any platform—mainframes, client/server or cloud systems. RPA only requires access to the presentation layer—i.e., the screens the user

22 For a study that summarizes processes suitable for outsourcing, see Lacity, M. and Willcocks, P. *Advanced Outsourcing Practice: Rethinking ITO, BPO, and Cloud Services*, Palgrave, 2012. For a study that looks at processes suitable for shared services, see McKee, J. and Smith, H. "Creating IT Shared Services," *Communications of the AIS* (29:34), 2011, pp. 645-656.

23 For studies on outsourcing standardized processes, see McIvor, R., McCracken, M. and McHugh, M. "Creating outsourced shared services arrangements: Lessons from the public sector," *European Management Journal* (29:6), 2011, pp. 448-461; Sako, M. "Technology Strategy and Management Outsourcing Versus Shared Services," *Communications of the ACM* (53:7), 2010, pp. 126-129.

24 For example, see Srikanth, K. and Puranam, P. "Integrating Distributed Work: Comparing Task Design, Communication, and Tacit Coordination Mechanisms," *Strategic Management Journal* (32:8), 2011, pp. 849-875.

25 See Bidwell, M. "Politics and Firm Boundaries: How Organizational Structure, Group Interests, and Resources Affect Outsourcing," *Organization Science* (23:6), 2012, pp. 1622-1642; Lacity, M. and Fox, J. "Creating Global Shared Services: Lessons from Reuters," *MIS Quarterly Executive* (7:1), 2008, pp. 17-32.

26 See Sia, S., Koh, C. and Tan, C. "Strategic Maneuvers for Outsourcing Flexibility: An Empirical Assessment," *Decision Sciences* (39:3), 2008, pp. 407-443; Tanriverdi, H., Konana, P. and Ge, L. "The Choice of Sourcing Mechanisms for Business Processes," *Information Systems Research* (18:3), 2007, pp. 280-299.

27 See Currie, W., Michell, V. and Abanishie, A. "Knowledge Process Outsourcing in Financial Services: The Vendor Perspective," *European Management Journal* (26:2), 2008, pp. 94-104; Desai, D., Gearard, G. and Tripathy, A. "Internal Audit Sourcing Arrangements and Reliance by External Auditors," *Auditing: A Journal of Practice and Theory* (30:1), 2011, pp. 149-171; Dunbar, A. and Phillips, J. "The Outsourcing of Corporate Tax Function Activities," *The Journal of the American Taxation Association* (23:2), 2001, pp. 35-49; Mathew, S. "Mitigation of risks due to service provider behavior in offshore software development: A relationship approach," *Strategic Outsourcing: An International Journal* (4:2), 2011 pp. 179-200.

28 See Luo, Y., Wang, S., Zheng, Q. and Jayaraman, V. "Task attributes and process integration in business process offshoring: A perspective of service providers from India and China," *Journal of International Business Studies* (43:5), 2012, pp. 498-524; Jayaraman, V., Narayanan, S., Luo, Y. and Swaminathan, J. M. "Offshoring business process services and governance control mechanisms: An examination of service providers from India," *Production and Operations Management* (22:2), 2013, p. 314; Narayanan, S., Jayaraman, V., Luo, Y. and Swaminathan, J. "The antecedents of process integration in business process outsourcing and its effect on firm performance," *Journal of Operations Management* (29:1-2), 2011, pp. 3-16.

29 See McIvor, R., Humphreys, P., McKittrick, A. and Wall, T. "Performance Management and the Outsourcing Process: Lessons from a Financial Services Organisation," *International Journal of Operations and Production Management* (29:10), 2009, pp. 1025-1047; Ventovuori, T. and Lehtonen, T. "Alternative Models for the Management of FM Services," *Journal of Corporate Real Estate* (8:2), 2006, pp. 73-90; Wahrenburg, M., Hackethal, A., Friedrich, L. and Gellrich, T. "Strategic Decisions Regarding the Vertical Integration of Human Resource Organizations," *International Journal of Human Resource Management* (17:10), 2006, pp. 1726-1771.

30 Discussion from The Robotic Automation Advisory Council, Chicago, Illinois, April 14, 2015.

31 For a comprehensive set of process complexity measures, see Day, A. "On Process Complexity," *Proc. Fifteenth Computing: the Australasian Theory Symposium (CATS 2009)*, Wellington, New Zealand, CRPIT, 94, Downey, R. and Manyem, P., Eds., ACS, 2009, pp. 29-34; Shen, W. H., Hsueh, N. L. and Chu, P. H. "Measurement-based Software Process Modeling," *Journal of Software Engineering* (5:1), 2011, pp. 20-37; Gruhn, V. and Laue, R. "Complexity Metrics for Business Process Models," University of Leipzig working paper, available at <http://czm.fel.cvut.cz/research/BPM%20Research%20knihovna/Complexity%20Metrics%20for%20Business%20Process%20Models.pdf>.

sees. RPA software can be configured to log on to many systems and execute tasks. Early adopters of RPA have reported that compliance risks are minimal because every action executed by the RPA software is logged and thus auditable.<sup>32</sup> Derek Toone, Managing Director at Alsbridge, Inc. (a provider of RPA advisory services) suggested, “The degree of business value inherent in the process is worth considering in situations where significantly increasing the speed or accuracy with which a process is executed can yield outsized benefits to the business, for example in terms of enhancing speed to market, product quality, customer satisfaction, regulatory compliance, etc.”

While these general process attributes offer sound advice for determining which processes are candidates for automating, O2 developed a simple heuristic—a process can be automated if automation can save at least three FTEs. Butterfield explained, “There are a lot of processes that require less than half an FTE a month. And we’re probably always going to keep those in the back office because even though the commercials are very good for RPA, there’s no point at the moment in automating a process that saves you less than three FTEs.” O2’s excellent management information enables Butterfield to identify

32 Panel discussion in “The Impact of Robotic Process Automation on BPO,” *Automation Innovation Conference*, New York City, December 10, 2014.

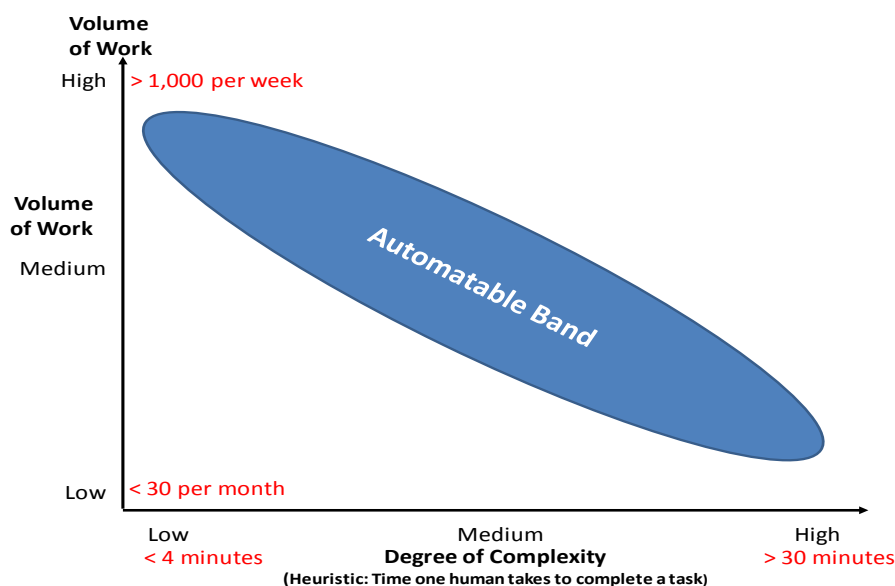
candidate processes for automation that will save at least three FTEs. He said, “The management information I receive from my BPO provider’s work allocation system is phenomenal. I can tell you to the zero point zero zero of an FTE what I’m going to save when I automate a process. I know to the second how long that process has taken to complete over a number of years.”

To determine which processes are candidates for saving three FTEs, O2 uses volume of transactions and process complexity as guides (see Figure 5). Time serves as a proxy for assessing process complexity. A human can complete a simple process in a few minutes. A complex process may take 30 minutes or more. Although O2 tended to select simple processes with around at least 1,000 transactions per week for automation, Butterfield explained how complex processes can be automated to generate savings: “If you were to automate a complex process, you may only be doing 30 of those a day, but automation would still deliver the three FTE savings that you’re looking for.”

### 3. Bring IT Onboard Early

O2, like some of the other RPA early adopters we studied, initially deployed RPA without involving IT. Butterfield almost lost his job because he did not inform IT or other parts of the organization that he was testing new software.

Figure 5: O2’s Assessment of RPA Suitability



In O2, and in other cases we have studied, the reasons for excluding IT at the outset were: (1) the RPA program was seen as a business operations program since it required process and subject matter expertise, not IT programming skills; and (2) fears that IT would encumber the adoption with bureaucracy. In most cases, hindsight indicated that not involving IT early on was a mistake; RPA adopters learned the value of involving the IT department from the beginning. Their suggested action principle is “Bring IT onboard early.”

RPA providers also suggest that IT should be brought onboard early. Certainly, this was the lesson Blue Prism took from its work at O2. Blue Prism’s Pat Geary said, *“The minute we engage with business owners, we insist on speaking with the IT function. When we talk to IT, we explain that we have a product that is designed to appease their requirements for security, scalability, auditability and change management.”*

O2 reported that the Blue Prism software was resilient and stable. (Butterfield said he could count on one hand the number of times it had gone down in five years.) However, O2’s internal IT infrastructure that runs the software incurred significant launch problems and growing pains, which could have been avoided if the IT department had been involved earlier. To start with, O2 decided to run Blue Prism on virtual machines (VMs) where a “lead” VM machine orchestrated all the robots.<sup>33</sup> But initially the RPA processes ran two to three times slower than when people were executing them. O2 had to change server, database and system locations to increase processing speed. Butterfield explained, *“Having a virtual infrastructure in Glasgow, for example, when your systems are down south in London and Slough, makes a difference.”*<sup>34</sup> It took about 16 weeks to optimize the infrastructure.

Once optimized, O2 learned that it needed to scale up the infrastructure as the RPA adoption scaled. A “lead” VM machine worked fine when there were 20 RPA software licenses deployed, but it imploded when the number of licenses quadrupled. Butterfield mused, *“It was like driving a Ferrari with a lawn mower engine.”*

<sup>33</sup> Blue Prism can run on the cloud, but O2 had decided (as of 2015) to keep the virtual machines in-house because it’s not yet made the leap to move away from its own server centers.

<sup>34</sup> Burnett, S., op. cit., 2015.

Since O2’s initial RPA adoption, VM desktop technology has advanced considerably, and Blue Prism has developed technical guidelines to minimize network latency. Neil Wright, Blue Prism’s Director of Professional Services, explained, *“We obviously learn with our clients. We have refined our infrastructure data sheets so that clients coming on board don’t experience the problems O2 initially had. We have clients now who are running virtual workforces bigger than O2’s without any problems.”*

Several other of our case studies reported that their IT departments facilitated RPA adoption by assessing the software’s “enterprise worthiness”—as one organization called it—and by configuring the IT infrastructure so it runs smoothly, even when the RPA solution was owned and governed by business operations. For example, one manager in charge of shared business services for a global financial services company asked the IT department to vet the different RPA providers’ software and to select the RPA provider for him. He said, *“IT did a lot of work for me.”* Two managers in charge of business services (one from an insurance company, the other from a healthcare company) said their IT departments were in a better position than business operations to ensure the RPA software complied with IT security, auditability and change management policies.

#### 4. Communicate the Intended Effect on Jobs Early in the Process

As with any automation technology, some employees will feel threatened by RPA. At O2, there was fear initially among back-office and IT personnel. According to Allen Surtees, an O2 Senior IT Project Manager at the time, *“People start fearing that this technology is going to take my job away. It’s not only the people in operations; the software developers also think it’s going to take their jobs away.”* At O2, fears were assuaged because RPA was used to reduce FTEs in the outsourced relationship; no internal jobs were directly threatened.

O2’s approach to removing fears about job security is typical in our research thus far. The operations groups adopting RPA had promised their employees that automation would not result in layoffs. Instead, automation was used only for the structured “swivel chair” tasks associated

with a job, and workers were redeployed to do more interesting work. Once that job assurance was given, knowledge workers did not feel threatened by automation—they embraced it and view the “robots” as teammates. For example, in our case study of Xchanging, knowledge workers named the robots, drew physical depictions of them and even invited them to office parties.<sup>35</sup>

Prior research on outsourcing and offshoring found that communicating the intended effect on jobs early in the process was by far the best practice,<sup>36</sup> and this should apply also to situations where RPA will be used to significantly reduce internal headcount. With outsourcing and offshoring, CIOs have often been reluctant to share the sourcing strategy until all the details were planned, reasoning it would be better to have most of the answers prepared before making an official announcement. However, many case studies have shown that delaying communication caused staff members to panic and to sabotage the outsourcing/offshoring initiatives because they overestimated the effects on jobs. The best time to announce outsourcing and offshoring was when CIOs were ready to search for service providers. Extrapolating from that lesson, the best time to communicate that the organization is considering RPA is at the proof-of-concept/controlled experiment stage.

## 5. Exploit New Automation Sourcing Options

In 2010, O2 did not have many sourcing options for RPA, both for the software itself and for developing the automation applications. Initially, O2 approached its offshore BPO provider to see if it would develop automation capabilities and proposed that financial gains from automation would be shared with the provider. At the time, the BPO provider’s business model relied primarily on labor arbitrage, so it ultimately decided to pass on the automation opportunity. But other organizations now looking at RPA have more sourcing options to choose among, including:

- *Insource*: buy RPA licenses directly from an RPA software provider
- *Insource and consulting*: buy licenses directly from an RPA software provider, and engage a consulting firm for services and configuration
- *Outsource with a traditional BPO provider*: buy RPA as part of an integrated service delivered by a traditional BPO provider
- *Outsource to an RPA provider*: buy RPA from the new breed of RPA outsourcing provider
- *Cloud-source*: buy RPA as a cloud service (this option is still emerging).

When O2 began its RPA journey in 2010, BPO providers and advisors did not offer RPA services, so its only option was to insource. The benefits of the insourcing option are that the organization has high levels of control and keeps all the cost savings.

Today, many traditional BPO providers have developed significant automation capabilities, including Xchanging, Accenture, IBM, Tata Consultancy Services and Genpact. The benefits of engaging a traditional BPO provider include a full suite of integrated services that combine labor arbitrage, process excellence, change management maturity and technology expertise. New RPA providers such as Genfour and Symphony are also emerging. Genfour, for example, is a licensed reseller of Blue Prism and Celeron RPA software. Sarah Burnett, Everest Group’s Vice President of Research, commented on the different sourcing options: *“The open question is whether the service providers will be asked to provide the toolsets for automation or if their clients will prefer to license commercial tools themselves and just utilize the service providers’ expertise to implement and optimize automation. Fears of technology lock-in may drive a preference to separate tools from services. ... There is also the rise of the new breed of service providers to consider. These are entirely focused on automated service delivery and could drive growth in consumption-based contract models.”*

## Concluding Comments

CIOs and other IT professionals have a key role to play in assessing and supporting Robotic

35 See Lacity, M. and Willcocks, L. “What Knowledge Workers Stand to Gain from Automation,” *Harvard Business Review Online*, June 19, 2015.

36 Lacity, M. and Rottman, J. *Offshore Outsourcing of IT Work*, Palgrave, 2008, pp. 20-22.

Process Automation. By understanding RPA's capabilities, the IT department can become an advisor to business operations, rather than being viewed as bureaucratic "buzz-kills." Even if RPA is "owned" by the business, IT governance is vital to ensure that RPA processes have been validated and the IT infrastructure is optimized. Sarah Burnett said, "*Optimization of virtualization in the run time environment matters. Poor optimization can make robots slower than people.*" Allen Surtees, who has since left O2 to help another organization with automation, concluded, "*The biggest lesson about starting the RPA journey is that it should be a cojoined collaboration between IT and the business.*" In his new position, he immediately engaged the IT department to help him develop the vision for automating back-office services before launching the RPA initiative.

## Appendix: Research Objectives and Methods

Our research aim is to assess the current and long-term effects of business services automation on organizations. While using software to automate work is not a new idea, recent interest in service automation has escalated with the introduction of new technologies, including Robotic Process Automation (RPA) and Cognitive Intelligence (CI) tools. However, many potential adopters of the new types of service automation tools remain skeptical about the claims for their promised business value. Potential adopters need to hear about actual and realistic adoption stories. We aim to educate potential adopters by objectively researching actual RPA and CI implementations in firms, by assessing what the software can and cannot yet do, and by extracting action principles on realizing its value.

The O2 case study of RPA adoption is the first one we have completed within the larger research program. The content for this case was

Client organization name or pseudonym	Industry	Client head-quarters	RPA first adopted in	First processes automated
O2	Mobile telecoms	U.K.	Business operations	SIM swaps Pre-calculated credit
Xchanging	Traditional BPO provider	U.K.	Business operations	Premium advice notices
Utility	Electricity and gas	Germany	Business operations	Meter reading feasibility checks
Ascension MSC	Healthcare	U.S.	Business operations	Employee record updates
VHA	Healthcare	U.S.	IT department	Web crawls for product descriptions
Virgin Trains	Public transport	U.K.	Business operations	Incoming customer correspondence
Associated Press	Media	U.S.	Business operations	Corporate earnings reports
Healthcare company	Healthcare	U.K.	Business operations	Patient registration
Building Society	Financial services	U.K.	Business operations	Mortgage lending and savings
Consulting company	Consulting	France	Business operations	Still considering pilot options
Energy company	Natural gas	Russia	Business operations	New customer registration
Finance company	Financial services	U.K.	Business operations	Payroll verification
Insurance company	Insurance services	U.K.	IT department	Pension enrollment

based on interviews with representatives from O2 and Blue Prism, the RPA software provider, as well as with advisors who are quickly gearing up to understand the emerging RPA space. The lead author also went through Blue Prism's foundational training.

We have also studied 12 other RPA adoption implementations (listed in the table below) and conducted a survey of attendees at the 2015 Outsourcing World Summit on service automation adoption practices.

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